



Sonoma Technology, Inc.  
*Innovative Environmental Solutions*

# **Forty-First Quarterly Report of Ambient Air Quality Monitoring at Sunshine Canyon Landfill and Van Gogh Elementary School**

December 1, 2017 – February 28, 2018

Quarterly Report  
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## Executive Summary

### ES-1. Background

Continuous monitoring of meteorological and air quality parameters began at the Sunshine Canyon Landfill (Landfill site) and at Van Gogh Elementary School (Community site) in the nearby community of Granada Hills in fall 2007. At these sites, particulate matter less than 10 microns in aerodynamic diameter (PM<sub>10</sub>), wind speed (WS) and wind direction (WD), and black carbon (BC), as a surrogate for diesel particulate matter (DPM) are measured. The collected data are validated and evaluated for completeness quarterly. Monitoring is conducted to fulfill stipulations in the City of Los Angeles' Conditions of Approval for the expansion of the landfill.<sup>1</sup> Similar conditions cover the County of Los Angeles' portion of the landfill.<sup>2</sup>

PM<sub>10</sub> concentrations are compared with federal and state PM<sub>10</sub> standards. When PM<sub>10</sub> concentrations are above the standard (i.e., an exceedance), additional comparisons are made with the historical, regional, and annual ambient PM<sub>10</sub> concentrations. The PM<sub>10</sub> and BC data are analyzed annually to characterize the impact of landfill operations on ambient air quality as observed at the Community site. The validated hourly data and a summary of the analytical results and field operations are reported to the Planning Department of the City of Los Angeles and to the Los Angeles County Department of Regional Planning. This Forty-First Quarterly Report summarizes the December-February (2018 winter quarter) monitoring results from the eleventh year of continuous monitoring.

In June 2017, a project was approved to replace the Landfill site trailer because deteriorating conditions of the existing trailer were impacting air quality and meteorological measurement equipment and operations. The goal of this project was to replace the existing Landfill trailer with the recently decommissioned Landfill North site<sup>3</sup> trailer before rain events could impact the trailer transfer process and compromise air quality equipment within the existing unit. However, due to delays in site approval and preparation, rain events in early January 2018 caused damage to the PM<sub>10</sub> instrument, which was sent to the manufacturer for repair. Because of the damage, PM<sub>10</sub> measurements were unavailable as of January 9, 2018. The trailer replacement project, including moving the meteorological tower, began February 19, 2018 (date on which the BC and meteorological instruments went offline) and was completed March 5, 2018. PM<sub>10</sub> and BC measurements resumed February 22, 2018, and meteorological measurements resumed March 5, 2018.

### ES-2. Statistics

For this quarter, the percent data capture for PM<sub>10</sub> was 52.4% at the Landfill site and 100.0% at the Community site. As mentioned above, PM<sub>10</sub> data capture at the Landfill site was uncharacteristically low this quarter because of the equipment damage caused by the deteriorated trailer conditions and weather-related events. Approximately 8% of the captured

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<sup>1</sup> Section C.10.a of Ordinance No. 172,933

<sup>2</sup> County Condition 81

<sup>3</sup> Installed in December 2015 and decommissioned on May 31, 2017

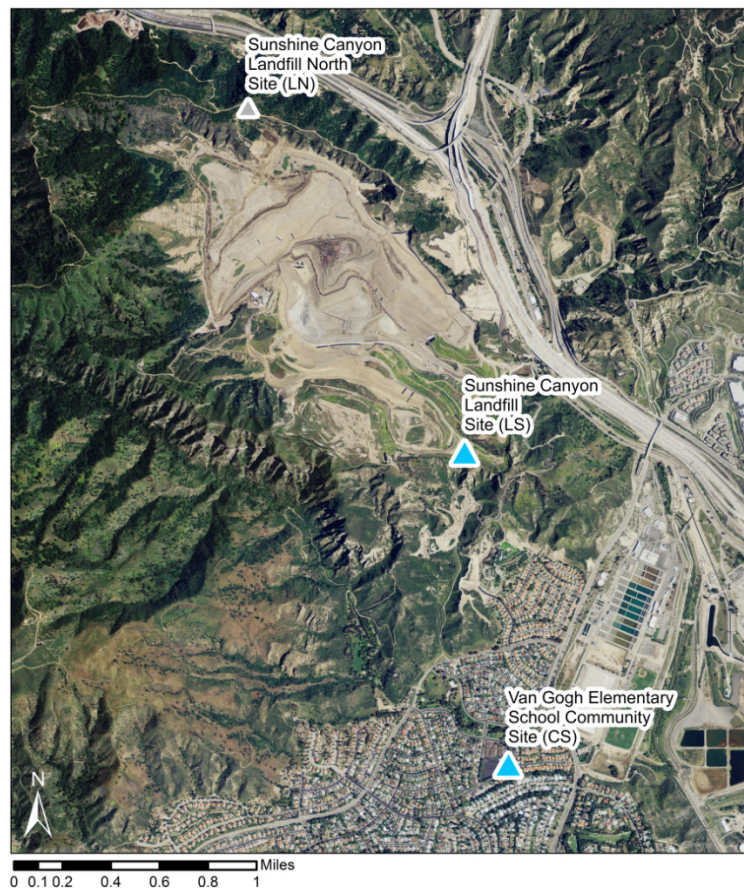
PM<sub>10</sub> data were invalidated at the Landfill site, and approximately 5% were invalidated at the Community site. No hourly PM<sub>10</sub> values were deemed suspect at either of the monitoring sites in this quarter. Hourly BC data capture was 82.5% at the Landfill site and 95% at the Community site. Approximately 0.2% and 0.1% of hourly BC data were invalidated at the Landfill and Community sites, and no values were deemed suspect.

During this quarter, the state 24-hr PM<sub>10</sub> standard (50 µg/m<sup>3</sup>) was exceeded on 26% of days (11) at the Landfill site and 5% of days (4) at the Community site. There were two exceedances of the federal 24-hr PM<sub>10</sub> standard (150 µg/m<sup>3</sup>) at the Landfill site, and no exceedances at the Community site. This matches the largest proportion of days exceeding the 24-hr PM<sub>10</sub> federal standard at the Landfill site during the winter quarter since the baseline year. Note that the number of days with measurements at the Landfill site during this quarter is the lowest (43 days) in the eleven years of monitoring because of the instrument damage and downtime during trailer replacement.



## 1. Introduction

This report summarizes data completeness, ambient particulate matter less than 10 microns in aerodynamic diameter ( $PM_{10}$ ) concentrations, average and maximum ambient black carbon (BC, a surrogate for diesel particulate matter [DPM] concentrations), instrument flow rate verification (quality control) data, and field operations for the quarterly period of December 1, 2017, through February 28, 2018. The collected data are validated and evaluated for completeness quarterly. This is the eleventh consecutive year that data were collected in the winter from continuous monitors at the Sunshine Canyon Landfill site (LS; previously called the Berm site) and the Van Gogh Elementary School Community site (CS). The monitoring site locations are shown in **Figure 1**.  $PM_{10}$  is measured with a beta attenuation monitor (BAM), and BC is measured with an Aethalometer. The Sunshine Canyon Landfill North (LN) monitoring site shown in Figure 1 was installed in December 2015 and decommissioned on May 31, 2017.



**Figure 1.** View of Sunshine Canyon Landfill and the surrounding monitoring stations (blue triangles): Sunshine Canyon Landfill (LS) and Community site (CS). The Sunshine Canyon Landfill North site (LN, gray triangle) collected data from December 1, 2015, through May 31, 2017, and has since been decommissioned.

Monitoring is conducted to fulfill stipulations in the City of Los Angeles' Conditions of Approval for the expansion of the landfill.<sup>4</sup> Similar conditions cover the County of Los Angeles' portion of the landfill.<sup>5</sup>

In June 2017, a project was approved to replace the Landfill site trailer because deteriorating conditions at the existing trailer were impacting air quality and meteorological measurement equipment and operations. The goal of this project was to replace the existing Landfill trailer with the recently decommissioned Landfill North site trailer before rain events could impact the trailer transfer process and compromise air quality equipment within the existing unit. However, due to delays in site approval and preparation, rain events in early January 2018 caused damage to the PM<sub>10</sub> instrument, which was sent to the manufacturer for repair. Because of the damage, PM<sub>10</sub> measurements were unavailable as of January 9, 2018. The trailer replacement project, including moving the meteorological tower, began February 19, 2018 (date on which the BC and meteorological measurements went offline) and was completed March 5, 2018. PM<sub>10</sub> and BC measurements resumed February 22, 2018, and meteorological measurements resumed March 5, 2018.

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<sup>4</sup> Section C.10.a of Ordinance No. 172,933

<sup>5</sup> County Condition 81

## 2. Data Completeness

Completeness statistics for all measured variables during the 2018 winter quarter are shown in **Table 1**. Data deemed as suspect are included in subsequent analyses (e.g., regional comparisons), while invalid data are not. The percent data capture for PM<sub>10</sub> was 52.4% at the Landfill site and 100.0% at the Community site. PM<sub>10</sub> data capture at the Landfill site was uncharacteristically low this quarter because of the equipment damage caused by the deteriorated trailer conditions and weather-related events. Approximately 8% and 5% of the captured PM<sub>10</sub> data were invalidated at the Landfill and Community sites, respectively. PM<sub>10</sub> data invalidated at the Landfill and Community sites were primarily due to instrumentation flow issues and secondary checks; no hourly PM<sub>10</sub> values were deemed suspect at either of the monitoring sites in this quarter.

**Table 1.** Data completeness statistics for hourly BC, hourly PM<sub>10</sub>, and 1-min wind speed and wind direction data for the 2018 winter quarter monitoring period.

Monitoring Location	Dates	Data Capture (%) <sup>a</sup>			Data Valid or Suspect (%) <sup>b</sup>			Data Suspect (%) <sup>c</sup>		
		PM <sub>10</sub>	BC	WS/WD	PM <sub>10</sub>	BC	WS/WD	PM <sub>10</sub>	BC	WS/WD
Sunshine Canyon Landfill (LS)	12/01/17-02/28/18	52.4	82.5	93.5	92	99.8	94.1	0.0	0.0	0.1
Community Site (CS)	12/01/17-02/28/18	100.0	95	100.0	95	99.9	98.9	0.0	0.0	0.0

<sup>a</sup> Data Capture is the number of collected data values divided by the total number of expected data intervals during the date range indicated in the “Dates” column (e.g., for the raw BC 1-hr data, 24 data values per day are expected), multiplied by 100

<sup>b</sup> Data Valid or Suspect is the number of data values that are either valid or suspect divided by the number of captured data values, multiplied by 100.

<sup>c</sup> Data Suspect is the number of data values labeled as suspect divided by the number of captured data values, multiplied by 100.

Hourly BC data capture was 82.5% at the Landfill site and 95% at the Community site. Most of the BC data loss this quarter was due to the downtime associated with the trailer replacement project. Approximately 0.2% and 0.1% of hourly BC data were invalidated at the Landfill and Community sites, while no values were deemed suspect.

The wind data capture percentages were 93.5% and 100.0% at the Landfill and Community sites, respectively. Most of the wind data loss at the Landfill site was due to software communications issues<sup>6</sup> and the trailer replacement project. Approximately 5.9% of the data were invalidated at the Landfill site, with 0.01% of the data deemed suspect. Approximately 1.1% of the data were invalidated at the Community site, though no data were deemed suspect.

<sup>6</sup> The data collection software is no longer supported by the manufacturer and needs to be updated; a software replacement request is under consideration.

### 3. PM<sub>10</sub> Exceedances

The federal and state PM<sub>10</sub> exceedances for the winter quarter of the baseline year (2002), the winter quarters of the previous ten years (2008–2017), and the current winter quarter (2018) are summarized in **Table 2**. In this quarter, the percentage of days on which the state PM<sub>10</sub> standard of 50 µg/m<sup>3</sup> was exceeded was 5% (4 days) at the Community site and 26% (11 days) at the Landfill site. This is the largest proportion of days exceeding the state PM<sub>10</sub> standard at the Landfill site during the winter quarter since the baseline year. The number of days measured at the Landfill site during this quarter is the lowest (43 days) in the eleven years of monitoring because of the instrument damage and downtime during trailer replacement.

There were two exceedances of the federal 24-hr PM<sub>10</sub> standard of 150 µg/m<sup>3</sup> during the 2018 winter quarter at the Landfill site. These exceedances occurred on December 5 and December 17, 2017. This matches the largest number of exceedances of the 24-hr PM<sub>10</sub> federal standard in a winter quarter on record at this site. There were no exceedances of the federal 24-hr PM<sub>10</sub> standard at the Community site.

**Table 2.** Number of exceedances of federal and state 24-hr PM<sub>10</sub> standards during the winter quarters of the baseline year (2002) and each year from 2008 to 2018. In the “Federal 24-hr” column, the values are number of exceedances and the date(s) on which those exceedances occurred. In the “State 24-hr” column, the values are number of exceedances/total days on which valid 24-hr averages were measured, and the percentage of exceedances out of the total number of days on which valid 24-hr average PM<sub>10</sub> concentrations were measured. The most recent winter quarter is shown in bold.

Site	Quarter Period	Quarter Name	Exceedances of PM <sub>10</sub> Standard	
			Federal 24-hr 150 µg/m <sup>3</sup>	State 24-hr 50 µg/m <sup>3</sup>
Sunshine Canyon Landfill (LS)	12/01/01–02/28/02	Baseline Year	0	8/55 (15%)
	12/01/07–02/29/08	2008 Winter	1 (02/14/08)	10/83 (12%)
	12/01/08–02/28/09	2009 Winter	1 (01/09/09)	3/51 (6%)
	12/01/09–02/28/10	2010 Winter	0	0/87 (0%)
	12/01/10–02/28/11	2011 Winter	1 (01/20/11)	7/90 (8%)
	12/01/11–02/29/12	2012 Winter	0	13/91 (14%)
	12/01/12–02/28/13	2013 Winter	0	2/88 (2%)
	12/01/13–02/28/14	2014 Winter	2 (12/04/13, 12/09/13)	14/90 (16%)
	12/01/14–02/28/15	2015 Winter	0	10/89 (11%)
	12/01/15–02/29/16	2016 Winter	0	4/91 (4%)
	12/01/16–02/28/17	2017 Winter	2 (12/02/16, 12/18/16)	12/86 (14%)
	<b>12/01/17–02/28/18</b>	<b>2018 Winter</b>	<b>2 (12/05/17, 12/17/17)</b>	<b>11/43 (26%)</b>
Community Site (CS)	12/01/01–02/28/02	Baseline Year	0	7/70 (10%)
	12/01/07–02/29/08	2008 Winter	0	2/73 (3%)
	12/01/08–02/28/09	2009 Winter	0	6/85 (7%)
	12/01/09–02/28/10	2010 Winter	0	0/81 (0%)
	12/01/10–02/28/11	2011 Winter	0	1/88 (1%)
	12/01/11–02/29/12	2012 Winter	0	2/86 (2%)
	12/01/12–02/28/13	2013 Winter	0	3/87 (3%)
	12/01/13–02/28/14	2014 Winter	0	1/90 (1%)
	12/01/14–02/28/15	2015 Winter	0	4/88 (5%)
	12/01/15–02/29/16	2016 Winter	0	0/91 (0%)
	12/01/16–02/29/17	2017 Winter	0	2/90 (3%)
	<b>12/01/17–02/28/18</b>	<b>2018 Winter</b>	<b>0</b>	<b>4/85 (5%)</b>

## 4. Average and Maximum Black Carbon Concentrations and PM<sub>10</sub> Concentrations

Although no federal or state standards exist for BC concentrations in ambient air, BC is a measurable component of ambient air that correlates well with DPM. Because of growing evidence that DPM is associated with several negative health effects, BC is often measured in an attempt to quantify the relative amounts of DPM in ambient air. Findings from the Multiple Air Toxics Exposure Study IV (MATES IV), conducted by the South Coast Air Quality Management District (SCAQMD), found DPM to be the most important toxic air pollutant contributing to risk in the Los Angeles basin (South Coast Air Quality Management District, 2015).

BC is measured using an Aethalometer, which passes air through a filter tape trapping the suspended particles. A light beam projected through the deposit is attenuated by light-absorbing particles. Aethalometers are subject to a saturation effect, where the buildup of BC on the air sampling tape causes an artifact that affects the accuracy of the measured concentration (Drinovec et al., 2015; Allen, 2014). Instrument response is dampened with heavier loading (i.e., higher concentrations) of BC aerosol. This artifact can cause BC concentration readings to be lower than the true concentration. However, mathematical methods to correct the BC concentration values are available and widely used. All the reported BC values to date from the Landfill, Landfill North, and Community sites have been adjusted to compensate for this tape saturation effect; this compensation had not been performed in quarterly reports prior to the 29<sup>th</sup> Quarterly Report (winter 2015). Because the compensation process changes the reported concentration, and because uncompensated values were used in previous reports, prior-year BC concentrations shown in this report do not match concentrations reported prior to the 29<sup>th</sup> Quarterly Report. All BC data shown in this Quarterly Report have been compensated, with the exception of data from the baseline year, because the raw data for the baseline year are unavailable.

The 24-hr average and maximum compensated BC concentrations collected during the 2018 winter quarter, the compensated BC data from the winter quarters of the ten previous years, and the uncompensated data from the baseline year are provided in **Table 3**. The 2018 winter quarter average and maximum 24-hr BC value at the Landfill site are the second lowest and lowest on record, and the values at the Community site are lower than all previous winter quarters.

Distributions of 24-hour average PM<sub>10</sub> and BC data from winter quarters from 2008 through 2018 (presented as notched box-whisker plots<sup>7</sup>), and percentile trends for these metrics, are shown in **Figures 2 through 5**.

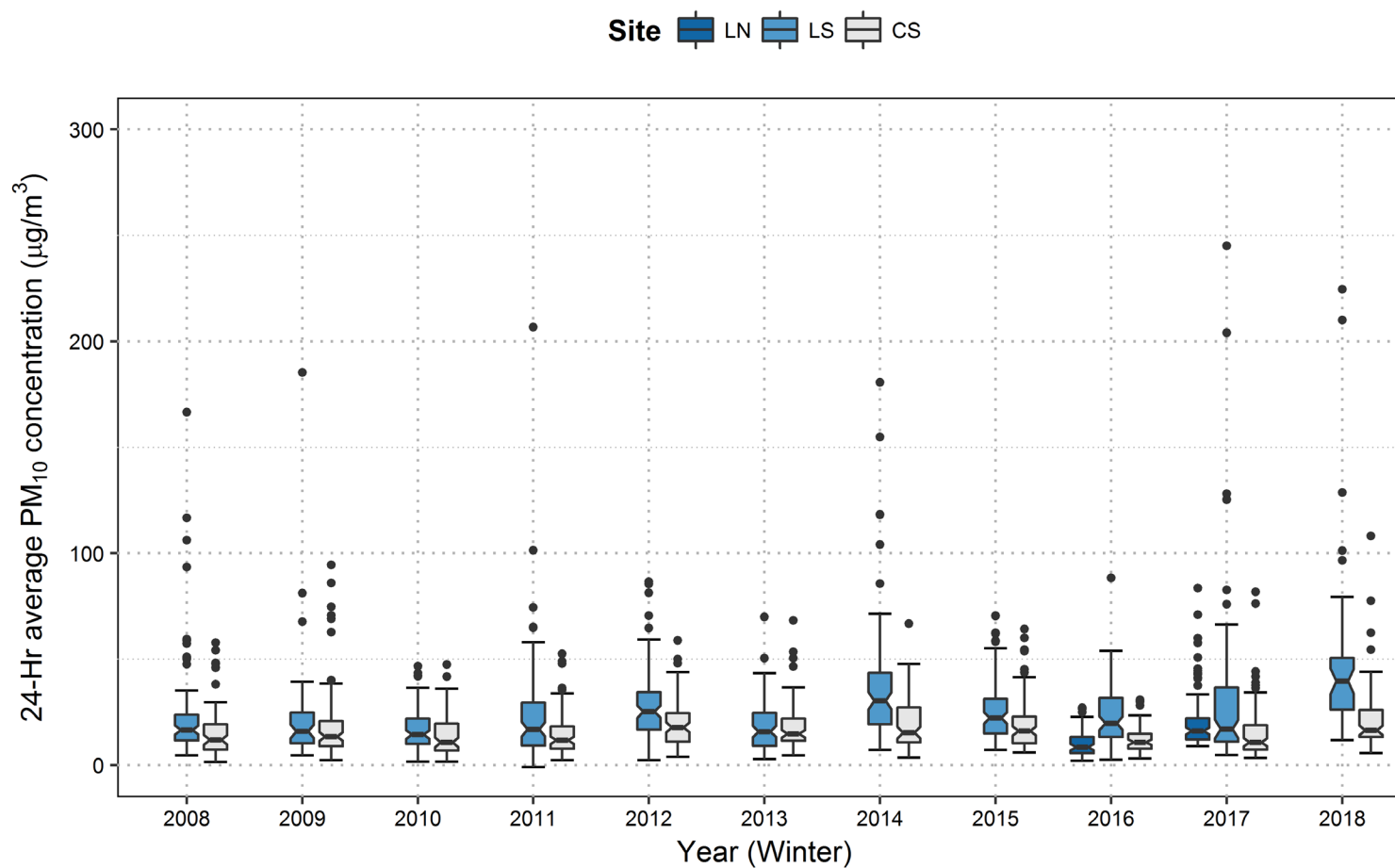
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<sup>7</sup> A notched box-whisker plot shows the entire distribution of concentrations for each year. Each box illustrates the 25<sup>th</sup> (lower box extent), 50<sup>th</sup> (median, midline), and 75<sup>th</sup> (upper box extent) percentiles. The extent of the box indicates the interquartile range (IQR), where 50% of the data lie. The whiskers indicate values that are up to 1.5 times the IQR from the 25<sup>th</sup> or 75<sup>th</sup> percentile. Data outside of the IQR are referred to as “outliers” and are plotted individually. The boxes are notched (narrowed) at the median and return to full width at the 95% lower- and upper-confidence interval values (i.e., the extents of the notches indicate the range in which the median falls with 95% confidence). If the 95% confidence interval of the median is beyond the 25<sup>th</sup> or 75<sup>th</sup> percentile, then the notches extend beyond the box, which creates a “folded” appearance. If the notches of any two boxes do not overlap, there is strong evidence that the medians are statistically different at the 95% confidence level.



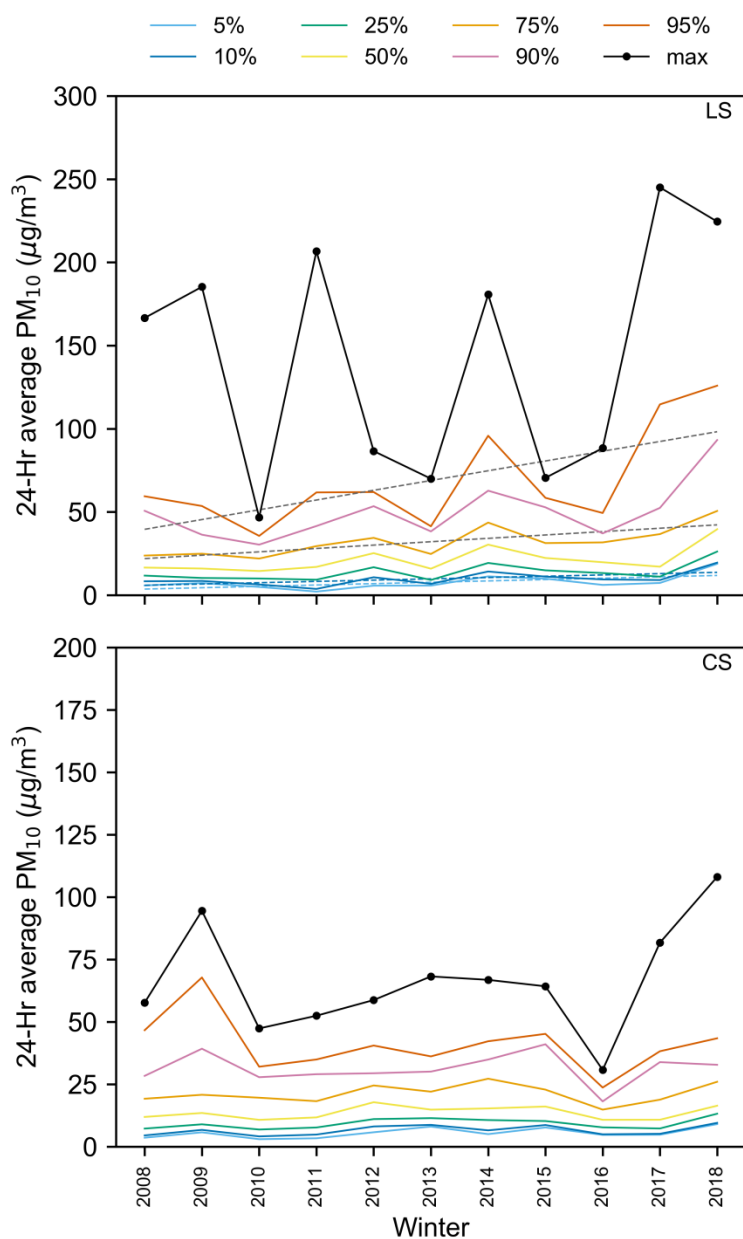
**Table 3.** Twenty-four-hour BC concentrations for the winter quarter of the baseline year (2002) and each year from 2008 to 2018. Asterisks (\*) denote uncompensated BC values. The most recent winter quarter is shown in bold.

Site	Quarterly Period	Quarter Name	BC Concentrations ( $\mu\text{g}/\text{m}^3$ )	
			Average 24-Hr	Maximum 24-Hr
Sunshine Canyon Landfill (LS)	12/01/01–02/28/02	Baseline Year	0.88*	3.49*
	12/01/07–02/28/08	2008 Winter	0.78	2.87
	12/01/08–02/28/09	2009 Winter	0.73	2.63
	12/01/09–02/28/10	2010 Winter	0.89	3.06
	12/01/10–02/28/11	2011 Winter	0.63	2.82
	12/01/11–02/28/12	2012 Winter	0.70	2.17
	12/01/12–02/28/13	2013 Winter	0.70	2.38
	12/01/13–02/28/14	2014 Winter	0.79	2.90
	12/01/14–02/28/15	2015 Winter	0.75	3.17
	12/01/15–02/29/16	2016 Winter	0.38	1.47
	12/01/16–02/28/17	2017 Winter	0.53	2.17
	<b>12/01/17–02/28/18</b>	<b>2018 Winter</b>	<b>0.49</b>	<b>1.24</b>
Community Site (CS)	12/01/01–02/28/02	Baseline Year	0.76*	3.72*
	12/01/07–02/28/08	2008 Winter	0.58	2.07
	12/01/08–02/28/09	2009 Winter	0.68	3.73
	12/01/09–02/28/10	2010 Winter	0.76	2.29
	12/01/10–02/28/11	2011 Winter	0.60	2.82
	12/01/11–02/28/12	2012 Winter	0.57	2.18
	12/01/12–02/28/13	2013 Winter	0.50	1.95
	12/01/13–02/28/14	2014 Winter	0.51	1.84
	12/01/14–02/28/15	2015 Winter	0.85	2.99
	12/01/15–02/29/16	2016 Winter	0.51	2.62
	12/01/16–02/28/17	2017 Winter	0.54	2.41
	<b>12/01/17–02/28/18</b>	<b>2018 Winter</b>	<b>0.45</b>	<b>1.50</b>

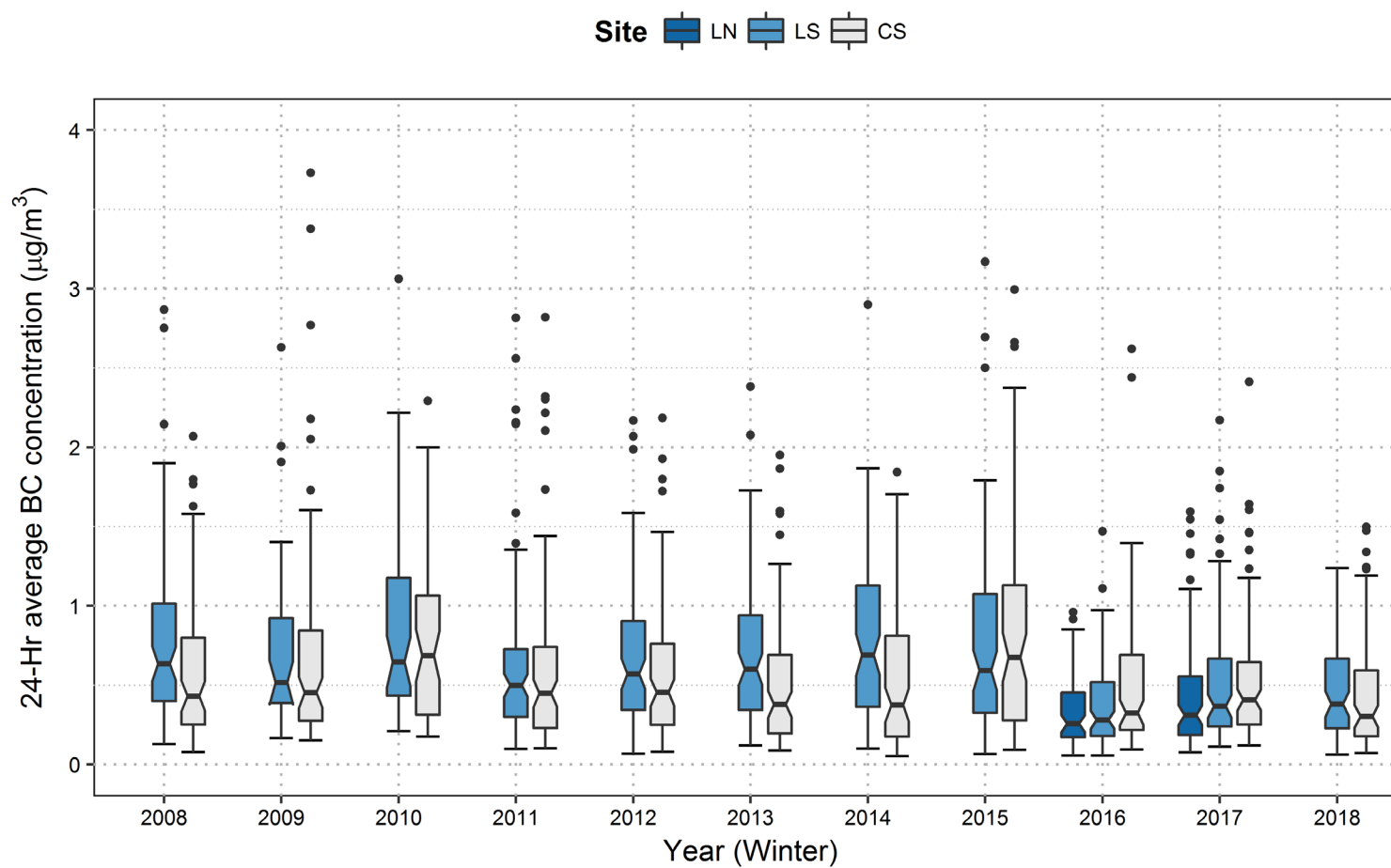


**Figure 2.** Distribution of 24-hr average PM<sub>10</sub> concentrations at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2018.

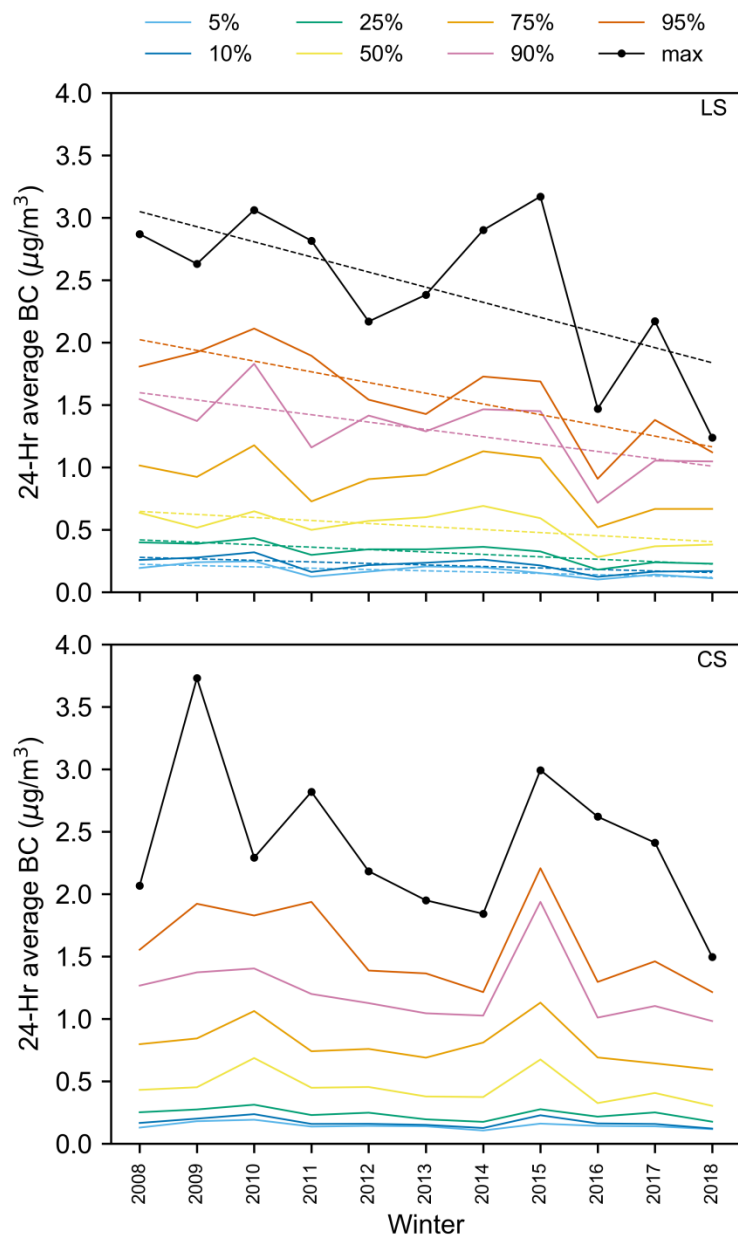




**Figure 3.** Trends of 24-hr average PM<sub>10</sub> maxima and percentiles at the Sunshine Canyon Landfill site (LS, top) and Community site (CS, bottom) during winter (December-February) quarters from 2008 to 2018. A colored dashed line denotes a statistically significant decreasing linear trend, whereas a gray dashed line denotes a statistically significant increasing linear trend. Statistical significance was defined at the 95% confidence level ( $p\text{-value} \leq 0.05$ ).



**Figure 4.** Distribution of daily 24-hr average BC concentrations at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December- February) quarters from 2008 to 2018.



**Figure 5.** Trends of 24-hr average BC maxima and percentiles at the Sunshine Canyon Landfill site (LS, top) and Community site (CS, bottom) during winter (December-February) quarters from 2008 to 2018. A colored dashed line denotes a statistically significant decreasing linear trend, whereas a gray dashed line denotes a statistically significant increasing linear trend. Statistical significance was defined at the 95% confidence level ( $p\text{-value} \leq 0.05$ ).

At this time of year, the median 24-hr average PM<sub>10</sub> concentrations measured at the Community site are typically lower than those measured at the Landfill site (Figure 2). As indicated by the non-overlapping notches (and the entire interquartile range) in the box-whisker plot, in the 2018 winter quarter, the difference between the median 24-hr PM<sub>10</sub> concentrations at the Community and the Landfill sites is statistically significant. At the Landfill site, there is a statistically significant trend in the 24-hr average PM<sub>10</sub> percentiles (Figure 3).<sup>8</sup> The percentiles recorded in the past two winter quarters have been higher than in previous winter quarters, and the maximum 24-hr average PM<sub>10</sub> concentration in this winter quarter is the second highest on record. In contrast, at the Community site, there are no statistically significant trends of 24-hr average PM<sub>10</sub> concentrations.

During the winter quarters, the median 24-hr average BC concentrations are not usually significantly different among the Landfill and Community sites, as indicated by overlapping notches in the box-whisker plot (Figure 4). However, 2018 median 24-hr average BC concentrations at the Landfill site were statistically higher than at the Community site. There is some year-to-year variability in median 24-hr average BC concentrations over the past eleven years, and the range of 24-hr average BC values generally decreased over time at both monitoring sites.

Similar to the previous two winter quarters (2016 and 2017), the 2018 winter quarter at both sites exhibits much lower median 24-hr average BC concentrations and smaller ranges of 24-hr average BC. There is a statistically significant decrease in 24-hr average BC concentrations during winter quarters at the Landfill site over the observational record. This may imply that the background BC levels at this site are also decreasing. At the Community site, there is no statistically significant trend in winter-quarter median 24-hr average BC over the past eleven years.

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<sup>8</sup> These results depend on the percentiles chosen in the trend analysis. Other percentiles may exhibit different trends, which may or may not be statistically significant.

## 5. Field Operations

**Tables 4 and 5** list dates and major tasks associated with visits to the Landfill site and the Community site during the 2018 winter quarter.

**Table 4.** Landfill monitoring site (LS) visits, field maintenance, and operations.

Date of Site Visit	Description of Work
12/18/17	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Checked Aethalometer and BAM tape supplies and replaced BAM tape. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
01/09/18	Investigate new flow issues with BAM. Removed BAM unit s/n T19280 and sent to manufacturer for repair.
02/19/18	Uninstalled Aethalometer, meteorological equipment, data logger, and computer for trailer decommissioning.
02/22/18	New trailer went live at Berm site 2/22/18 1300 hrs. Aethalometer and PM <sub>10</sub> instruments (previously used at Landfill North site) powered up. Advised STI information systems (IS) staff that data from Upwind, IP 166.140.167.28 is now located at Berm. Cleaned BAM roller and nozzle, and performed leak check. Noticed flow error on BAM. Ran self-test and passed.
02/26/18	Found multiple flow failures beginning 2/23 through 2/25. Suspect probable bad flow controller, flow stabilized beginning 2/26. Trailer temperature data added to internal website. Began meteorological tower assembly.
02/27/18	Checked Aethalometer and BAM tape supplies and replaced BAM tape. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
02/28/18	Completed meteorological equipment setup. Wind speed/wind direction data went live.
03/05/18*	Investigated new flow issues with BAM. Removed unit s/n H8933 and replaced with recently repaired s/n T19280 (original Landfill site BAM).

\* The next site visit that occurred after the current quarter is included in this report. The information from this site visit is used to assess the quality of the last portion of data from the current quarter.

**Table 5.** Community site (CS) visits, field maintenance, and operations.

Date of Site Visit	Description of Work
12/18/17	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Checked Aethalometer and BAM tape supplies and replaced BAM tape. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
01/25/18	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Checked Aethalometer and BAM tape supplies and replaced BAM tape. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
02/26/18	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Checked Aethalometer and BAM tape supplies and replaced BAM tape. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
03/28/18*	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Checked Aethalometer and BAM tape supplies and replaced BAM tape. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.

\* The next site visit that occurred after the current quarter is included in this report. The information from this site visit is used to assess the quality of the last portion of data from the current quarter.

Aethalometer and BAM flow rates measured with a National Institute of Standards and Technology (NIST)-traceable flow standard are shown in **Table 6**. BAM flow rates are volumetric (i.e., they depend on local temperature and pressure), and Aethalometer flow rates are at standard temperature and pressure. The target flow rate of the BAM is 16.7 liters per minute (lpm) volumetric to meet the 10-micron cut point of the inlet, with an acceptable range of 16.0 lpm to 17.3 lpm. The Aethalometer has no size cut point.

**Table 6.** Flow rates for the BAM PM<sub>10</sub> and Aethalometer BC monitors at the Landfill and Community sites. “Ref.” is the Reference and “Aeth.” is the Aethalometer.

Location	Date	Flow Rate (lpm)					
		As Found		As Left		As Found	
		BAM	Ref.	BAM	Ref.	Aeth.	Ref.
Sunshine Canyon Landfill (LS)	12/18/17	-	16.93	-	16.93	2.6	-
	02/27/18	16.7	16.67	16.7	16.67	4.0	4.9
Community Site (CS)	12/18/17	16.7	16.78	16.7	16.80	3.0	3.5
	01/25/18	16.7	16.96	16.7	16.96	3.1	3.2
	02/26/18	16.7	16.94	16.7	16.94	3.0	3.1
	03/28/18*	16.7	16.86	16.7	16.86	3.1	3.2

\* The next site visit that occurred after the current quarter is included in this report. The information from this site visit is used to assess the quality of the last portion of data from the current quarter.

## 6. References

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