



Sonoma Technology, Inc.  
*Innovative Environmental Solutions*

# Thirty-Seventh Quarterly Report of Ambient Air Quality Monitoring at Sunshine Canyon Landfill and Van Gogh Elementary School

December 1, 2016 – February 28, 2017

Quarterly Report  
STI-915023-6716-QR

Prepared by

Annie F. Seagram  
Steven G. Brown, PhD  
Sonoma Technology, Inc.  
1450 N. McDowell Blvd., Suite 200  
Petaluma, CA 94954-6515  
Ph 707.665.9900 | F 707.665.9800  
sonomatech.com

Prepared for

Planning Department, City of Los Angeles  
City Hall, Room 525  
200 N. Spring St.  
Los Angeles, CA 90012  
and  
Los Angeles County Department of Regional Planning  
320 West Temple Street, 13<sup>th</sup> Floor  
Los Angeles, CA 90012

April 17, 2017



## Table of Contents

Section	Page
Executive Summary .....	ES-1
1. Introduction.....	1
2. Data Completeness .....	2
3. PM <sub>10</sub> Exceedances .....	3
4. Average and Maximum Black Carbon Concentrations and PM <sub>10</sub> Concentrations.....	5
5. Field Operations .....	10
6. References .....	14

## List of Figures

Figure	Page
1. View of Sunshine Canyon Landfill and the surrounding monitoring stations: Sunshine Canyon Landfill (LS), Sunshine Canyon Landfill North (LN), and Community site (CS). ....	1
2. Notched box-whisker plot of daily 24-hr average concentrations of PM <sub>10</sub> at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2017. ....	7
3. Notched box-whisker plot of daily 24-hr average concentrations of BC at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2017. ....	8

## List of Tables

Table	Page
1. Data completeness statistics for hourly BC, PM <sub>10</sub> , and 1-min wind speed and wind direction data for the 2017 winter quarter monitoring period. ....	2
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 2008–2016. ....	4
3. Twenty-four-hour BC concentrations for the fall quarter of the baseline year (2002) and each year from 2008 through 2017. ....	6
4. Landfill monitoring site visits, field maintenance, and operations. ....	10
5. Landfill North monitoring site visits, field maintenance, and operations. ....	11
6. Community site visits, field maintenance, and operations. ....	12
7. Flow rates for the BAM PM <sub>10</sub> and Aethalometer BC monitors at the Landfill, Landfill North, and Community sites. ....	13



## 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. The Sunshine Canyon Landfill North site (Landfill North) was installed in December 2015.<sup>1</sup> Sampling for volatile organic compounds (VOCs) and carbonyl compounds was initiated in July 2016 at the Landfill site and Community site. PM<sub>10</sub> (particulate matter less than 10 microns in aerodynamic diameter) is measured hourly; wind speed (WS) and wind direction (WD) are measured as 1-minute averages; and black carbon (BC, a surrogate for diesel particulate matter [DPM]) is averaged over 5-minute intervals. The collected data undergo quarterly validation and are evaluated for completeness. BC data are compensated for filter tape saturation effects, which cause BC values to be underestimated.

Following data validation, all data are reported as hourly averages. PM<sub>10</sub> concentrations are then compared with federal and state PM<sub>10</sub> standards. When PM<sub>10</sub> exceedances occur, 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 at least once a year to characterize the impact of landfill operations on ambient air quality on a neighborhood scale. 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 Thirty-Seventh Quarterly Report summarizes the December-February (winter 2017) quarter monitoring results from the tenth year of continuous monitoring.

### ES-2. Statistics

The percent data captured for PM<sub>10</sub> was 99.96%, 99.95%, and 100.00% at the Landfill, Landfill North, and Community sites, respectively. Approximately 2.4%, 0.8%, and 0.3% of the captured PM<sub>10</sub> data at the Landfill, Landfill North, and Community sites were invalidated, respectively. No hourly PM<sub>10</sub> values were deemed suspect at any of the three monitoring sites. BC data capture was 96.3%, 96.1%, and 94.7% at the Landfill, Landfill North, and Community sites, respectively. No hourly BC data were invalidated or deemed suspect during this quarter.

There were two exceedances of the federal 24-hr PM<sub>10</sub> standard of 150 µg/m<sup>3</sup> during this quarter at the Landfill site; there were no exceedances of the federal 24-hr PM<sub>10</sub> standard at either the Landfill North site or the Community site. The percentage of days on which the state PM<sub>10</sub> standard of 50 µg/m<sup>3</sup> was exceeded during this spring quarter was 14% (12 days) at the Landfill site, 6% (5 days) at the Landfill North site, and 3% (2 days) at the Community site.

From 2008 to 2017, winter-quarter average 24-hr BC concentrations ranged from 0.38 µg/m<sup>3</sup> to 0.89 µg/m<sup>3</sup> at the Landfill site, and from 0.50 µg/m<sup>3</sup> to 0.85 µg/m<sup>3</sup> at the

---

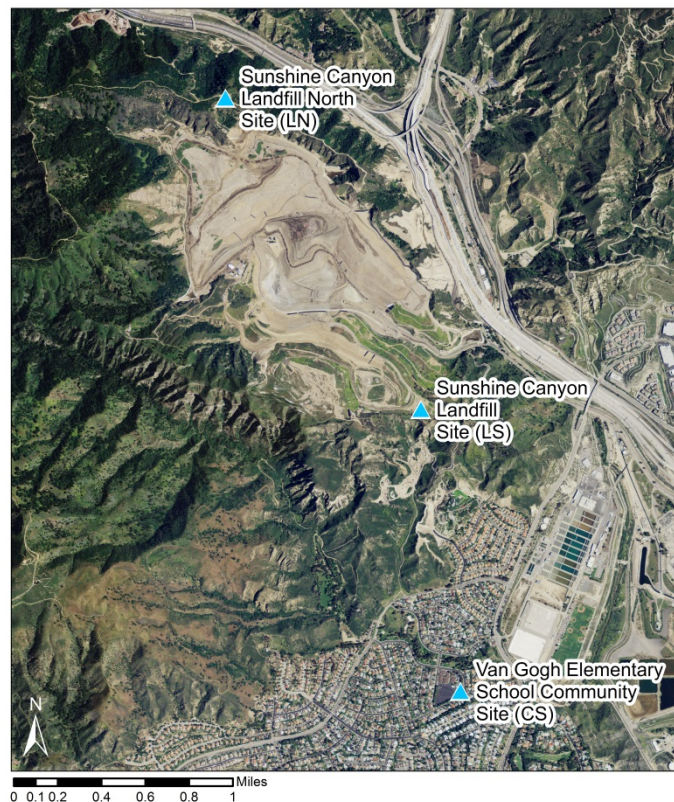
<sup>1</sup> The Landfill North site is planned to run for a minimum of one year, at which time its utility will be assessed and a decision will be made whether to keep the site for the duration of the existing monitoring contract.

Community site. This is the second winter quarter during which the Landfill North site was operational; the average 24-hr BC concentration at this site in the winter 2017 quarter was  $0.43 \mu\text{g}/\text{m}^3$ , compared to  $0.33 \mu\text{g}/\text{m}^3$  during the winter 2016 quarter.



## 1. Introduction

This report summarizes data completeness, ambient PM<sub>10</sub> (particulate matter less than 10 microns in aerodynamic diameter) concentrations, average and maximum 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, 2016, through February 28, 2017. This is the tenth consecutive year that winter-season data have been collected from continuous monitoring at the Sunshine Canyon Landfill (LS; previously called the Berm Site) and Community site at Van Gogh School (CS) monitoring locations, and the second year that winter-season data have been collected from continuous monitoring at the Sunshine Canyon Landfill North (LN) monitoring site. PM<sub>10</sub> was measured with a beta-attenuation monitor (BAM), and BC was measured with an Aethalometer. **Figure 1** shows the monitoring site locations. Starting July 11, 2016, a one-year program of one-in-six-day sampling of volatile organic compounds (VOCs) and carbonyl compounds began at the LS and CS sites; these VOC data will be summarized in a report after sampling is complete.



**Figure 1.** View of Sunshine Canyon Landfill and the surrounding monitoring stations (triangles): Sunshine Canyon Landfill (LS), Sunshine Canyon Landfill North (LN), and Community site (CS).

## 2. Data Completeness

**Table 1** gives completeness statistics for all measured variables during the 2017 winter quarter. The percent data capture for PM<sub>10</sub> was 99.9%, 99.9%, and 100.0% at the Landfill, Landfill North, and Community sites, respectively. Approximately 2.3%, 0.7%, and 0.3% of the captured PM<sub>10</sub> data were invalidated at the Landfill, Landfill North, and Community sites, respectively. No hourly PM<sub>10</sub> values were deemed suspect at any of the three monitoring sites in this quarter. Suspect data are included in subsequent analyses (e.g., regional comparisons), while invalid data are not.

**Table 1.** Data completeness statistics for hourly BC, PM<sub>10</sub>, and 1-min wind speed and wind direction data for the 2017 winter quarter monitoring period.

Monitoring Location	Dates	Percent Data Capture <sup>a</sup>			Percent Data Valid or Suspect <sup>b</sup>			Percent 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)	12/01/16-02/28/17	99.9	96.3	99.7	97.6	100.0	98.0	0.0	0.0	0.1
Sunshine Canyon Landfill North (LN)	12/01/16-02/28/17	99.9	96.1	99.9	99.2	100.0	98.9	0.0	0.0	0.1
Community Site (CS)	12/01/16-02/28/17	100.0	94.7	99.9	99.7	100.0	98.3	0.0	0.0	0.0

<sup>a</sup> Percent 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).

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

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

BC data capture was 96.3%, 96.1%, and 94.7% at the Landfill, Landfill North, and Community sites, respectively. No hourly BC data were invalidated or deemed suspect during this quarter.

The wind data capture percentages were 99.7%, 99.9%, and 99.9% at the Landfill, Landfill North, and Community sites, respectively. Approximately 2.0% of the data were invalidated at the Landfill site, with 0.07% of the data deemed suspect. Approximately 1.14% of the data were invalidated at the Landfill North site, with 0.05% of the data deemed suspect. Approximately 1.7% of the wind data at the Community site were invalidated; none of wind data at this site was deemed suspect during this quarter.

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

The federal and state PM<sub>10</sub> exceedances for the winter 2017 quarter, the winter quarters of the previous nine years (2008–2016), and the winter quarter of the baseline year (December 1, 2001–February 28, 2002) are summarized in **Table 2**. There were two exceedances of the federal 24-hr PM<sub>10</sub> standard of 150 µg/m<sup>3</sup> during the winter 2017 quarter, both of which occurred at the Landfill site. 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 14% (12 days) at the Landfill site, 6% (5 days) at the Landfill North site, and 3% (2 days) 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 2008–2016. 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%)
	<b>12/01/16–02/28/17</b>	<b>2017 Winter</b>	<b>2 (12/02/16, 12/18/16)</b>	<b>12/86 (14%)</b>
Sunshine Canyon Landfill North (LN)	12/01/16–02/29/17	2016 Winter	0	0/91 (0%)
	<b>12/01/16–02/28/17</b>	<b>2017 Winter</b>	<b>0</b>	<b>5/90 (6%)</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%)
	<b>12/01/16–02/29/17</b>	<b>2017 Winter</b>	<b>0</b>	<b>2/90 (3%)</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).

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 are 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; raw data for the baseline year are unavailable for compensation.

**Table 3** provides the 24-hr average and maximum compensated BC concentrations collected during the winter 2017 quarter and compares them to compensated BC data from the winter quarters of the nine previous years and the baseline year (baseline-year data are *not* compensated). The winter 2017 quarter data at the Community site are similar to those of previous winter quarters. The winter 2017 24-hour BC average at the Landfill site is slightly higher than the BC average in the previous winter quarter, but is still relatively low over the record of study. The average 24-hr BC concentration at the Landfill North site is similarly low.

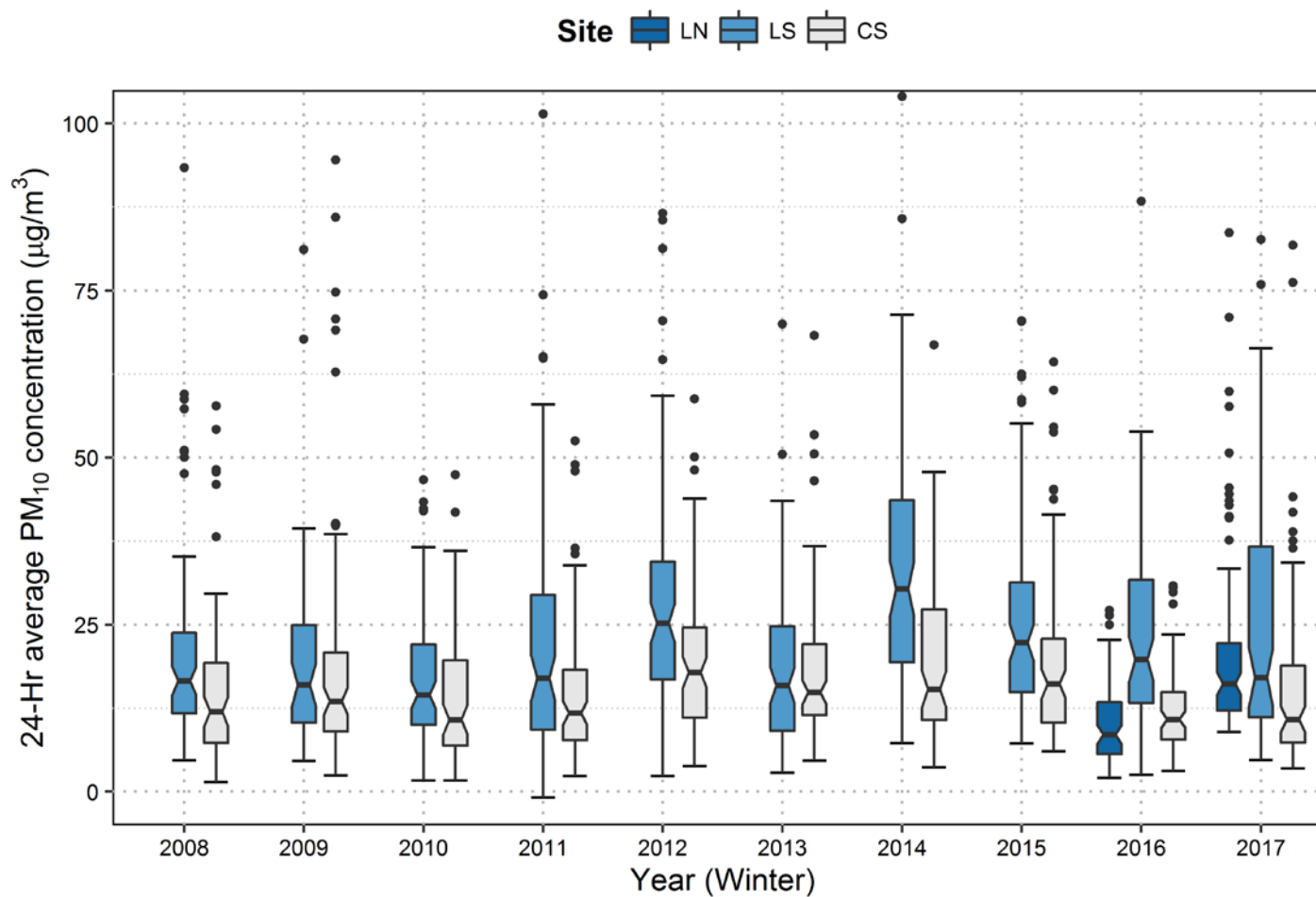
Notched box-whisker plots<sup>2</sup> of winter quarter 24-hour average PM<sub>10</sub> and BC data for the Landfill North site, Landfill site, and the Community site for winter quarters during all ten monitoring years (2008–2017) are shown in **Figures 2 and 3**, respectively.

---

<sup>2</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 (hence a “folded” appearance). If the notches of any two boxes overlap, there is strong evidence that the median are statistically different at the 95% confidence level.

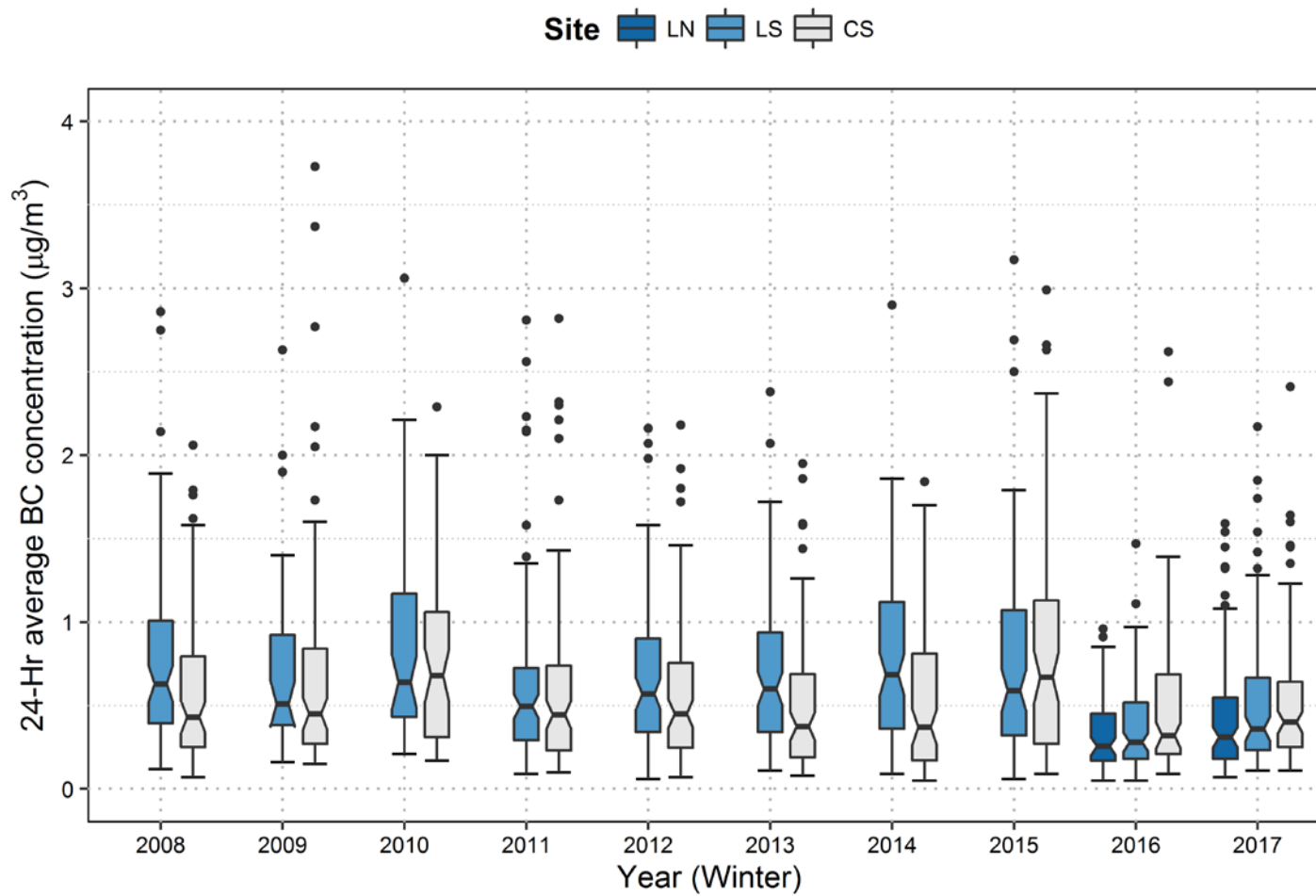
**Table 3.** Twenty-four-hour BC concentrations for the fall quarter of the baseline year (2002) and each year from 2008 through 2017. Asterisks (\*) denote uncompensated BC values. The most recent winter quarter is shown in bold.

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
	<b>12/01/16–02/28/17</b>	<b>2017 Winter</b>	<b>0.53</b>	<b>2.17</b>
Sunshine Canyon Landfill North (LN)	12/01/15–02/29/16	2016 Winter	0.33	2.62
	<b>12/01/16–02/28/17</b>	<b>2017 Winter</b>	<b>0.43</b>	<b>1.59</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
	<b>12/01/16–02/28/17</b>	<b>2017 Winter</b>	<b>0.54</b>	<b>2.41</b>



**Figure 2.** Notched box-whisker plot of daily 24-hr average concentrations of PM<sub>10</sub> at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2017.





**Figure 3.** Notched box-whisker plot of daily 24-hr average concentrations of BC at the Sunshine Canyon Landfill North site (LN), Landfill site (LS), and Community site (CS) during winter (December-February) quarters from 2008 to 2017.



Based on Figure 2, there is no statistically significant trend in the median 24-hour average PM<sub>10</sub> concentrations for winter quarters over the past ten years at the Landfill site or the Community site. At this time of year, the median 24-average PM<sub>10</sub> concentrations measured at the Community site are usually lower than those measured at the Landfill site. In the winter 2017 quarter, the median 24-hr average PM<sub>10</sub> concentration was highest at the Landfill site and lowest at the Community site. As indicated by the non-overlapping notches in the box-whisker plot, the 24-hour PM<sub>10</sub> concentrations at the Community site were significantly lower than those at the two Landfill sites.

Table 3 and Figure 3 suggest that, while there is some year-to-year variability, there is no statistically significant trend in winter-quarter median 24-hr average BC over the past ten years at any of the monitoring sites, although the range of 24-hr average BC values generally decreased over time at each site. The previous two winter quarters (2016 and 2017) exhibit much lower median and smaller ranges of 24-hour average BC concentrations. The median 24-hr average BC concentrations are not significantly different among the Landfill, Landfill North, and Community sites.

## 5. Field Operations

**Tables 4 through 6** list dates and major tasks associated with visits to the Landfill, Landfill North, and Community sites during the winter 2017 quarter.

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

Date of Site Visit	Description of Work
December 5, 2016	Found BAM tape error. Tensioned both BAM spool covers, tensioned and then advanced the tape. Ran self-tests on BAM, all passed. Returned BAM to operating mode.
December 20, 2016	Power outage at station (due to other site activities) caused data collection issues with BAM; instrument was restarted and reconnected to server. Found BAM tape error; re-spooled and re-tensioned the tape.
December 28, 2016	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Cleaned BAM roller, vane, and nozzle, and performed leak check. Re-spooled and re-tensioned BAM. Performed flow check on Aethalometer and BAM samplers.
January 3, 2017	Restarted carbonyl sampler.
January 25, 2017	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Cleaned BAM roller, vane, and nozzle, and performed leak check. Checked tape supply on Aethalometer and BAM samplers. Performed flow check on Aethalometer and BAM samplers.
February 15, 2017	Collected PM <sub>10</sub> and BC data. Restarted Aethalometer. Performed flow check on Aethalometer and BAM samplers.

**Table 5.** Landfill North monitoring site visits, field maintenance, and operations.

Date of Site Visit	Description of Work
December 28, 2016	Collected PM <sub>10</sub> and BC data. Restarted data communications. Restarted Aethalometer. Re-spooled BAM sampler, and checked Aethalometer and BAM tape supplies. Cleaned BAM roller, vane, and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
January 17, 2017	Collected PM <sub>10</sub> and BC data. Repaired BAM, tested operations, and returned instrument to normal operating mode. Replaced BAM tape supply. Performed leak check on BAM sampler. Performed flow check on Aethalometer and BAM samplers.
February 15, 2017	Collected PM <sub>10</sub> and BC data. Restarted data communications. Restarted Aethalometer. Cleaned BAM roller, vane, and nozzle and performed leak check. Performed flow check on Aethalometer and BAM samplers.

**Table 6.** Community site visits, field maintenance, and operations.

Date of Site Visit	Description of Work
December 28, 2016	Collected PM <sub>10</sub> data. Restarted Aethalometer. Cleaned BAM roller, vane, and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
January 25, 2017	Collected PM <sub>10</sub> data. Restarted Aethalometer and cleaned roller. Checked Aethalometer and BAM sampler tape supplies. Cleaned BAM roller and nozzle, and performed leak check. Performed flow check on Aethalometer and BAM samplers.
February 16, 2017	Collected PM <sub>10</sub> data. Restarted Aethalometer and cleaned roller. Replaced BAM tape supply. Cleaned BAM roller and vane, and performed leak check. Performed flow check on Aethalometer and BAM samplers.

**Table 7** shows the PM<sub>10</sub> and BC flow rates as reported by the monitors and measured with a NIST-traceable flow standard. BAM flow rates are volumetric (local temperature and pressure), and Aethalometer flow rates are at standard temperature and pressure. The BAM target flow rate 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 to 17.3 lpm. The Aethalometer has no size cut point.

**Table 7.** Flow rates for the BAM PM<sub>10</sub> and Aethalometer BC monitors at the Landfill, Landfill North, and Community sites.

Location	Date	Flow Rates (lpm)					
		BAM as Found	Reference as Found	BAM as Left	Reference as Left	Aethalometer as Found	Reference as Found
Sunshine Canyon Landfill (LS)	12/28/16	16.7	-	16.7	-	2.8	3.0
	01/25/17	16.7	17.03	16.7	17.03	2.8	2.8
	02/15/17	16.7	16.96	16.7	16.96	-	3.2
Sunshine Canyon Landfill North (LN)	12/28/16	16.7	16.61	16.7	16.61	4.0	4.2
	01/17/17	16.7	16.66	16.7	16.66	4.1	4.3
	02/15/17	16.7	16.63	16.7	16.63	4.0	4.5
Community Site (CS)	12/28/16	16.7	16.71	16.7	16.71	2.9	3.2
	01/25/17	16.7	16.72	16.7	16.72	2.9	3.2
	02/16/17	16.7	16.79	16.7	16.79	3.0	3.3

## 6. References

- Allen G. (2014) Analysis of spatial and temporal trends of black carbon in Boston. Report prepared by Northeast States for Coordinated Air Use Management (NESCAUM), Boston, MA, January. Available at <http://www.nescaum.org/documents/analysis-of-spatial-and-temporal-trends-of-black-carbon-in-boston/nescaum-boston-bc-final-rept-2014.pdf/>.
- Drinovec L., Močnik G., Zotter P., Prévôt A.S.H., Ruckstuhl C., Coz E., Rupakheti M., Sciare J., Müller T., Wiedensohler A., and Hansen A.D.A. (2015) The "dual-spot" Aethalometer: an improved measurement of aerosol black carbon with real-time loading compensation. *Atmospheric Measurement Techniques*, 8, 1965-1979, doi: 10.5194/amt-8-1965-2015. Available at <http://www.atmos-meas-tech.net/8/1965/2015/amt-8-1965-2015.pdf>.
- South Coast Air Quality Management District (2015) Multiple Air Toxics Exposure Study in the South Coast Air Basin: MATES IV. Final report, May. Available at <http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7>.