Sunshine Canyon VOC and Carbonyl Monitoring Report





Final Report Prepared for

Planning Department, City of Los Angeles, and
Los Angeles County Dept. of Regional Planning
November 2017

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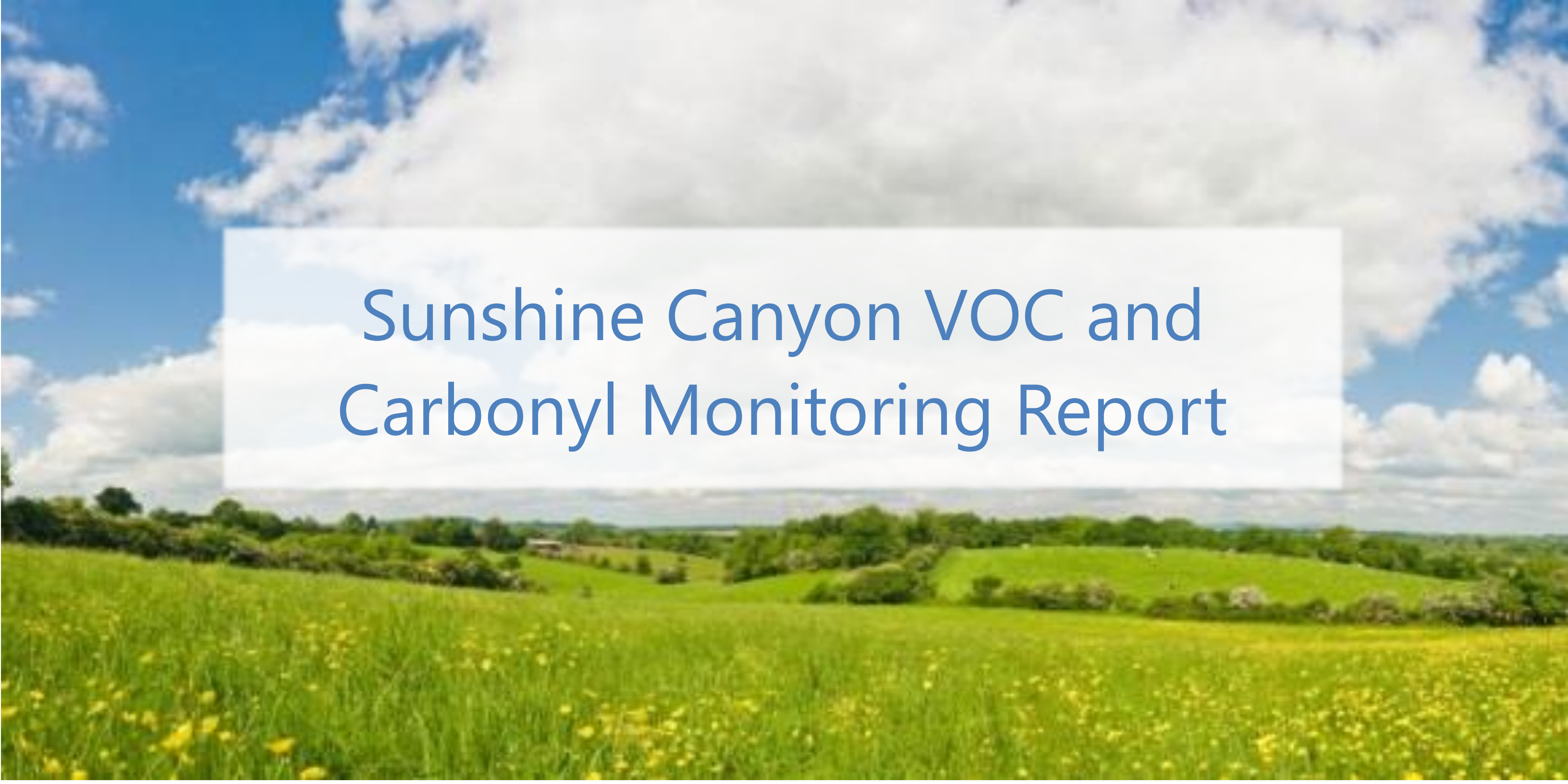

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Cover graphic illustrates one of the monitoring shelters at the Sunshine Canyon Landfill.

Acknowledgments

Steve Hoyt and Judy Daly of Environmental Analytical Services contributed to this report.

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1. Introduction

Two air quality monitoring sites were established in 2001 by the operators of the Sunshine Canyon Landfill (the landfill). One monitoring site is on a high-elevation ridge on the southern edge of the landfill (the Landfill South site), while the second site is at the Van Gogh Elementary School (the Community site) in the nearby community of Granada Hills. These sites were established to monitor air quality in the vicinity of the landfill as part of its ongoing operations. In 2016, the Los Angeles Department of City Planning decided to add measurements of volatile organic compounds (VOCs) and carbonyl compounds, and assess the possible air quality impacts of hazardous air pollutants from the landfill on nearby residents. Sonoma Technology, Inc. (STI) and our subcontractor collected and analyzed the VOC and carbonyl compound concentrations, and compared the measurements to those from the nearest monitoring station operated by the South Coast Air Quality Management District (SCAQMD) and to basin-wide averages collected during the Multiple Air Toxics Exposure Study (MATES) IV monitoring study (South Coast Air Quality Management District, 2015). The sampling took place on a one-in-six day schedule, aligned with the U.S. Environmental Protection Agency (EPA) air toxics sampling schedule. Sampling began in July 2016 and ran for a full year, resulting in 60 sample collection events at each site. For 10% of collected samples, collocated samples were taken at each site in order to ensure data reproducibility.

1.1 Background

The two air quality sites routinely monitor particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), black carbon (BC) as a surrogate for diesel particulate matter (DPM), wind direction, and wind speed. The measurements were collected in fulfillment of the stipulations set forth in the City of Los Angeles' Conditions of Approval for the expansion of the landfill in the City of Los Angeles (Section C.10.a of Ordinance No. 172,933). In 2009, the County of Los Angeles Department of Regional Planning and Public Works adopted conditions (County Condition 81) very similar to the City's conditions, governing ambient air quality monitoring for the County portion of the landfill. The City's Conditions of Approval also required sampling of landfill gas (LFG) at the two sites on four occasions throughout each year. From April 2010 through December 2012, BFI/Republic operated the landfill under a Stipulated Order for Abatement (SOA) issued by the SCAQMD Hearing Board (a quasi-judicial body separate from SCAQMD). A subsequent amendment to the SOA required BFI/Republic to collect VOC measurements on a one-in-six day sampling schedule for a minimum of one year. As a result of this required higher frequency sampling of VOCs, the four LFG samples are no longer required as part of both the City's and County's Conditions of Approval. Although the formal SOA has been lifted, the landfill operator still adheres to some of the stipulations, such as those limiting landfill activities under certain wind conditions.

1.2 Project Description

STI and its subcontractor collected one year of VOC and carbonyl measurements at the Landfill South and Community sites on a one-in-six day EPA sampling schedule from July 2016 through June 2017. Target VOCs included key air toxics in the MATES IV protocol, such as benzene, tetrachloroethene, 1,3-butadiene, carbon tetrachloride, dichloromethane, ethylbenzene, xylenes, toluene, and trichloroethene, as well as tracers of landfill emissions such as chlorobenzene, dichlorobenzenes, and vinyl chloride (Chiriac et al., 2007; Eklund et al., 1998). Carbonyl sampling primarily targeted the key air toxics formaldehyde and acetaldehyde, although other aldehydes and ketones were included.

The project sought to answer two key questions:

1. Is the Sunshine Canyon Landfill causing elevated concentrations of air toxics at the Community site?
2. Are concentrations of air toxics at the Landfill South or Community sites elevated relative to the Los Angeles basin or nearby routine air toxics monitoring sites?

1.3 Overview

Section 2 describes the monitoring project, including the sampling and analysis methods, study domain, data quality measures, and the data analysis to assess the impacts of the landfill on local residential air quality. Section 3 lists the study results, including the sampling issues for carbonyls at the Landfill South site that caused a loss of multiple samples from February through May 2017. Section 4 provides a brief discussion of the air quality monitoring in the context of measurements from other southern California monitoring sites and states the conclusions from the monitoring study. All conclusions are those of STI only and do not represent the views of the City of Los Angeles Planning Department or the Los Angeles County Department of Regional Planning.

2. Project Overview and Methods

2.1 Measurements and Samples

Sampling of VOCs was carried out with automated samplers that use mass flow controllers and pumps to fill evacuated 6-liter, stainless steel, electropolished SUMMA canisters. Using absolutely clean canisters is of paramount importance in this type of sampling because unclean canisters can cause false positive detects of compounds not actually present in the ambient air. Therefore, laboratory-conducted method-blank analyses were an important quality-control procedure for identifying any canister contamination.

The SUMMA canisters begin under vacuum, and then are pressurized with the pump over the 24-hour sampling period. The sampler's mass flow controller provides a constant flow rate of ambient air into the canister until the pressure approaches one atmosphere (760 mmHg or 14.7 psi). Pre-sample purging helps to flush the system of any contamination or residue. The automated samplers are capable of collecting duplicate samples. Advantages of using a pressurized canister and an automated sampler over a passive flow sampler are

- It assures that the sample is uniformly integrated over the 24-hour period;
- It provides a higher volume of air, thus improving (lowering) method detection limits (MDLs);
- It avoids variable flow rates that can exist with passive sample flow control methods; and,
- It allows for the sampling systems to be purged for several hours before the canister is filled.

In our experience with passive flow VOC sampling, we have determined that the flow control valves can be affected by handling and shipping, which requires additional on-site validation of flow rates.

Filled SUMMA canisters were shipped to the analysis laboratory and analyzed using EPA method TO-15, which uses a gas chromatograph mass spectrometer (GC-MS). Following this method, detection limits for VOCs have been demonstrated to be comparable to those required in the MATES IV monitoring protocol.

Sampling of carbonyls was carried out using dinitrophenylhydrazine (DNPH) cartridges. For 24-hour samples, air flowed through the cartridges at a maintained rate of 1.0 lpm, controlled by a dedicated carbonyl sampler with mass flow controllers (MFCs), check valves, solenoid valves, and a pump. The sampler employed separate, independent MFCs to handle duplicate samples for quality control. Cartridges were shipped to the analysis laboratory and analyzed using EPA method TO-11, which uses high-performance liquid chromatography with ultraviolet detection (HPLC-UV). Detection limits for carbonyls were comparable to those in the MATES IV monitoring protocol.

Target analytes include the species shown in **Table 1**.

Table 1. Target VOC and carbonyl species measured at the Sunshine Canyon Landfill sites.

Species		
1,1,1-Trichloroethane	Acetaldehyde	Formaldehyde
1,1,2,2-Tetrachloroethane	Acetone	Hexane
1,1-Dichloroethane	Benzene	m,p-Xylenes
1,1-Dichloroethene	Benzyl chloride	Methyl ethyl ketone
1,2-Dibromoethane	Carbon tetrachloride	o-Xylene
1,2-Dichlorobenzene	Chlorobenzene	Styrene
1,2-Dichloropropane	Chloroform	Tetrachloroethene
1,3-Butadiene	cis-1,2-Dichloroethene	Toluene
1,3-Dichlorobenzene	Dichloromethane	Trichloroethene
1,4-Dichlorobenzene	Ethylbenzene	Vinyl chloride

The sampling took place on a one-in-six day schedule aligned with the EPA sampling schedule. Sampling began on July 11, 2016, and ended on July 6, 2017, resulting in 61 sample collection events at each site over the year.

For 10% of collected samples, collocated samples were taken at each site in order to ensure that the data displayed precision within data quality objectives.

2.2 Spatial and Temporal Extents

As shown in Figure 1, the landfill is located at the northern end of the San Fernando Valley adjacent to the I-5 Freeway. In order to properly place the Landfill South and Community site monitors to capture the larger context of regional concentrations, STI compared concentrations from the downtown Los Angeles monitoring site (the LA Central site), located on North Main Street, which was the closest regional site operated by the SCAQMD. Figure 2 shows a close-up map of the landfill area and the two monitoring sites.

Figure 1. Locations of the Landfill South and Community site monitors in relation to nearby SCAQMD PM_{10} sites and four MATES IV sites. Note that in MATES IV documentation, the Los Angeles site is referred to as "Central LA."

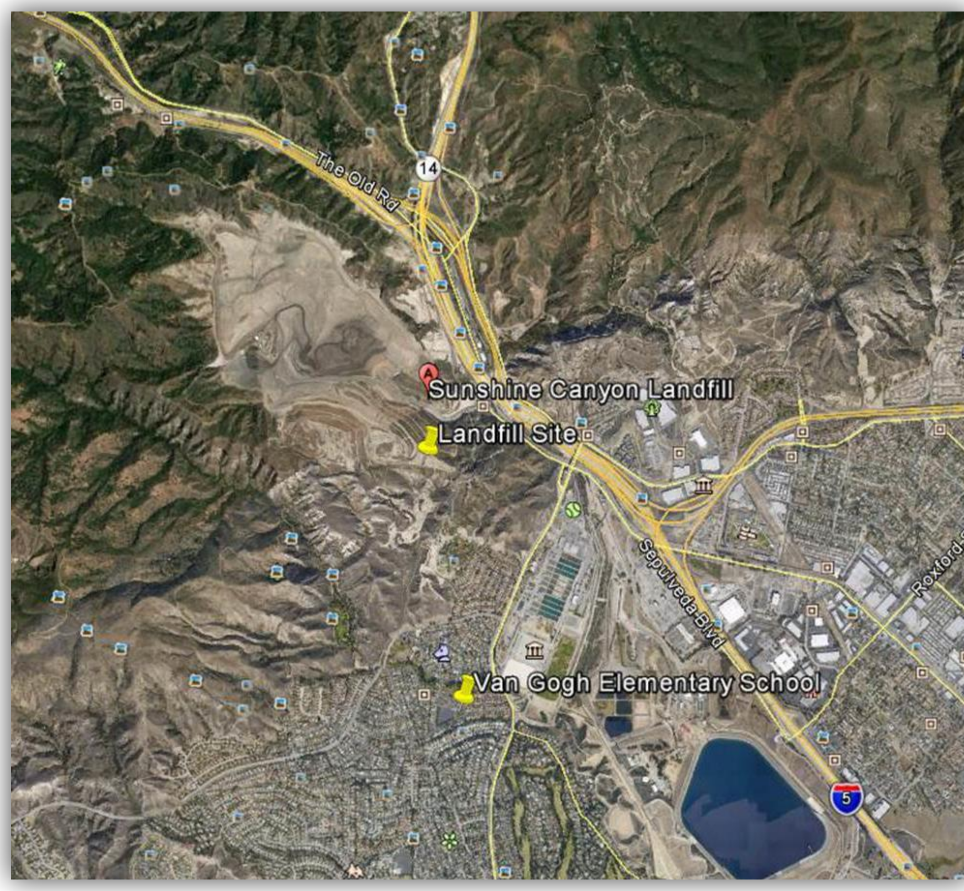

Figure 2. A satellite image of the two sampling locations around the Sunshine Canyon Landfill. The Landfill South site is marked as the Landfill Site, and the Community site is marked as Van Gogh Elementary School. The landfill is the tan area northwest of Landfill South site.

2.3 Data Quality Objectives and Performance Criteria

The study design set data quality objectives (DQOs) for the monitoring data for:

- **Completeness.** Data needed to be representative of the typical meteorological conditions of the surrounding area and the landfill. Thus, we required at least 25 cool season (November to April) and 25 warm season (May to October) samples. Since all samples were 24-hr. duration samples, they are representative of daily average exposures.
- **Accuracy.** Measurements collected at the landfill needed to be accurate at the individual sample level to within ±30% of a traceable standard.
- **Detection limits.** Concentrations needed to be measurable at levels representing ambient conditions and potential concern for human health. Thus, detection limits needed to be

comparable to those limits established in previous health risk assessment work, such as the MATES IV assessment.

- **Precision.** Concentrations needed to be reproducible. Collocated sampling was used to establish that the precision of individual canisters was within ±30%.

If all the data quality objectives were met, we expected that the annual mean concentrations would have 95% confidence intervals of ±25%. Thus, we anticipated being able to assess whether the difference in the concentrations at the two sites was statistically significant (by more than 35%) from the concentrations measured at the nearest SCAQMD site. If concentrations were different at these sites, then we expected we would be able to attribute whether differences in local emissions were attributable to the landfill.

2.4 Contextual Data

STI acquired data from sites in Southern California in October 2016. Data from the Central LA site were used as the nearest monitoring site to the Landfill South and Community sites. MATES IV data were based on basin average concentrations from the MATES IV final report.

3. Results

3.1 Data Quality Objectives

Four measures of data completeness—completeness, accuracy, detection limits, and precision—were set forth for the study.

3.1.1 Data Completeness

Table 2 shows the data completeness for samples collected during the project and the percent of samples collected that were valid. For the completeness and valid percentages, we expected 61 samples for the one year sampling campaign, and 7 collocated samples at each site. Percentages listed in Table 2 were based on these two numbers.

While both sites met basic data completeness criteria for sample collection, the Landfill South site failed to meet the goal of having sufficient valid samples for use in analysis. The goal was to have 25 samples in each sampling season, but this criteria was not met for the November through April season for the Landfill South site. This is detailed in Section 4.

Table 2. The number and percent expected of collected samples and valid samples for the entire measurement campaign. **Red** text signifies incomplete data.

Site	Type	Samples Collected	% Completeness	Valid Samples	% Valid
Landfill South Site	VOC	62	>100%	62	>100%
	Carbonyl	57	93%	**46**	**75%**
Community Site	VOC	61	100%	61	100%
	Carbonyl	59	97%	54	89%
Landfill South Site, Collocated	VOC	7	100%	7	100%
	Carbonyl	7	100%	6	86%
Community Site, Collocated	VOC	7	100%	7	100%
	Carbonyl	6	86%	6	86%

3.1.2 Accuracy

All samples were tested based on an internally spiked sample and internal calibration standards. All pollutants and standards were within ±30% of the expected value, with a single exception for a sample of 1,2,4-Trimethlbenzene. Average recovery values ranged from 95% to 103%, based on aldehydes. Results for individual samples are available upon request.

3.1.3 Detection Limits

A summary of average and median detection limits for all samples collected during the study is shown in Table 3. Most species detection limits were at or below 10 ppt. Only the carbonyls had higher detection limits and their ambient concentrations were typically well above 100 ppt. These detection limits are comparable to those in the routine SCAQMD monitoring network and the MATES IV monitoring study.

Table 3. Average and median method detection limits across all samples for the Sunshine Canyon monitoring study.

Parameter	Average MDL (ppb)	Median MDL (ppb)
1,1,1-Trichloroethane	0.0061	0.006
1,1,2,2-Tetrachloroethane	0.0061	0.006
1,1-Dichloroethane	0.0061	0.006
1,1-Dichloroethene	0.0061	0.006
1,2-Dibromoethane	0.0101	0.01
1,2-Dichlorobenzene	0.0101	0.01
1,2-Dichloropropane	0.0101	0.01
1,3-Butadiene	0.0061	0.006
1,3-Dichlorobenzene	0.0101	0.01
1,4-Dichlorobenzene	0.0101	0.01
2-Butanone	0.0193	0.0193
Acetaldehyde	0.0315	0.0316
Acetone	0.0748	0.0749
Benzene	0.0099	0.01
Benzyl chloride	0.0101	0.01
Carbon tetrachloride	0.0061	0.006

Parameter	Average MDL (ppb)	Median MDL (ppb)
Chlorobenzene	0.0101	0.01
Chloroform	0.0061	0.006
cis-1,2-Dichloroethene	0.0061	0.006
Dichloromethane	0.0101	0.01
Ethylbenzene	0.0061	0.006
Formaldehyde	0.0290	0.0290
Hexane	0.0061	0.006
m,p-Xylenes	0.0062	0.006
o-Xylene	0.0061	0.006
Styrene	0.0101	0.01
Tetrachloroethene	0.0061	0.006
Toluene	0.0068	0.006
Trichloroethene	0.0061	0.006
Vinyl chloride	0.0061	0.006

3.1.4 Precision

Precision was calculated using collocated samples. As shown in Table 2, multiple collocated samples were collected at both sites for estimating the precision of the measurements collected during the study. Table 4 displays the summary of precision results for the study. Note that the number of collocated samples for the aldehydes is reduced as a result of the high number of invalid primary samples. Percent differences are calculated as 200*|(A-B)|/(A+B), where A denotes the primary samples and B denotes the collocated samples.

Data quality objectives for the average percent difference were set at ±30%. Among parameters with concentrations well above the MDL (ratio > 10), the m,p-xylenes did not meet the DQO. All other high concentration parameters were within the acceptance criteria for the DQO. Among pollutants with qualitative concentration ratios (ratio between 3 and 10), styrene, chloroform, and o-xylene all were above the ±30% DQO. Styrene in particular was very poorly measured. In investigating the time series of these pollutants collocated samples, the Community site samples were very poorly qualified for all these species. It is possible that some form of contamination of the collocated sampling line was affecting these species; we note that the sampling apparatus was a split line between the two canisters, so this may have affected the primary sampler as well. The implications are discussed in Section 4.1.

Table 4. Average and median precision calculated as percent difference across all collocated samples for the Sunshine Canyon monitoring study. The median Conc:MDL ratio indicates the concentration level relative to the MDL, where values above 10 should be quantitative and values above 3 should be qualitative.

Parameter	Count	Avg % Diff	Median % Diff	Median Conc:MDL Ratio
1,1,1-Trichloroethane	14	2	0	0.5
1,1,2,2-Tetrachloroethane	14	0	0	0.5
1,1-Dichloroethane	14	0	0	0.5
1,1-Dichloroethene	14	0	0	0.5
1,2-Dibromoethane	14	2	0	0.5
1,2-Dichlorobenzene	14	65.8	66.7	0.4
1,2-Dichloropropane	14	0	0	0.5
1,3-Butadiene	14	9.2	0	0.5
1,3-Dichlorobenzene	14	54.5	41.6	0.4
1,4-Dichlorobenzene	14	29.2	20.2	0.7
2-Butanone	9	10.9	4.6	2.8
Acetaldehyde	9	13.6	6	18.3
Acetone	9	11.5	11.8	14
Benzene	14	12.3	8.5	19.4
Benzyl chloride	14	1.6	0	0.5
Carbon tetrachloride	14	12.4	9.1	16.8
Chlorobenzene	14	27.1	21.1	0.5
Chloroform	14	35.6	21.1	3.8
cis-1,2-Dichloroethene	14	0	0	0.5
Dichloromethane	14	29	15.3	1.7
Ethylbenzene	14	28.4	17.6	10.5
Formaldehyde	9	18.3	16.4	57.1
Hexane	14	14.4	0	0.5
m,p-Xylenes	14	43.4	29.4	29.3
o-Xylene	14	32.7	12.6	6.3
Styrene	14	60.3	51.2	7.6

Parameter	Count	Avg % Diff	Median % Diff	Median Conc:MDL Ratio
Tetrachloroethene	14	30.8	25.4	2
Toluene	14	22.8	8.8	29
Trichloroethene	14	34.9	34.3	0.5
Vinyl chloride	14	0	0	0.5

3.2 Monitoring Results

Table 5 shows the average concentrations (ppb) measured at both sites during the measurement campaign. It also shows the average difference between the two sites and the percent difference; in both cases, a negative number indicates Community site had a higher average concentration than the Landfill South site.

Table 5. Summary statistics for average concentrations (ppb) and differences between the two monitoring sites for VOCs and carbonyls with at least one measurement above detection. Negative differences indicate values at the Community site are higher than those at the Landfill South site.

Parameter	Landfill South Site Avg. (ppb)	Community Site Avg. (ppb)	Average Difference (ppb)	% Difference
1,2-Dibromoethane	0.009	0.005	0.003	47.2
1,2-Dichlorobenzene	0.009	0.008	0.001	13.6
1,2-Dichloropropane	0.005	0.005	0	-1.9
1,3-Butadiene	0.004	0.003	0.001	23.7
1,3-Dichlorobenzene	0.007	0.006	0.001	11.6
1,4-Dichlorobenzene	0.013	0.014	0	-3.3
2-Butanone	0.093	0.079	0.013	15.5
Acetaldehyde	0.783	0.781	0.002	0.2
Acetone	1.379	1.262	0.117	8.9
Benzene	0.171	0.154	0.017	10.2
Benzyl chloride	0.005	0.005	0	-1
Carbon tetrachloride	0.104	0.106	-0.003	-2.4

Parameter	Landfill South Site Avg. (ppb)	Community Site Avg. (ppb)	Average Difference (ppb)	% Difference
Chlorobenzene	0.006	0.006	0	-2.2
Chloroform	0.017	0.022	-0.006	-28.4
Dichloromethane	0.059	0.057	0.002	3.5
Ethylbenzene	0.051	0.06	-0.009	-15.4
Formaldehyde	2.166	2.087	0.079	3.7
Hexane	0.01	0.014	-0.004	-35.2
m,p-Xylenes	0.17	0.195	-0.026	-14
o-Xylene	0.051	0.06	-0.009	-16.5
Styrene	0.028	0.025	0.003	13.1
Tetrachloroethene	0.019	0.012	0.007	44.4
Toluene	0.295	0.285	0.01	3.5
Trichloroethene	0.007	0.006	0.001	16.1

Most of the differences between the two sites were very small in terms of both absolute concentrations (<20 ppt for most species) and percentage differences (<20%). The only two species with differences more than 20 ppt between the two sites are formaldehyde and acetone, the two highest concentration species. Moreover, the large differences in number of samples between the two sites for the carbonyls introduce a confounding temporal factor. In percentage difference terms, the two pollutants with percentage differences large enough to be considered potentially significant are tetrachloroethene, chloroform, hexane, and 1,2-dibromoethane. Tetrachloroethene and 1,2-dibromoethane are higher at the Landfill South site; these chlorinated and brominated species are the kinds of tracer compounds one might expect to see from landfill emissions of old refrigerants and solvents. Higher hexane and chloroform concentrations at the Community site may be indicative of some sort of higher solvent use in the community.

Figure 3 illustrates the average concentrations at each site and shows the 95% confidence intervals in the mean. The MDLs are also shown to indicate the relative confidence in the concentrations. The mean concentrations at both sites are very similar and are all equivalent within the 95% confidence intervals. The largest differences in concentrations between sites are not particularly apparent on the logarithmic scale of the x-axis and are still within the confidence intervals.

Figure 4 illustrates the average concentrations at the two Sunshine Canyon sites compared to the MATES IV 2012-13 basin site averages and the 2015 Central Los Angeles concentrations measured at the North Main Street downtown site. Basin averages and Central LA site concentrations are all higher than those measured at the landfill sites, usually by a significant amount. Of the key risk drivers from MATES IV, formaldehyde, benzene, 1,3-butadiene, and acetaldehyde are all statistically significantly lower at the Sunshine Canyon sites. Of note, carbon tetrachloride which is a global background pollutant, is identical between the MATES IV, Central LA, and Sunshine Canyon sites. We do note that the 2016-17 basin concentrations may be somewhat lower as a result of declining trends in air toxics concentrations over time, and that could account for differences of 20-30% in some of the pollutants when compared to the MATES IV basin averages from 2012-13. However, we do not expect the differences to be particularly large when compared to the Central LA data from 2015.

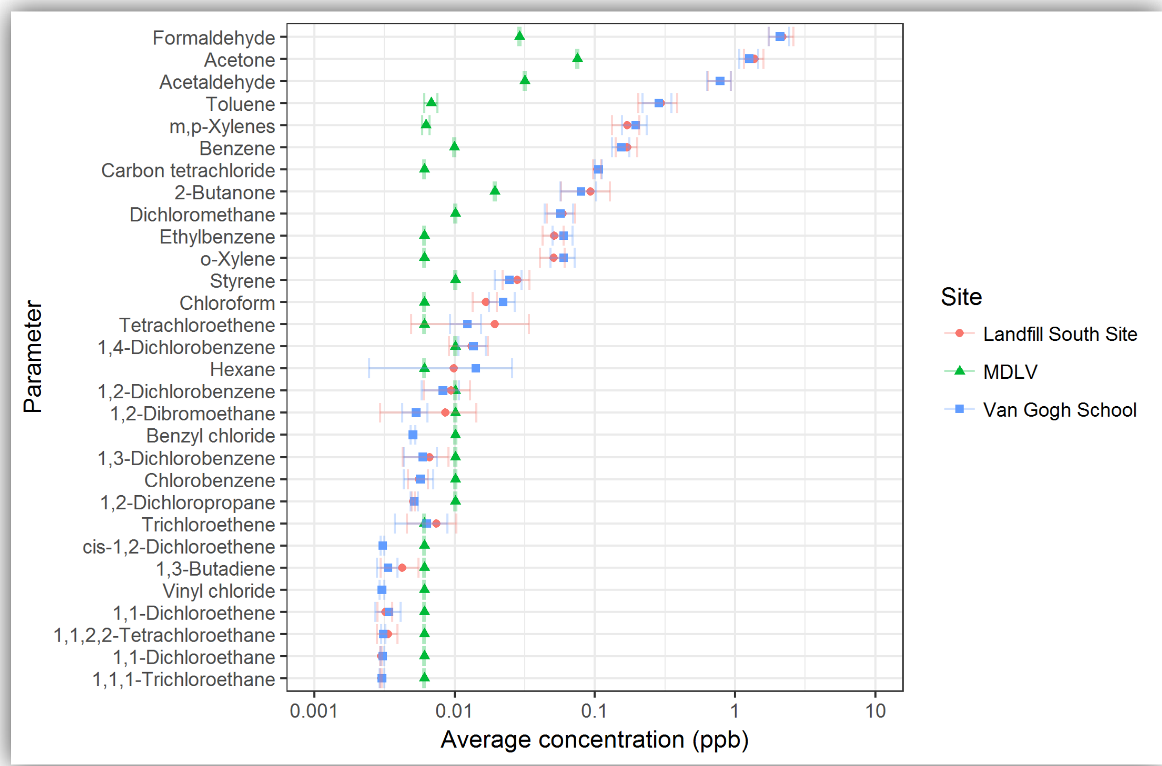

Figure 3. Average concentrations, MDLs, and 95% confidence intervals of pollutants measured at the two monitoring sites.

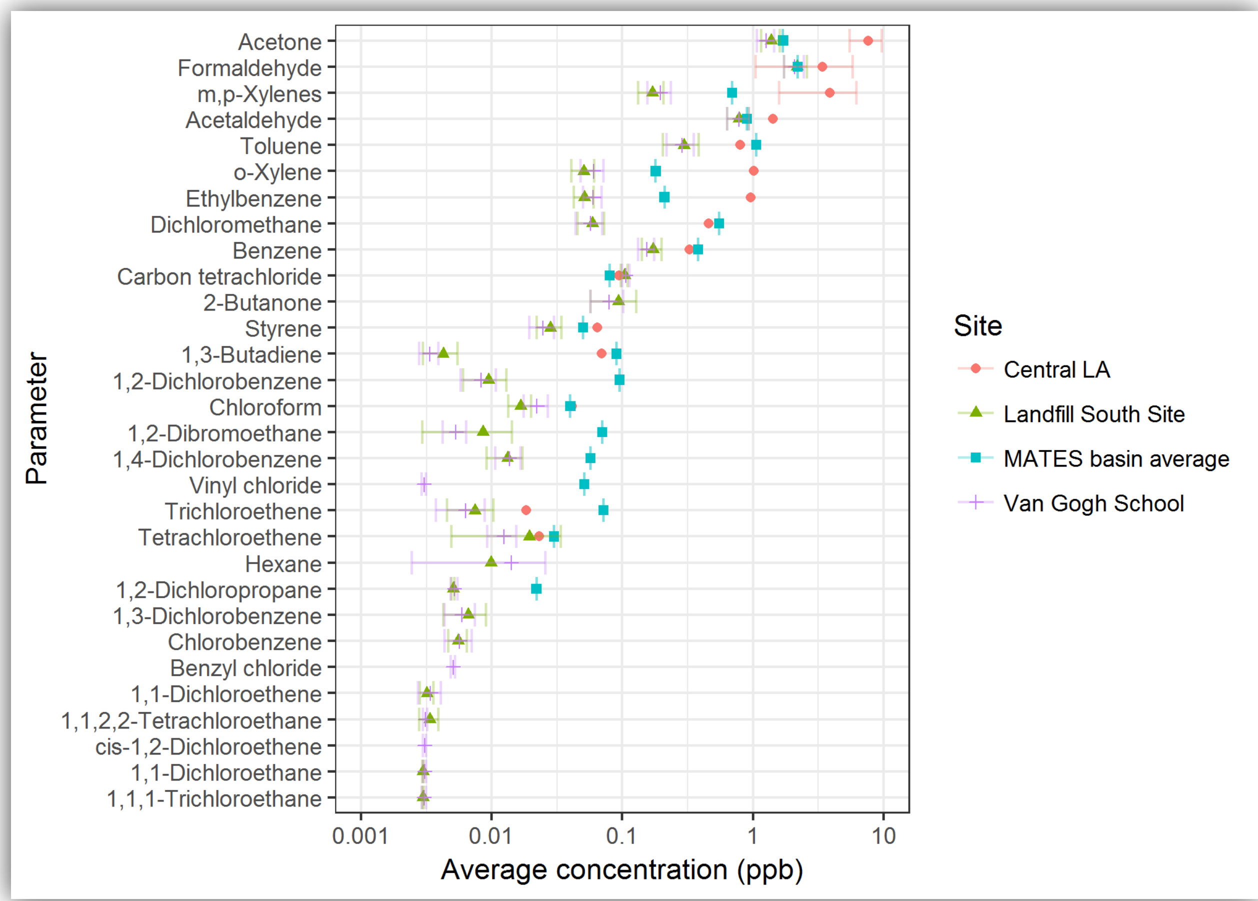

Figure 4. Average concentrations, MDLs, and 95% confidence intervals of pollutants measured at the two Sunshine Canyon monitoring sites compared to the Central LA site data from 2015 and the MATES IV basin averages from 2012-13.

3.3 Data Quality Issues at the Landfill South Site

Starting in February 2017, STI staff noticed data quality issues with carbonyl samples collected at the Landfill South site. The site's shelter had deteriorated to the point where there were serious water leaks and dust penetration. We suspect that the humidity inside the trailer affected the carbonyl samples (specifically the ozone scrubber), especially during the rainy months of January and February 2017. Three possible hypotheses explaining the data anomalies are related to the potential deliquescence[1] of the ozone scrubber material upstream of the dinitrophenylhydrazine cartridge due to high relative humidity (RH) or free water in the sample line of the shelter. The interaction of water in the line may have caused deliquescence of the ozone scrubber material, followed by recrystallization between the ozone scrubber and DNPH cartridge. This could result in crystals

[1] The act of a solid absorbing moisture from the air and dissolving.

plugging the sample line and causing other flow perturbations. If this had been accompanied by a leak upstream of the DNPH, trailer air would have been in the sample.

This problem was then followed by a failure of the primary mass flow controller at the Landfill South site that caused a loss of pressure on multiple samples. The samples that were outside of desired volume ranges by more than ±30% of 1440 L were invalidated. Figure 5 shows the relationship of formaldehyde and acetaldehyde at the two monitoring sites through May 2017.

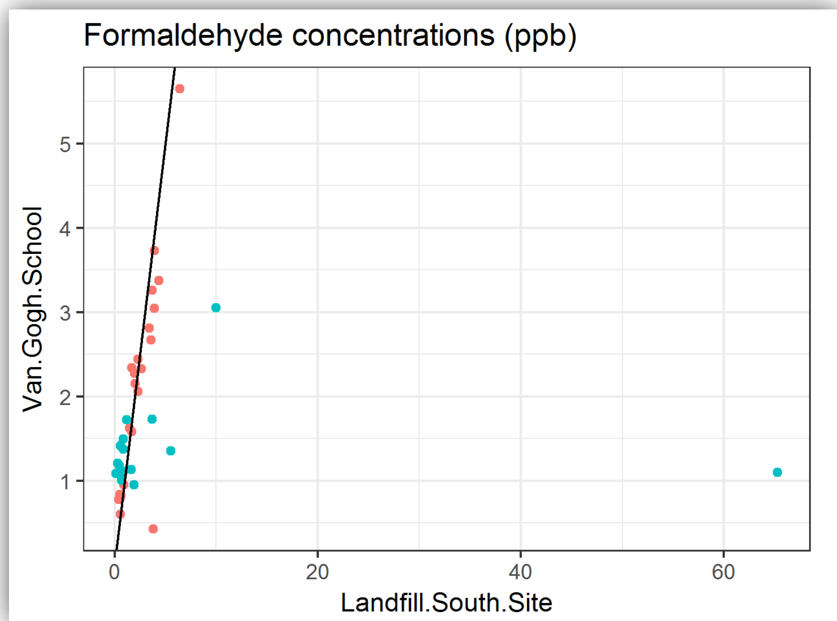

Figure 5. Scatter plot of formaldehyde concentrations (ppb) at the two sites through May 2017. Blue dots indicate the samples collected after February 2017, when sampling issues began.

4. Discussion and Conclusions

4.1 Discussion

A full year of monitoring data for VOCs and carbonyls were collected at the Landfill South and Van Community monitoring sites. While not all DQOs were met within the goals stated at the beginning of the study, it is still possible to come to reasonable conclusions about the monitoring study's two main questions.

1. Is the Sunshine Canyon Landfill causing elevated concentrations of air toxics at the Community site?

2. Are concentrations of air toxics at the Landfill South or Community sites elevated relative to the Los Angeles basin or nearby routine air toxics monitoring sites?

Figures 3 and 4 show the annual average concentrations at the Landfill South and Community site are very similar for almost all of the air toxics. As noted in the results section, most differences are small in both percentage and absolute terms. Moreover, all concentrations at the Landfill South and Community sites are lower than the MATES IV 2012-13 basin average concentrations and the 2015 LA Central average concentrations for every pollutant measured, other than carbon tetrachloride.

With 24-hr average duration samples, wind direction analyses of concentrations is much less feasible than in 1-hr average duration samples due to diurnal changes in wind direction and diurnal patterns in average concentration that will affect the analysis.

The DQOs that were not met during the study reduce our confidence in a few subsets of the data for the average concentrations measured.

- Carbonyl concentrations at the Landfill South site did not meet the completeness DQO; this reduces our confidence in the representativeness of the winter/spring concentrations and likely results in an overestimate of average carbonyl concentrations at this site because winter/spring concentrations tend to be lower (McCarthy et al., 2007).
- Precision estimates for xylenes, styrene, and chloroform were above the $\pm$30% DQO; this reduces our confidence in any individual sample concentration and reduces the certainty in the comparison of average concentrations between the two sites for these species. Average percent differences in concentrations between the two sites for these species were smaller than the precision estimates for the measurements.

The detection limits and accuracy of the measurements met all DQOs. Despite these two subsets of data having qualitatively lower confidence, we assert that the data quality is sufficiently robust to answer the two key questions posed in the study for these pollutant subsets. Lower precision data is sufficiently robust to assess that concentrations are not significantly different between the two sites and are significantly lower than basin averages/LA Central concentrations. The lower quantity of carbonyl samples for the Landfill South site was still sufficiently large and representative to conclusively show that the concentrations are not significantly different than those at the Community site, and are significantly lower than those measured at other sites in the Los Angeles basin.

4.2 Conclusions

STI and its subcontractor collected one year of VOC and carbonyl measurements at the Landfill South and Community sites on a one-in-six day EPA sampling schedule from July 2016 through June 2017.

The monitoring study addressed two main questions.

1. Is the Sunshine Canyon Landfill causing elevated concentrations of air toxics at the Community site?
2. Are concentrations of air toxics at the Landfill South or Community sites elevated relative to the Los Angeles basin or nearby routine air toxics monitoring sites?

We determined that the annual average Landfill South site concentrations of air toxics were statistically the same as concentrations at the Community site. We also determined that concentrations of air toxics at the two sites were lower than those measured in both the Los Angeles Basin and the nearest routine monitoring location. Given that there are no regional background sites in the vicinity, we cannot definitely conclude that the emissions from the landfill are not impacting the local community. However, we can definitely state that the total exposure of residents to the chemicals measured is lower than the typical resident of the Los Angeles basin and does not appear to be elevated for any tracers of landfills (i.e., chlorinated aromatics, chlorocarbons, bromocarbons) relative to other measurements in the Los Angeles basin. While carbonyls and substituted aromatics did not meet all DQOs, the qualitative results from this study suggest that exposures are not elevated for those compounds.

This study did not target odor causing compounds, and only focused on those gaseous air toxics most likely to contribute to risk, hazard, and/or to be emitted from a landfill. Within this subset of pollutants, STI did not find any evidence for significant impacts of emissions at the Community site.

5. References

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