



Box Hill

Burwood

Glen Waverley

Monash

Clayton

Stabling facility

Cheltenham

Suburban Rail Loop East Early Works

Air Quality Monthly Report

18 May – 17 June 2023



Document Information

Document Details	
Issue Date	04/07/2023
Revision Number	C
Status	Issued for Client Review

Review and Approval

Revision Number	Prepared By	Verified By	Approved By
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Revision Control

Revision Number	Change Detail	Date	Comment
A	Issued for Client Review	14/06/2023	Issued for Client Review
B	Issued for Client Review	04/07/2023	Issued for Client Review
C	Issued for Client Review	11/07/2023	Issued for Client Review

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Executive Summary

This report presents the results of the monthly review of the air quality monitoring data for each Suburban Rail Loop East Early Works construction site for the period between 18 May 2023 and 17 June 2023 in accordance with Suburban Rail Loop (SRL) East Environmental Management Framework and Environmental Performance Requirements (EPRs) AQ1 and AQ2.

No works requiring monitoring (i.e. Early Works) occurred at the following locations during this period:

- Box Hill
- Cheltenham
- Stabling Facility
- Clayton
- Monash
- Glen Waverley.

The key findings are summarised in Table ES-1.

Table ES-1: May - June 2023 Air quality monitoring, results summary

Location	Parameter	Averaging period	Max concentration ($\mu\text{g}/\text{m}^3$)	99 th percentile ($\mu\text{g}/\text{m}^3$)	Air Quality Objective ($\mu\text{g}/\text{m}^3$)	Exceedances
Representative Background (Alphington EPA monitoring station)	PM ₁₀	24 hours	50	N/A	50	0
Burwood (monitor 1 – Cnr McComas Grove and Sinnott St)	PM ₁₀	24 hours	136.8*	31	50	1
Burwood (monitor 2 – Zinfra fence)	PM ₁₀	24 hours	182.5*	32	50	1

*Exceedance is likely due to meteorological event. No construction activities were being undertaken at the time of the exceedance.

Over the monitoring period, the Burwood Air Quality (AQ) SiteHive Hexanode Multi monitoring stations 1 and 2 recorded maximum 24-hour average PM₁₀ concentration of 136.8 $\mu\text{g}/\text{m}^3$ and 182.5 $\mu\text{g}/\text{m}^3$ respectively. Each monitoring station recorded one exceedance of air quality objectives or trigger values for PM₁₀. The elevated values above the representative background values were recorded on 4 June 2023 which correlates with elevated humidity levels recorded between 3 June 2023 to 5 June 2023. At these times no construction activities were being undertaken and as a result there was no requirement to implement Trigger Action Response Protocol (TARP) as per Risk Management and Monitoring Program (RMMP). The 99th percentile result for the monitoring period show dust levels were within the air quality objective values.

The SiteHive Hexanode Multi offers the advantage of real-time measurement capabilities. However, it has been observed that these devices are sensitive to high relative humidity, which can result in notable spikes in data that do not accurately represent the levels of particulate matter. These spikes are not indicative of actual measurements of construction dust. Please refer EPA Victoria publication 1745 <https://www.epa.vic.gov.au/about-epa/publications/1745>.

Glossary

$\mu\text{g}/\text{m}^3$ - micrograms per cubic metre is a unit of measurement used to measure the mass of air pollutants (micrograms) per volume of air (cubic metre) as a concentration.

Environment Effects Statement (EES) - In Victoria, environment assessment of the potential environmental impacts or effects of a proposed development under the *Environment Effects Act 1978*.

Environmental Management Framework (EMF) - The purpose of the EMF is to provide a transparent and integrated framework to manage environmental effects of the SRL East Project during construction and operation to achieve acceptable environmental outcomes.

Environmental Reference Standard (ERS) – The ERS is a tool made under the *Environmental Protection Act 2017* to identify and assess environmental values, including air quality, in Victoria.

PM₁₀ - Particulate matter with an aerodynamic diameter of 10 micrometres (μm) or less. PM₁₀ particles are small enough to have a potential impact on human health.

1. Introduction

1.1. Suburban Rail Loop East

Suburban Rail Loop (SRL) will deliver a 90km rail line linking every major suburban line from the Frankston Line to the Werribee Line via Melbourne Airport, better connecting Victorians to jobs, retail, education, health services and each other. SRL East from Cheltenham to Box Hill will connect major employment, health, education and retail destinations in Melbourne's east and south-east. The new underground train line will reduce travel times, connect people travelling on the Gippsland corridor and building it will create up to 8000 direct local jobs. Trains will be running by 2035.

Early Works for SRL East commenced at Burwood in May 2023. Laing O'Rourke is delivering the Early Works as Managing Contractor. Early Works include:

- road modifications
- utility relocations
- ground improvement works
- tram terminus works, and
- site preparations for tunnel boring machines.

1.2. Environmental Management Framework

The Environmental Management Framework (EMF) for SRL East (the Project) provides a transparent and integrated framework to manage environmental effects of the Project and includes EPRs that define environmental outcomes that must be achieved during the design, construction, and operation phases of the Project. The EMF is available on the SRL East website at <https://bigbuild.vic.gov.au/library/suburban-rail-loop/planning/srl-east-environmental-management-framework>.

The development of the EMF has been informed by relevant legislation, policy and guidelines, and the specialist impact assessment studies completed for the SRL East Environment Effects Statement (EES) and the Minister's Assessment, dated 5 August 2022.

The EMF requires the contractor to develop and implement an Environmental Air Quality and Dust Management Plan (EAQDMP) that includes a Risk Management and Monitoring Plan (RMMP). As part of the implementation of the RMMP the contractor is required to conduct instrumental monitoring of PM₁₀ concentrations and measure wind speed and direction at each Early Works construction site and also measure PM₁₀ at a representative control site in accordance with the EMF.

The Managing Contractor reviews the instrumental monitoring data at each site, on a monthly basis for the purpose of assessing the effectiveness of the implementation of the EAQDMP. The results of the instrumental air quality monitoring of PM₁₀ for the period between 18 May 2023 to 17 June 2023 are contained in the following report and have been made publicly available in accordance with the requirements of the EMF.

2. Air Quality Monitoring

2.1. Context

Maintaining air quality is important for public health, the liveability of our cities and our environment. Overall air quality conditions in Melbourne are good however like all major cities, there are days in each year where the background concentrations of air pollutants are very high. Sometimes these elevated concentrations are due to regional influences such as windblown continental dust, bushfires or hazard reduction burns. Emissions from traffic, home heating, and industrial emissions across Melbourne can also cause high background concentrations, especially when the weather is calm. Environmental Protection Authority (EPA) monitoring stations measure these background levels of pollution that already exist in the air within the surrounding area. The EPA monitoring station at Dandenong is used as the representative control site for Heatherton, and the EPA monitoring station at Alphington is used as the representative control site for all other SRL work sites.

Without effective management, construction of the Project has the potential to contribute to these background concentrations which may impact public health. Comparison of SRL East monitoring results with publicly available EPA monitoring data can help the contractor identify when construction-related activities are impacting local air quality, and conversely when the local air quality results may be influenced by background conditions rather than the construction site.

Meteorological conditions such as wind direction and speed can impact on the dispersion of particulates in the air and by monitoring these, contractors can respond when conditions on site change. Having records of wind conditions is also helpful for retrospectively identifying the activity that is causing any elevated dust concentrations.

2.2. Purpose

The purpose of the air quality monitors is to measure the concentration of small particles in the air near the construction site. These particles, known as PM₁₀, have the potential to impact human health. PM₁₀ refers to particles with an aerodynamic diameter of 10 µm or less.

The measured concentrations are compared to air quality objectives that are defined in the Environment Reference Standard (ERS) which is a tool under the Environment Protection Act 2017. The objectives are risk-based concentrations that are not intended to be compliance levels, but they assist the contractor to understand the risk to human health. The ERS sets out the air quality objectives for PM₁₀ which are measured over a day, as reproduced below in Table 2-1.

Table 2-1: Ambient air quality objectives for PM₁₀

Indicator	EPA Air Quality Objective (µg/m ³)	Averaging Period
Particles as PM ₁₀ (maximum concentration)	50 µg/m ³	24-hour

The measured concentrations (which include both existing background concentrations and the Project's incremental contribution over a 24-hour period) are presented in Section 3 and compared against the air quality objective. Monitoring is continuous, even when there are no construction-related activities occurring on the site, and periods of time where there are no site activities are classified as 'Out of Hours.' The potential for dust generation from the work sites is much lower when there are no site activities occurring, however dust can still be generated at the work site during "Out of Hours" periods due to wind erosion.

2.3 Monitoring Locations

Air quality monitors are located on or adjacent to the Early Works construction sites, to represent local air quality conditions and in positions that enable the contractor to adequately measure potential impact of works on local sensitive receivers including residents.

The air quality monitors were installed together with meteorological sensors (wind speed and direction) on the following dates and at each of the following locations. The location of these monitors is shown on maps in Section 3 of this Report.

Table 3-2: May 2023 Air quality monitors

Air quality monitor	Date Installed/Commissioned	Coordinates	Monitoring Parameters	Representative Control Site
Burwood (monitor 1)	18 May 2023	Latitude: -37.852388° and Longitude: 145.111653°	PM ₁₀ , wind speed and wind direction	Alphington EPA monitoring station
Burwood (monitor 2)	18 May 2023	Latitude: -37.851557° and Longitude: 145.111555°	PM ₁₀ , wind speed and wind direction	Alphington EPA monitoring station

2.4 Data Limitations and Verification

The following limitations apply to this data:

- Meteorological conditions on site can affect measurements made by monitoring devices. For instance, dust measurements can be impacted by rainfall and/or humidity (with water droplets in the air being mistaken as dust particles). Displaying periods of inclement and humid weather allows reviewers to identify measurements that may have been impacted.

Data are provided in tabular and graphical form in Section 3 to visually present 24-hour averages of PM₁₀ over the monthly period. The data included in this report have been verified by the Managing Contractor and relevant subject matter expert.

3. Results

Data are provided in graphical form, below, to visually present 24-hour averages of PM₁₀ dust concentration over the monthly period for each active construction site.

3.1. Burwood



Figure 3-1.0 Burwood AQ Monitoring Stations Locations

3.1.1. Results

Table 3-2: Burwood air quality monitor PM10 percentiles

Parameter	Max concentration (µg/m ³)	99 th percentile (µg/m ³)	EPA Air Quality Objective (µg/m ³)	Exceedances
PM ₁₀ (monitor 1)	136.8*	31	50	1
PM ₁₀ (monitor 2)	182.5*	32	50	1

*Exceedance is likely due to meteorological event. No construction activities were being undertaken at the time of the exceedance.

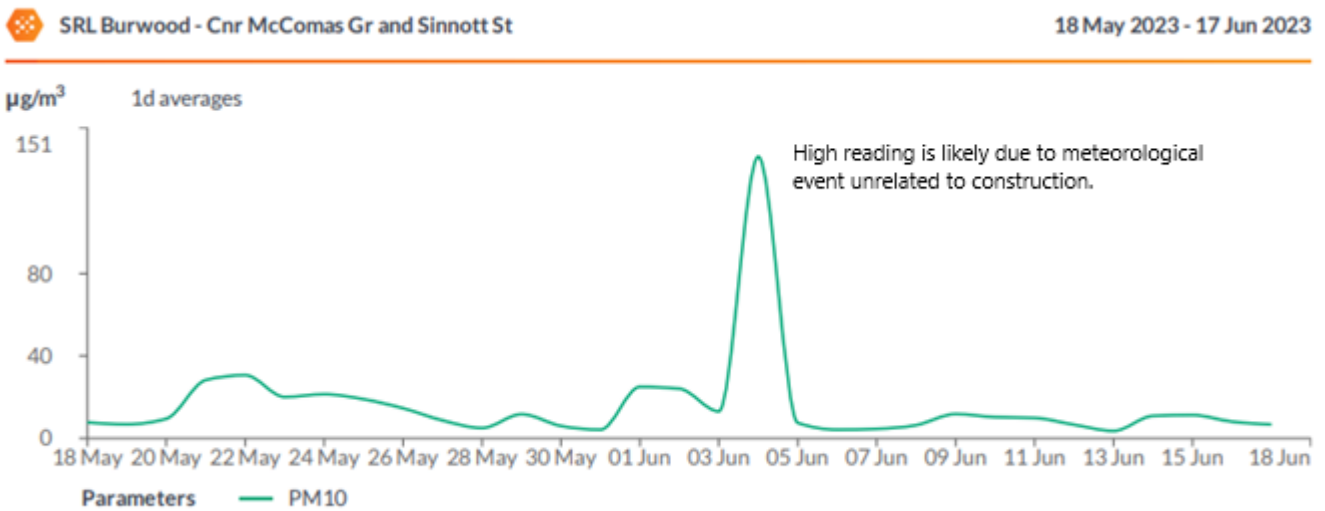


Figure 3-1.1: Air quality concentration (24-hour average), Burwood (monitor 1)

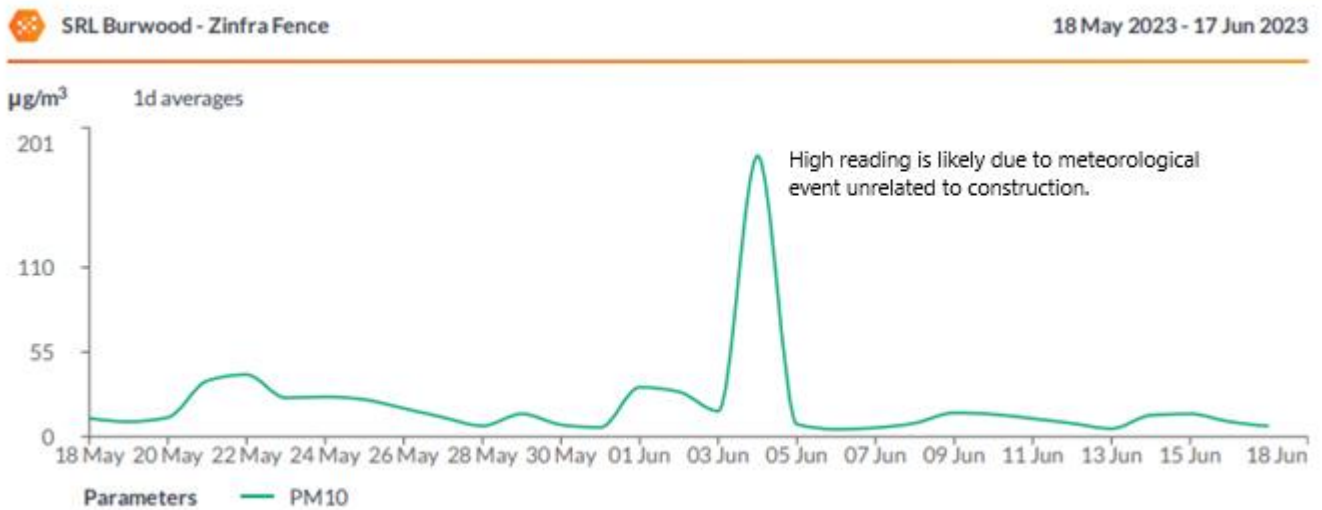


Figure 3-1.2: Air quality concentration (24-hour average), Burwood (monitor 2)

3.1.2. Analysis

Over the monitoring period, the Burwood AQ SiteHive Hexanode Multi monitoring stations 1 and 2 recorded maximum 24-hour average PM₁₀ concentration of 136.8µg/m³ and 182.5µg/m³. Each monitoring station recorded one exceedance of air quality objectives or trigger values for PM₁₀. The elevated values above the representative background values were recorded on 4 June 2023. This correlates with elevated humidity levels recorded at the Bureau of Meteorology (BOM) Olympic Park station between 3 June 2023 to 5 June 2023. For more detailed information, you can visit the BOM website at <http://www.bom.gov.au/climate/dwo/202306/html/IDCJDW3033.202306.shtml>. No Construction works were undertaken with elevated levels detected outside of site work hours. As a result, there was no requirement to implement Trigger Action Response Protocol (TARP) as per Risk Management and Monitoring Program (RMMP). Predominant wind direction was northerly and a maximum wind speed of 15.83m/s was recorded on 17 June 2023. The 99th percentile result for the monitoring period show dust levels were within the air quality objective values.

The SiteHive Hexanode Multi offers the advantage of real-time measurement capabilities. However, it has been observed that these devices are sensitive to high relative humidity, which can result in notable spikes in data that do not accurately represent the levels of particulate matter. These spikes are not indicative of actual measurements of construction dust. A useful guide providing more explanation has been published by the Victorian EPA <https://www.epa.vic.gov.au/about-epa/publications/1745>.

3.1.3. Background air quality

Alphington EPA monitoring station data are not currently available at the time of reporting.

4. Quality assurance

4.1. Data capture

Data capture is defined as the number of valid data periods collected divided by the number of available data periods. Valid data excludes periods where the instrument is unavailable due to calibration and maintenance and excludes periods where the data has been rejected due to quality assurance/data validation procedures.

Data capture statistics for the reporting period between 18 May 2023 to 17 June 2023 are shown in Table 4-1, below.

Data capture statistics were 100% for all parameters at Burwood station for the reporting period. Monitoring station was commissioned 18 May 2023 providing 31 days of data capture for the reporting period.

Table 4-1: Air quality monitoring, data capture summary

Location	Parameter	Averaging period	Collected periods	Available periods	Data capture
Burwood (monitor 1)	PM ₁₀	24 hours	31	31	100%
Burwood (monitor 2)	PM ₁₀	24 hours	31	31	100%

4.2. Data validation

Data contained in this report have been validated against performance and calibration requirements for each instrument. Data during commissioning, maintenance and calibration periods have been removed from the validated data sets.