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July 9, 2025

Joe Burke
Chief Communications Officer
FORT MILL SCHOOL DISTRICT
2233 Deerfield Drive
Fort Mill, South Carolina 29715

Re: Citadel Project No. 2732.1001.0
Air Quality Monitoring Plan
Flint Hill Elementary School #12 - 392 Gold Hill Road, Fort Mill, SC 29715
& Flint Hill Middle School #7 - 360 Gold Hill Road, Fort Mill, SC 29715

Dear Mr. Burke:

Citadel EHS (Citadel) has prepared this Air Quality Monitoring Plan to evaluate indoor and outdoor locations at the Flint Hill Elementary #12 and Flint Hill Middle School #7 in Fort Mill, South Carolina.

If after your review you have any questions or require additional information, please do not hesitate to telephone me at (414) 233-2866.

Sincerely,
CITADEL EHS

Julie Wojnowski

Julie Wojnowski
Practice Leader, ESG & Sustainability

Enclosure

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Fort Mill School District
2233 Deerfield Drive
Fort Mill, South Carolina 29715

Air Quality Monitoring Plan

July 9, 2025

Citadel Project Number 2732.1001.0

SITE:

Flint Hill Elementary School #12
392 Gold Hill Road
Fort Mill, SC 29715

and

Flint Hill Middle School #7
360 Gold Hill Road
Fort Mill, SC 29715

www.CitadelEHS.com

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1.0 INTRODUCTION

The Fort Mill School District (the District) engaged Citadel EHS, Inc. (Citadel) to provide air quality monitoring recommendations in response to community concern about the presence and handling of industrial chemicals and gases at the nearby Silfab Solar manufacturing facility. While Silfab Solar is still under construction, its proximity—approximately 1,300 feet from the future Flint Hill Elementary and Middle School campus—prompted questions about the potential for chemical releases and the need for appropriate environmental safeguards.

This document presents Citadel's initial recommendations to assist the District in making informed decisions about air quality monitoring, stakeholder engagement, and overall environmental health strategy. These recommendations are based on a thorough review of available information and are designed to provide a sound scientific foundation for evaluating potential risks and building appropriate response procedures.

Our work began with a focused review of relevant documentation, including:

- Silfab Solar's air permits, emissions projections, chemical inventories, and risk management planning materials
- District-provided documentation related to HVAC system design, maintenance, and safety protocols
- Applicable environmental health standards and guidance from the U.S. Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (DHEC)

This report reflects what, in the environmental health and safety field, is considered a proactive planning approach. While the decision to initiate this work followed public concerns, the methods proposed here—such as baseline data collection, real-time perimeter monitoring, and routine sampling—are considered industry best practices for enabling early detection of potential air quality issues and guiding timely response actions. These steps allow districts to monitor effectively, respond quickly, and communicate transparently—especially in situations where schools are located near industrial activity.

The recommendations in this report are not mandates, but rather a set of tools the District may adopt to support its operational, safety, and communication goals. These strategies focus on an air quality monitoring framework and continued stakeholder engagement.

2.0 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN (COPCs)

To support the development of a scientifically grounded air monitoring strategy, Citadel conducted a review of publicly available documentation related to the Silfab Solar manufacturing facility, along with internal documents provided by the Fort Mill School District. Materials reviewed included Silfab's air permits, the facility's Statement of Basis (issued by the DHEC, Bureau of Air Quality (BAQ), emissions modeling data, chemical inventory records, and process descriptions. These sources provided insight into the types and quantities of substances expected to be used or released during normal operations.

Citadel evaluated these materials against applicable regulatory guidance and toxicological screening benchmarks from the EPA and South Carolina DHEC. This review informed the selection of substances considered most relevant for air quality monitoring near the school site.

Based on this analysis, Citadel identified a set of Contaminants of Potential Concern (COPCs) - substances that have the potential to be present, and which warrant inclusion in the monitoring strategy due to their known or suspected toxicity and relevance to inhalation exposure.

These COPCs are expected to be present primarily as gases, vapors, aerosols, or particulates - forms that influence how contaminants behave in the air and exposure routes. Due to the fact that these COPCs are emitted from a property 1,300 feet away and may be present in ambient air, inhalation is considered the most significant route of exposure for school site occupants. Many of these contaminants are associated with both acute and chronic health effects, including respiratory irritation, corrosivity to skin and mucous membranes, systemic toxicity via inhalation or dermal absorption, and, in some cases, carcinogenicity.

For the purposes of this plan:

- **Gases** are substances that exist entirely in the gas phase under normal environmental conditions (e.g., ammonia, carbon monoxide).
  These behave like the gases from cleaning products or vehicle exhaust - spreading quickly indoors or outdoors, often without being detected unless you have monitoring equipment.
- **Vapors** are the gaseous phase of substances that are typically liquids or solids at room temperature and pressure.
  These often come from building materials, cleaners, or industrial processes and can carry strong odors or chemical smells.
- **Aerosols** are solid or liquid particles that are dispersed in a gas (usually air). Aerosols include mists, smokes, fumes, and dusts. They can pose significant health risks depending on their size, composition, and concentration. These contaminants are commonly generated by industrial activities such as welding, combustion, grinding, material handling, and high-temperature processes. *These particles are often invisible to the naked eye and can remain airborne for long periods, increasing the risk of inhalation.*
- **Particulate Matter** is a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke are large or dark enough to be seen with the naked eye. Particle pollution includes:
  - **PM10 (inhalable fraction)** includes particles with diameters ≤10 micrometers.
    These can enter the body through the nose and mouth and deposit in the upper respiratory tract - the nose, pharynx, and larynx. They include dust from activities such as construction, agriculture, or mechanical abrasion.
  - **PM2.5 (respirable fraction)** includes particles ≤2.5 micrometers, which are small enough to bypass the upper airway defenses and deposit deep within the alveolar region of the lungs, where gas exchange occurs.
    These are typically generated from high-heat or combustion sources, such as diesel engines, smelting, or thermal cutting.

These definitions are in alignment with the EPA definitions for various airborne substances and are used to guide both air sampling strategies. The full list of COPCs, along with their physical form, and rationale for inclusion, is presented in ***Table 1 – COPCs Selection, Form/Physical State, and Rationale***.

Table 1 – COPC Selection, Form/Physical State, and Rationale

Substances	Form/Physical State	Rationale
Ammonia	Gas	Flammable, corrosive, and toxic gas stored in large quantities (approximately 1 million cubic feet)
Carbon Monoxide (CO)	Gas	BAQ Statement of basis emissions projections
Formaldehyde	Gas/Vapor	Review of chemical inventory / potential for creation when heating silicones at high temperatures
Hydrochloric Acid (HCl)	Gas	BAQ Statement of basis emissions projections

Table 1 – COPC Selection, Form/Physical State, and Rationale		
Substances	**Form/Physical State**	**Rationale**
Hydrogen Fluoride (HF)	Gas	BAQ Statement of basis emissions projections
Lead	Particulate	Natural gas thermal oxidizer emissions
Nitrogen Dioxide (NO_2)	Gas	BAQ Statement of basis emissions projections
Sulfur Dioxide (SO_2)	Gas	BAQ Statement of basis emissions projections
Particulate Matter (PM 2.5, PM10)	Liquid, Particulate	BAQ Statement of basis emissions projections
Silane	Gas	Pyrophoric and toxic gas stored in large quantities (approximately 290,000 cubic feet)
Volatile Organic Compounds (VOCs)	Gas/Vapor	BAQ Statement of basis emissions projections

3.0 AIR MONITORING METHODOLOGY

Citadel recommends a two-part air quality monitoring strategy to support the Fort Mill School District in evaluating environmental conditions at the Flint Hill Elementary and Middle School campuses. This strategy includes both scheduled air sampling and continuous outdoor perimeter monitoring to assess potential airborne COPCs identified in Section 2.0.

These recommendations are grounded in best practices from the EPA, the National Institute for Occupational Safety and Health (NIOSH), and the Occupational Safety and Health Administration (OSHA). All sampling activities will be overseen by a Citadel Certified Industrial Hygienist (CIH), and results interpreted using applicable health-based screening thresholds.

The approach is structured to capture conditions across multiple time periods, support transparency in school operations, and provide actionable data to inform health and safety planning.

3.1 SCHEDULED AIR SAMPLING & METHODOLOGY

Citadel proposes to collect indoor and outdoor air samples to evaluate baseline and operational air quality conditions. Indoor samples will be collected from approximately 10 percent of classrooms, offices, and other regularly occupied rooms and shared spaces. Sample locations will be selected in consultation with the District to represent different air handling zones across each school. Indoor air will be sampled near the typical breathing zone of occupants (approximately 3 to 5 feet above the floor). While sampling is underway, Citadel will also qualitatively assess each location for potential indoor sources of COPCs that could influence air quality results.

Outdoor samples will be collected concurrently, enabling comparison between indoor and ambient air conditions. Sample locations will include rooftop locations near air intake vents and areas along the school property boundary nearest the Silfab Solar facility. A summary of the proposed samples to be collected is provided in ***Table 2 – Indoor and Outdoor Sampling Strategy by School***.

Table 2 – Indoor and Outdoor Sampling Strategy by School			
School	**Sample Location**	**Sample Number**	**Sample Type**
Flint Hill Elementary School #12	Indoor	8	Area

Table 2 – Indoor and Outdoor Sampling Strategy by School			
School	**Sample Location**	**Sample Number**	**Sample Type**
	Outdoor	2	Area
Flint Hill Middle School #7[1]	Indoor	11	Area
	Outdoor	2	Area
Note: [1] - Initial samples to be collected after construction and prior to occupancy			

Air samples will be collected to assess airborne COPCs identified during the planning phase. These substances were selected based on their known use / emission at the Silfab Solar facility and the potential and their known or suspected health impacts when present in indoor environments. COPCs will be measured using sampling methods appropriate to their physical and chemical properties.

Citadel proposes the use of four primary collection methods:

- **Air Cassettes**: Filter-based devices used with portable pumps to collect reactive gases such as hydrochloric acid (HCl) and hydrogen fluoride (HF). These will be deployed in two 12-hour intervals to approximate a 24-hour sampling period.
- **Summa Canisters:** Vacuum-sealed stainless-steel containers designed to collect air slowly over 24 hours. These are used for capturing a wide range of VOCs, which may originate from industrial sources or indoor building materials.
- **Passive Badges:** Lightweight samplers that rely on natural air diffusion to absorb gases such as ammonia and formaldehyde over a 24-hour period.
- **Direct-Read Instruments**: Real time monitor to measure for silane.

Each sampling event will include the use of these methods, deployed at both indoor and outdoor locations. Outdoor results will be used as a background comparison to indoor concentrations. A summary of the indoor and outdoor COPC sampling media and sampling frequency is provided in ***Table 3 – COPC Scheduled Sample Collection Methods, Frequency, and Locations.***

Table 3 – COPC Scheduled Sample Collection Methods, Frequency, and Locations			
Substance	**Sample Collection Method**	**Sample Frequency**	**Location[1]**
Hydrochloric Acid (HCl)	Air Cassettes	Quarterly	Indoor & Outdoor
Hydrogen Fluoride (HF)	Air Cassettes	Quarterly	Indoor & Outdoor
VOCs	Summa Canisters	Quarterly	Indoor & Outdoor
Ammonia	Passive Badges	Quarterly	Indoor & Outdoor
Formaldehyde	Passive Badges	Quarterly	Indoor & Outdoor
Silane	Direct-Read	Quarterly	Indoor & Outdoor
Note:[1] – Outdoor locations will be used as a background for comparison to indoor results			

The sampling procedures for each substance are described below. Methods have been selected based on the physical form of each COPC and are consistent with established industry standards to ensure accurate and reliable results.

Hydrochloric Acid (HCl) and Hydrogen Fluoride (HF)
Area air samples for HCl and HF will be collected using portable, battery-powered air sampling pumps. The air sampling pumps will be used to draw a known volume of air through a specific collection media which will be attached to the pump via Tygon tubing. Sampling pump airflow rates will be pre-calibrated and post-verified using a primary airflow calibrator connected in-line with the sampling media. A series of samples will be collected to calculate a 24-hour average concentration.

Volatile Organic Compounds (VOCs)
Area air samples for VOCs will be collected using certified clean stainless steel evacuated canisters equipped with a 24-hour regulator. The canisters will be placed at approximately breathing zone heights and remain in their representative areas for the entire sampling period. Samples will be submitted to a laboratory for VOC analysis to a laboratory accredited by the American Industrial Hygiene Association, Laboratory Accreditation Programs. The analytical method reports over 70 VOCs.

Ammonia and Formaldehyde
Area air samples for ammonia and formaldehyde will be collected using passive monitoring badges. The passive badges collect vapors as air diffuses through micro-porous membranes and collects on an adsorbent media. Area samples will be collected over a 24-hour period. A series of samples will be collected to calculate a 24-hour average concentration.

All air samples will be sent to a laboratory accredited by the American Industrial Hygiene Association, Laboratory Accreditation Programs (AIHA-LAP) for analysis.

Silane
A direct-read instrument to monitor the air for silane will be used during the quarterly sampling event. The instrument is a portable, battery-powered single-gas sensor monitor. Measurements will be collected at representative indoor locations and at exterior locations to serve as a background reference.

3.2 CONTINUOUS OUTDOOR AIR PERIMETER MONITORING

To supplement scheduled air sampling events, Citadel recommends the District implement a continuous perimeter air monitoring system to enhance visibility into outdoor environmental conditions surrounding the Flint Hill school campus. These monitoring systems are designed to operate around the clock and provide near real-time data on key air quality indicators. This information supports early detection of outdoor air quality changes, informs operational decisions, and enables timely communication with stakeholders.

Citadel has outlined two options for implementing perimeter air quality monitoring. Both are suitable for long-term surveillance, with differing levels of data resolution and system scope.

Option 1: Comprehensive Perimeter Monitoring Suite
This option provides a broad spectrum surveillance of gases, particulates, and environmental conditions using advanced sensor technology. It is designed to generate robust, multi-contaminant data to assess any potential pattern analysis and high-resolution reporting.

Parameters Monitored:

- Particulate Matter (PM1.0, PM2.5, PM10)
- Total Volatile Organic Compounds (TVOCs)
- Gases: Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Carbon Monoxide (CO)
- Wind Speed and Direction

Benefits:

- Provides comprehensive, real-time upwind and downwind data for comparison
- Ideal for understanding multiple air quality parameters that have established national standards for ambient air quality
- Well suited for areas near active or high-risk facilities, such as Silfab Solar

This option involves installing two continuous air monitoring units at the boundaries of the school property - one upwind and one downwind of potential off-site sources such as the nearby Silfab Solar facility. These systems are configured to capture changes in air quality related to external emissions and ambient weather patterns.

Table 5 – Comprehensive Air Perimeter Monitor Placement (Option 1)

Location	Monitor Quantity	Sample Type
Near the northwest property boundary adjacent to Silfab Solar facility	1	Perimeter
Southeast property boundary near Gold Hill Road	1	Perimeter

Option 2: Targeted Perimeter Monitoring Approach

This option focuses on key air quality indicators with the flexibility to expand over time. It includes sensors needed to assess potential air quality contaminants, while offering a streamlined system setup and reduced operational complexity.

Parameters Monitored:

- Particulate Matter (PM2.5, PM10)
- Total Volatile Organic Compounds (TVOCs)
- Wind Speed and Direction
- Optional Gases: Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Carbon Monoxide (CO)

Benefits:

- Focuses on key air quality indicators that are common industrial emissions
- Allows for staged implementation and future upgrades
- Cost-efficient while maintaining environmental awareness at the perimeter

Table 6 – Targeted Outdoor Air Perimeter Monitor Placement (Option 2)

Location	Monitor Quantity	Sample Type
Near the northwest property boundary adjacent to Silfab Solar facility	1	Perimeter
Southeast property boundary near Gold Hill Road	1	Perimeter

This option involves installing two (2) continuous air monitoring units at the boundaries of the school property - one upwind and one downwind of potential off-site sources such as the nearby Silfab Solar facility. The system is configured to focus on a set of key air quality indicators that are typical of most industrial emissions, while allowing for future expansion if needed.

3.3 HUMAN HEALTH SCREENING LEVELS

Scheduled indoor and outdoor sampling and continuous outdoor air perimeter monitoring results will be compared to the following human health screening levels:

Schedule Air Sampling Data
Air sampling data will be compared to the maximum allowable 24-hour average concentration for contaminants listed in the South Carolina Toxic Air Pollutants (TAP), Regulation 61-62.5, Standard No. 8 and the EPA's Regional Screening Levels (RSLs) for Resident Air receptor scenario. If a COPC has an RSL and TAP limit, the most conservative value will be used.

Continuous Outdoor Perimeter Monitoring
Perimeter monitoring data will be compared to National Ambient Air Quality Standards (NAAQS) established by the EPA.

4.0 SAMPLING STRATEGY

4.1 SCHEDULED AIR SAMPLING

Citadel proposes conducting indoor and outdoor air sampling at four key time points. Each sampling event is designed to capture representative environmental conditions related to construction completion, school occupancy, and operations at the nearby Silfab Solar facility:

- **Pre-Occupancy Sampling -** Conducted after construction is complete, and the certificate of occupancy has been issued, but prior to the first day of school in August 2025. The purpose of this sampling is to establish a baseline understanding of indoor and outdoor air quality in newly constructed buildings.
- **Post-Occupancy Sampling -** Conducted approximately 2–3 months after the first day of school in August 2025, when the building is at normal capacity and operating conditions. The purpose of this sampling is to assess indoor air quality under typical use and occupancy conditions.
- **Silfab Startup Sampling** - Conducted 1–2 months after operations begin at the adjacent Silfab Solar facility. The purpose of this sampling is to evaluate whether nearby facility activity is associated with detectable changes in air quality.
- **Quarterly Sampling** - Conducted every three months for one year after Silfab's operations commence. The purpose of this sampling is to monitor seasonal trends and identify potential shifts in air quality over time.

Following one year of data collection, a comprehensive review of the data collected and Silfab's emissions reporting should be performed. The monitoring plan may be modified based on the presence or absence of COPCs.

4.2 CONTINUOUS OUTDOOR AIR PERIMETER MONITORING

The continuous outdoor air perimeter monitoring system will be designed for durability, reliability, and ease of access. Each unit will be configured to operate independently under various environmental conditions while maintaining secure, uninterrupted data collection.

The following features describe the core components and operational framework of the system and monitoring strategy:

- Air quality monitors will be mounted in secure weather-resistant enclosures
- Power will be provided via solar panels with battery backups
- Data from monitors will be continuously recorded and stored via onboard dataloggers

- Wind direction and speed will be monitored continuously using a weather station
- Monitors will be preset with alert thresholds for selected parameters
- Remote access to real-time data will be enabled for users authorized by the District
- Equipment will be inspected monthly by Citadel to confirm proper function

5.0 REPORTING

Following each scheduled air sampling event, Citadel will analyze sample results, develop, and deliver a report that includes background on the scope of work performed, methods, observations, results, conclusions, and recommendations, if any. Baseline data will be used to update the District's emergency preparedness and evacuation plans, and to develop policies and procedures should there be any incidences of results that are above screening levels or background levels (if the baseline air results exceed screening levels).

Citadel will conduct weekly offsite data checks for the duration of the project and will provide monthly reports for the duration of the project. Citadel anticipates conducting the proposed monitoring for twelve (12) months; thus the Client shall receive a total of twelve (12) monthly reports.

6.0 SIGNATURES

This Air Monitoring Plan has been Prepared by:

Adrian Olivares, MPH, CIH
Senior Consultant, Industrial Hygiene and Safety

Reviewed and Approved by:

Nalinna Rasu, Certified Asbestos Consultant (CAC), California Department of Public Health (CDPH), Certified Hazardous Materials Manager (CHMM), Leadership in Energy and Environmental Design Accredited Professional (LEED AP)
Principal, Environmental Compliance