Exponent
475 14th Street, Suite 400
Oakland, CA 94612

telephone 510-268-5000
facsimile 510-268-5099
www.exponent.com

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Lynn M. Beekman, Esq.
Fagen Friedman & Fulfrost LLP
1525 Faraday Avenue, Suite 300
San Diego, California 92008

VIA ELECTRONIC MAIL: lbeekman@f3law.com

Subject: Focused Indoor Environmental Quality Inspections at Emblem, North Park, Mountain View, and Bridgeport Elementary Schools
Saugus Unified School District, Valencia, California
Exponent Project No. 1703766.000, Task 0501

Dear Ms. Beekman:

Exponent conducted a focused indoor environmental quality investigation at Emblem, North Park, Mountain View, and Bridgeport Elementary Schools in Valencia, California, on August 1 and August 2, 2017. The objective of this investigation was to evaluate the current indoor environmental conditions within the schools in response to complaints of odor and/or moisture and indoor air quality complaints based on information provided to Exponent by representatives of the School District. The inspections were attended by Mr. Michael Posson (Exponent), the Assistant Superintendent of Business, site-representatives for each school, and the School District heating, ventilation and air conditioning (HVAC) Mechanics, as outlined in this letter report.

This evaluation included the following tasks:

- Focused building inspections for areas identified as having historical water intrusion, odor complaints, or possible fungal growth at each school identified by School District Representatives
- Focused visual inspection of air handling units (AHUs) at Emblem and Bridgeport Elementary Schools
- Measurement of outdoor air supplied to selected classrooms at Emblem and Bridgeport Elementary Schools

This report presents the study methods, observations, conclusions, and limitations associated with our inspections.

Study Methods

School Tours with School District and School Representatives

Representatives of the school district were present during the school tours, as noted below:

- Emblem Elementary: Assistant Superintendent of Business, HVAC Mechanics
- North Park Elementary: Assistant Superintendent of Business, Principal, Site Custodian Supervisor
- Mountain View Elementary: Assistant Superintendent of Business, Principal, Vice Principal
- Bridgeport Elementary: Assistant Superintendent of Business, Principal, Site Custodian Supervisor, HVAC Mechanics

These individuals pointed out locations identified as having historical water intrusion, odor complaints, or possible fungal growth.

The information from these initial discussions is summarized in the results section below:

Focused Building Inspection

A tour of select areas of each school was conducted, which included the interior occupiable spaces and exterior of the school areas under study. The focused building surveys included one or more of the following activities for each specific area of the school inspected, as noted in Table 1:

- Visual inspection and odor sensations
- Measurement of outdoor air supply
- Moisture meter measurements in either construction materials or concrete slab
- Volatile Organic Compound (VOC) screening with a handheld photo-ionization detector (PID)

- Collection of thermal comfort parameters, including relative humidity and temperature

During our inspections, information was recorded concerning general observations and any remarkable conditions as well as noticeable odors and visible observations of moisture or water intrusion. Photographs were taken to document the observations. At Bridgeport Elementary and North Park Elementary Schools, we lifted at least one carpet tile to observe the condition of the concrete slab and carpet backing in the classrooms that were inspected. Visible signs of moisture were subjectively graded (on a scale from 0 to 3, as noted in the attached tables) based on the visible presence of moisture on the exposed surfaces of the slab and/or carpet backing when it was lifted. Odor sensations were noted upon entering each room and also when lifting a carpet tile, if applicable. Concrete moisture meter measurements were taken in some locations using a handheld Tramex moisture meter, as noted in Table 1. Moisture meter measurements were taken using a handheld GE Protimeter Hygromaster. The moisture meter was calibrated according to the manufacturer's instructions before and after use and was found to be within normal operating conditions.

As noted in Table 1, VOC screening measurements were obtained at each sampling location during our inspections using a calibrated Rae Systems 3500 photo-ionization detector (PID). This device is capable of detecting general VOCs at part per billion (ppb) levels. The PID instrument is a non-specific method of measuring a combination of gases and vapors simultaneously. It is commonly used to measure the presence of volatile organic compounds, such as solvents, petroleum fuels (e.g., gasoline and diesel vapors), and common chemicals off-gassing from new furnishings and building materials. The instrument does not indicate the identity of the chemical it is detecting. Thus, it is only a general indicator of indoor air quality related to the presence of these types of chemicals and the likely source of VOCs. VOC measurements made with the PID were compared to a screening value range of 200 to 300 ppb (parts per billion in air). This value is not a health-based value and was approximated[1] based on the screening value published by the U.S. Green Building Council for establishing Leadership in Energy and Environmental Design (LEED) Certifications[2] since there are no established health-based screening levels for total volatile organic compounds (TVOCs).

[1] Air concentration units for the TVOC screening level (500 micrograms per cubic meter [µg/m3]) from the U.S. Green Building Council was converted using the molecular weight range of 40 to 60 grams per mole based on the molecular weight range of typical indoor air contaminants commonly found in normal buildings (e.g., ethanol, acetone, isopropanol).

[2] U.S. Green Building Council. 2017. Table 1. Maximum Concentrations Levels. Available online: http://www.usgbc.org/resources/table-1-maximum-concentration-levels-contaminant-and-testing. Accessed May 12, 2017.

Temperature and Humidity Measurements

A calibrated, handheld Q-Trak (TSI Model 7575) was used to measure temperature and humidity levels at each sampling location, as applicable. The instrument was placed in the area under study and allowed to equilibrate. Triplicate measurements were recorded during the inspection at each location. The average of the three measurements is reported.

Air Flow Measurements and Focused Visual Inspection of Select Air Handling Unit (AHU) Components at Emblem and Bridgeport Elementary Schools

An assessment was made of the amount of outdoor air supplied by the AHUs to portable classrooms located at Emblem Elementary School and two classrooms at Bridgeport Elementary School. Air velocity measurements were taken from the outdoor air intakes of the AHUs that supply outdoor air to the room(s) serviced. An experienced HVAC mechanic who maintains the systems at the school identified and provided an overview of the system operation for the rooms of interest. A calibrated, handheld velometer (TSI VelociCalc, Model 9565) was used to measure air velocities. Measurements were taken at times of calm winds to reduce the influence of outdoor wind conditions. Six to ten measurements were collected and recorded along the horizontal and vertical dimensions of the outdoor air intakes of each AHU evaluated. The size of each opening was measured with a tape measure. The air flow measurements were used to calculate the average air velocity over the face of the outdoor air intake vent. The average air velocity values, in concert with the intake dimensions, were used to calculate volumetric flow rates (in cubic feet per minute [CFM]). To determine the volumetric flow per person, air flow rates were divided by the room occupancy. The room occupancy values were provided by the School District. The resulting CFM/occupant values were then compared to the California Code of Regulation (CFR), Title 24 requirements of 15 CFM/occupant for nonresidential buildings. Further, the American National Standards Institute/American Society of Heating, Refrigerating, and Air Conditioning Engineers (ANSI/ASHRAE) Standard 62.1 (*Ventilation for Acceptable Indoor Air Quality*) values of 13 to 15 CFM/occupant recommended for school classrooms were also used as a point of comparison.

In addition to the air velocity measurements, several other observations were made regarding each AHU inspected, including:

- The orientation of the intake louver controlled by the economizer
- Visual inspection of the condition of the air filters
- The general condition of the heat exchange coils and condensation trays. In general, we were looking for readily apparent signs of corrosion, soiling, rusting, unusual moisture, or fungal growth in these areas.

Observations

Focused Building Inspections

As shown in Table 1, inspection activities occurred at Emblem Elementary, North Park Elementary, Mountain View Elementary, and Bridgeport Elementary Schools. The specific findings and results are discussed below by each school location. Representative photos are presented in Attachment A.

Emblem Elementary School

Exponent understands that the School District is commissioning seven portable classrooms for the 2017 school year. During our site visit on August 1, 2017, the exteriors of the portable buildings were being painted by contractors. Furnishings were also being delivered at the time of our inspection. We calculated airflow rates in each of the classrooms that were being commissioned. As shown in Table 2, classrooms 37, 38, and 40 had outdoor air supply below the California Building Code (required 15 CFM/occupant) and the ANSI/ASHRAE standards for classrooms (13 to 15 CFM/occupant). The remaining four classrooms had outdoor air supply airflow measurements that were acceptable relative to these requirements. The volumetric airflows and observations of the AHUs inspected are presented in Table 2. Occupancy values were provided to Exponent by the School District. A recommendation is offered at the end of this report based on this finding.

In addition, we noted the following during the visual assessment of the AHUs:

- The HVAC systems are equipped with automated economizer systems, which were noted to be operational. These systems control the flow of outdoor air into the classrooms.

- The air filters did not appear to have excessive accumulation of dust or debris. We understand that the filters are changed on an approximately quarterly basis as part of a preventative maintenance program for the AHUs by the School District.

- There were no readily apparent visual signs of corrosion, particulate accumulation, rusting, excessive moisture, or fungal growth on the surfaces inspected. This included the accessible portions of the heat exchanger, condensation tray, filters, and readily accessible inner compartment of the AHUs.

- Condensation drains should be inspected to assure that they drain outside of the AHU and some distance away from the structure to avoid water accumulation near the foundation of the portable classrooms. Some of the portable classrooms had drain lines that dripped on the portable's exterior siding (Photo 1).

At the time of our inspection, the exteriors of the portable classroom buildings were being repainted; therefore, representative measurements of the normal VOC levels could not be accomplished due to potential interferences from the freshly applied paint. Noticeable odors of paint were observed in the vicinity of the portable buildings upon arrival at the school. As the paint dries, the VOC levels associated with the painting will dissipate in a matter of days to weeks. We noted that low VOC paint was being used to paint the exteriors of the portable buildings.

North Park Elementary School

As shown in Table 1, several classrooms and common areas were inspected at North Park Elementary School and are discussed below.

Shared Utility Room between Kindergarten 1/Kindergarten 2

A water heater relief drain reportedly leaked and caused staining and possible fungal growth on some building materials in a shared utility room between Kindergarten 1 and Kindergarten 2 rooms (Photos 2 to 3). Custodial personnel informed us that possible fungal-impacted drywall was removed from the area surrounding the sink and near the water heater, which had been identified during the repair. This condition was discovered and was repaired during the Summer Break of 2017, prior to Exponent's inspection. Based on our review, no elevated moisture or visible fungal growth was observed on the construction materials that were present in this area at the time of our inspection. There were no obvious odors consistent with fungal growth noted in these repair areas. There was some residual, visible, construction dust remaining on some surfaces in the immediate area and were primarily concentrated on the floor. The work practices and controls used by the repair contractor related to this work were unknown.

We reviewed one document related to repair work conducted at North Park Elementary School, as noted in Attachment B. The document referenced removal of some construction materials in response to possible fungal growth on drywall in the summer of 2017. The scope of work based on the invoice included removal of impacted materials (e.g., drywall, "treatment" of exposed wood members, reinstallation of new construction materials, and painting (Document #14 in Attachment B). We understand, based on information from the school district, that this represents work performed in the Shared Utility Room between Kindergarten 1/Kindergarten 2 that we inspected and discussed above. I do not have any information about whether typical fungal remediation practices were followed during this repair (e.g., use of negative air machines, cleaning methods, and waste disposal).

Atrium near Reception Area

An atrium located near the entrance and main reception area was observed to have areas of water staining and possible historical flooding (Photos 4 and 5). No drain in this area was observed. This area's irrigation system should be inspected, repaired, and possibly modified to reduce the direct impact of water against the building exterior.

Classrooms 8 and 26

We inspected classrooms 8 and 26 as they were identified by School District personnel as having possible moisture intrusion beneath the installed carpet tiles and were representative of other classrooms on the campus. The condition was characterized by School District personnel as similar to the condition documented in Exponent's May 23, 2017, report outlining our investigation at Bridgeport Elementary School. As noted in Table 3, the classrooms inspected had visible staining or apparent moisture beneath the carpet tiles lifted in each classroom. School District personnel noted that this school was currently under investigation by a third-party geotechnical consulting firm to address the subsurface moisture intrusion issues through the concrete slab. Further, the School District indicated during the time of our inspection that additional remedial steps would be taken to address the moisture intrusion issue upon the completion of the geotechnical investigation. Exponent observed that the concrete slab had elevated levels of moisture using the moisture meter and noted in Table 3. As shown in this table, the VOC measurements were normal. As shown in Table 3, the relative humidity measured in room 8 was slightly greater than 60%; however, this could have been influenced by the outdoor relative humidity as there was an unseasonal storm event during the inspection that resulted in elevated outdoor humidity (average relative humidity of 65.7%, as shown in Table 3). There were no obvious odors consistent with fungal growth noted in these repair areas.

We noted that the rainwater downspouts terminated immediately outside of the buildings, which allows for storm water to pool on the concrete adjacent to room entry points and the building foundations. Ideally, these termination points would carry water away from the building foundation (Photos 6 and 7). Further, staining due to possible impact from irrigation water was observed on some buildings (see exemplar Photo 8).

Mountain View Elementary School

As shown in Table 1, several classrooms and common areas were inspected and are discussed below:

Classrooms 1, 19, 20, Meeting Room between Rooms 1 and 2

During our tour, the School District and Site Representatives provided access to several areas that were currently undergoing repair and replacement of construction materials of interior surfaces, mostly around windows. Site Representatives reported that storm

water downspouts routinely clog with debris resulting in overflowing of the roof drains that impacted the exterior walls of several buildings at the school. Water then overflows and impacts the building exterior, reportedly resulting in water intrusion. Exponent did not verify the source of water intrusion of buildings as it was not within the scope of this inspection. Exponent observed several of these areas where water intrusion had reportedly occurred and had been recently repaired (primarily in the summer of 2017) by a third-party contractor. During our inspection, no significant findings of moisture intrusion were noted in any of the newly installed building materials (e.g., drywall). There were no obvious odors consistent with fungal growth noted in these repair areas. In one area (Meeting Room between Rooms 1 and 2), some staining was observed that may be consistent with water intrusion (Photo 9). Based on interviews with school staff, the procedures used to repair the impacted areas included removal of some vinyl wall paper and drywall with possible fungal growth by a third-party contractor. The school staff did not know if the source of water intrusion had been repaired.

Classrooms 10, 33, 48

As noted in Table 1, these classrooms had some previous repairs that had occurred around exterior windows to address moisture intrusion and possible fungal growth on building materials, as reported by school staff at the time of our inspection. No evidence of current fungal growth, odors consistent with fungal growth, or elevated moisture within existing building materials was noted at the time of our inspection.

Classroom 24

During our tour, School District and Site Representatives noted that there had been a recent complaint of odor within this classroom. We inspected this space and found no evidence of current fungal growth, no odors consistent with fungal growth, and no elevated moisture within existing building materials. There was a noted, unidentifiable odor within the room; however, the odor was not considered unpleasant. As shown in Table 4, no unusual concentrations of VOCs were measured in this room at the time of our inspection. TVOC concentrations were well below the U.S. Green Building Council's screening concentration of 220 ppb. As shown in Table 4, the relative humidity measured in room 8 was slightly greater than 60%; however, this could have been influenced by the outdoor relative humidity as there was an unseasonal storm event during the inspection that resulted in elevated outdoor humidity.

Classroom 34

School District and Site Representatives indicated that there has been historical water intrusion within this room. We inspected this space and found no evidence of current fungal growth, no odors consistent with fungal growth, and no elevated moisture within

existing building materials. Some minor water stains on the ceiling tiles were noted in this room.

Multipurpose Room (Outdoors, Roof)

School District and Site Representatives stated that there had been a historical flood on the roof of the multipurpose room that was attributable to clogged roof drains. We inspected the roof and found no existing presence of visible moisture or fungal growth. However, the downspouts that remove storm water from the roof were consistent with the design noted on other buildings with reported moisture intrusion issues.

Review of Historical Documents

We reviewed several reports documenting inspections that investigated reports of suspected indoor air quality issues and water intrusion, communications regarding complaints for specific rooms, repair invoices and records, some custodial personnel logs, and indoor air quality (IAQ) checklists at Mountain View Elementary School. In general, these documents summarized investigations by other industrial hygienists and engineers, complaint logs/surveys, and some timeline information. The list of documents provided and reviewed by Exponent is contained in Attachment B.

Based on our review of the documents, some areas of documented water intrusion and mold growth have been identified. Historical repairs have been completed in Rooms 1, 13, 10, 20, and 19. These prior repairs had been completed by a third-party contractor and generally include removal of drywall, vinyl wall paper, and cabinets due to water intrusion reportedly around exterior windows. In addition, the third-party contractor performed some additional sealing, caulking, and repairs to window seals, drains, and downspouts in 2017. The work practices used during every repair operation are not clear from the documentation; however, there are indications that the work areas were partially contained during repairs (specifically in Room 10, as shown in Document #9 listed in Attachment B). During my inspection, I also observed plastic sheeting around some work areas. I do not have any information about whether typical fungal remediation practices were consistently followed during all repair work (e.g., use of negative air machines, cleaning methods, and waste disposal).

There is specific documentation regarding additional investigations conducted in Room 10. An initial work order was issued on February 6, 2017. In particular, there are photographs of Room 10 showing what appears to be fungal impacted vinyl wall paper backing and drywall (noted in Document #9 listed in Attachment B). In addition, in approximately March 2017, drywall material, cabinetry, wall paper, and cleaning of the window frame was completed in Room 10. In addition, new drywall was installed followed by taping/painting, and reinstallation of cabinets was completed by a third-party contractor. Additional cleaning by custodial personnel included wet-wiping surfaces within the classroom on March 14 and 15, 2017, and April 5, 2017.

Additional carpet disinfection was conducted on April 5, 2017. A complaint was issued to Cal/OSHA for Room 10 resulting in a letter to resolve directed to SUSD but indicating that Cal/OSHA would not be conducting an inspection. On May 5, 2017, Machado issued a report outlining fungal spore testing completed in Rooms 10, 35, and 48 due to historical complaints. Machado concluded that the air tests were normal in all three of these classrooms, confirming that there were no unusual levels of fungal spores in the area after the repairs were completed and the room cleaned.

Based on our review of the air sampling results provided with the Machado report and our inspection of Room 10 on August 2, 2017, we agree with this conclusion. Machado did recommend that additional cleaning of the HVAC system servicing Room 10 and an elevated location within the room be cleaned via use of a HEPA vacuum and wet-wiping methods. In their May 23, 2017, report, Machado issued another proposal for cleaning the HVAC system due to the age of the system. The HVAC system cleaning occurred before June 5, 2017, based on the invoice date for the cleaning performed by Machado.

Historical complaints of water intrusion have been noted in Rooms 24 and 34 that I inspected. For Room 24, there have been reports of a "hamster" odor in the room based on the work order log provided to me. I inspected the room on August 2, 2017, and did not notice an odor consistent with animal infestation. As previously discussed above, there was a noted unidentifiable odor within the room; however, the odor was not considered unpleasant. We understand that the source of the odor has not been identified.

Future remediation efforts are planned for Rooms 2 through 9, 11, 12, 14 through 18, 21, 22 through 25, 27, 28, and "RSP". We understand that an Institute of Inspection, Cleaning and Restoration (IICRC) Certified mold remediation company is being hired to complete this planned work.

Bridgeport Elementary School

Classrooms with Concrete Slab Remediation

As noted in Table 1, several classrooms were repaired for moisture intrusion issues. These classrooms were noted in Exponent's May 23, 2017, report as having visible staining or obvious moisture beneath carpet tiles. Remediation was reported to include removal and disposal of the carpet tile, cleaning of the residual adhesive from the slab surface, sealing of the concrete slab surface, and installation of new carpet tile. We inspected all of the rooms remediated and found no evidence of residual moisture beneath the carpet tiles. While temperature and relative humidity measurements were taken in each room inspected, the operation schedule of the ventilation system may not

have been representative of typical conditions as the school was on summer break and the rooms were unoccupied.

Within a representative number of classrooms, a carpet tile was lifted and inspected for the presence of obvious staining on residual moisture and was tested using a concrete moisture meter, as previously described. As noted in Table 1, with the exception of classroom A8, all of the measurements collected from the exposed concrete slab beneath the carpet tiles in the classrooms inspected were normal. Classroom A8 had not been remediated. Further, as shown in Table 5, the observations of elevated VOCs indoors relative to outdoors in some classrooms were not considered abnormal given that the ventilation systems were not operating on a normal or typical schedule. Further, VOC concentrations were well below the U.S. Green Building Council's screening concentration range of 200 to 300 ppb. The observations and measurements made in the classrooms inspected are noted in Table 1.

Classrooms without Concrete Slab Remediation

As noted in Table 1, two classrooms were inspected as a point of comparison for the classrooms that have undergone slab remediation. As noted in Table 5, the concentrations of VOCs, relative humidity, temperature, and odor sensations were consistent with the classrooms inspected that underwent slab remediation. The observations and measurements made in the classrooms inspected are noted in Table 1.

Air Handling Units (AHUs) for Rooms A3 and A11

School District personnel reported elevated relative humidity measurements within classroom A11 in the days preceding our inspection. (We understand that a handheld monitoring device maintained by the School District was used.) During our inspection, we measured relative humidity, temperature, and outdoor air flow rates for two classrooms, including classroom A11.

As shown in Table 2, classrooms A3 and A11 initially had outdoor air supply below the California Building Code (required 15 CFM/occupant) and the ANSI/ASHRAE standards for classrooms (13 to 15 CFM/occupant). Exponent, with the assistance of the HVAC Mechanic present during the inspection, opened the minimum set point for the economizer to allow for increased outdoor air intake into the AHU. The results of the post-adjustment measurement resulted in acceptable outdoor air supply based on the screening measurements collected at the time of our inspection for classroom A11. The volumetric airflows and observations of the AHUs inspected are presented in Table 2.

In addition, we noted the following during the visual assessment of the AHUs:

- All of the economizers were activated to control the flow of outdoor air into the classrooms.

- The air filters did not appear to have excessive accumulation of dust or debris. We understand that the filters are changed on an approximately quarterly basis as part of preventative maintenance.

- There were no readily apparent visual signs of corrosion, particulate accumulation, rusting, excessive moisture, or fungal growth on the surfaces inspected. This included the accessible portions of the heat exchanger, condensation tray, filters, and readily accessible inner compartment of the AHUs.

Upon arrival at the school and prior to any adjustment to the AHU, we measured relative humidity and temperature inside of classroom A11, as noted in Table 6. Relative humidity was above 60% at the center of the room. Adjustment of the AHU to increase outdoor air supply resulted in a slight decrease in the relative humidity measurement, as noted in Table 6.

Classrooms C1 and D3

In classroom C1, Site custodial personnel reported that a small area (<10 square feet) of stained and possible fungal growth on vinyl wall paper was identified near the entry door after the concrete sealing occurred in the summer of 2017. Site custodial personnel attributed this condition to the covering of the classroom walls with plastic during the concrete slab sealing activities. The custodial personnel reported that they cleaned the area with a dilute bleach solution, and the vinyl wall paper was replaced. During our inspection, we did not observe residual staining or fungal growth on the accessible surfaces. There was a small area adjacent to the lower left of the exit sign along the base cove molding that tested slightly damp with a moisture meter (Photo 10). This area was a few square inches in size. All other surfaces tested with the moisture meter were dry. In room C1, there was some evidence that irrigation water may be hitting the windows and possibly the exterior wall (Photo 11).

In classroom D3, site custodial personnel reported that a small area (<10 square feet) of stained and possibly fungal growth-impacted vinyl wall paper was identified near the entry door after the concrete sealing occurred in the summer of 2017. Site custodial personnel attributed this condition to the covering of the classroom walls with plastic during the concrete sealing activities. The custodial personnel cleaned the area with a dilute bleach solution, and the vinyl wall paper was replaced in this area. During our inspection, we did not observe any residual staining or fungal growth on the accessible surfaces. All other surfaces tested with the moisture meter were “dry.”

Summary and Recommendations

We did not identify any hazardous indoor air quality conditions within the areas of the schools inspected on August 1 and 2, 2017. All VOC measurements were at low or normal concentrations with no unusual findings. No visual evidence of fungal growth was observed in the accessible areas that we inspected. Exponent has the following recommendations based on our inspection and the review of documentation noted in this report.

Emblem Elementary School, Portable Classrooms

- Ventilation for Classrooms 24, 25, 41, and 39A/39B were acceptable (Table 2) relative to the required minimum of 15 CFM outdoor air/occupant under Title 24 of the California Code of Regulations.

- Ventilation for Classrooms 37, 38, and 40 were below code requirements (Table 2). We suggest opening the economizers on Portable 37 to match those of Portable 25 to increase the amount of outdoor air. For Classroom 37, we recommend opening the economizer significantly as the air velocity was very low on that unit. Note that Classroom 37 was of different construction than the other units, so we cannot identify a comparative unit for louver adjustment based on our observations. A balancing contractor should be consulted to verify outdoor air supply.

- A "flush-out" period for furnished portables should be conducted for several days prior to the start of school to accelerate off-gassing of newly installed building materials and furniture and diluting any airborne chemicals. Do this by running the HVAC fan continuously (24-hours per day) for as long as possible (i.e., at least 2 to 4 days). The air conditioning can be on during this time.

- Occupancy values are based on information from the School District. For these calculations, a value of 1 was added to the occupancy limits to account for a teacher present in the rooms. For planned classrooms, we assumed the maximum occupancy for this group of portables, or 31 students and one (1) teacher.

Mountain View Elementary School

- The source of water intrusion resulting in impacts to interior building surfaces around windows should be investigated and resolved by a qualified building contractor. Further, the reported clogging of storm drains by debris should also be investigated by a qualified contractor to prevent the roof drains from clogging up in the future. Consider having the custodial personnel inspect the roofs following rain events.

Bridgeport Elementary School

- Open the economizers further (3 fingers' width or 2.5 to 3 inches versus 2 fingers' width or 1 to 1.5 inches) to increase outdoor air supply. This is based upon the results of measurements in room A3 and A11 on Wednesday. I used occupancy values from our May 2017 Report for the Bridgeport School.

- The air handling units (AHUs) at this school should be evaluated and balanced by a qualified individual (e.g., balancing contractor) to assure that proper comfort and outdoor air supply are maintained in accordance with building code requirements and industry standards. This does not have to happen immediately as long as the custodial personnel open up the economizers in the interim.

- For Classroom C1 at Bridgeport, a small area near the entry door was reportedly cleaned a week prior to my inspection. There was a small area adjacent to the lower left of the exit sign along the base cove molding that tested slightly damp with a moisture meter. This area should be monitored by custodial personnel for the presence of moisture. If moisture persists, then additional investigation will be necessary.

- There was also a report of possible fungal-impacted construction materials in room D3 adjacent to the entry door, as previously discussed. If not already completed in these areas, the source of water intrusion should be inspected, identified, and resolved, as necessary. Based on our observations, after these additional actions are completed, no additional immediate actions should be taken at this time. However, these areas should also be monitored for wet conditions by custodial personnel, particularly after rain or suspected water intrusion events; building materials can be tested for moisture using a pin-type moisture meter.

<u>General Recommendations for All Schools</u>

- From this point moving forward, hire a qualified remediation company to complete remediation repairs of significant size involving disturbing confirmed or possible fungal-impacted materials (>10 square).[3] These specialized contractors should identify the scope, conduct the remediation, and provide documentation reflecting that the remediation was performed pursuant to industry requirements. For smaller areas (<10 square feet), a specialized contractor may not be needed, but certain precautions should be taken. For example, workers doing small scale remediation should be trained in the use of personal protective equipment, including respirators. Respirator fit testing and medical evaluations should be performed. Basic information about proper remediation should be provided to the personnel conducting this type of work.

[3] The U.S. Environmental Protection Agency (EPA) recommends enhanced controls be put in place when over (>) 10 square feet of fungal-impacted materials are to be disturbed during remediation. Source: U.S. EPA. 2008. Mold Remediation in Schools and Commercial Buildings. EPA 402-K-01-001.

- We understand that repairs to address moisture intrusion and/or building materials with confirmed or possible fungal growth had been recently conducted in some locations at Bridgeport, North Park, and Mountain View Elementary Schools. During the inspections discussed above, School District personnel and I observed all such accessible areas during my inspections on August 1 and 2, 2017, based on guidance and information from school representatives and prior experience with Bridgeport Elementary. For the areas recently remediated (i.e., over the 2017 summer break) at North Park, Bridgeport, and Mountain View Elementary Schools, as a precautionary measure, the immediate areas should be re-cleaned. Hard surfaces can be wet-wiped with a surface cleaner (e.g., Simple Green or equivalent). Soft surfaces (e.g., carpet) can be vacuumed with a HEPA vacuum. All debris should be bagged in a garbage bag, sealed, and disposed of in the general waste stream or following current school disposal practices.

- Irrigation watering systems should be evaluated and adjusted to prevent irrigation water from hitting the exterior of the building. This was observed on buildings at North Park and Bridgeport Elementary Schools.

- Relative humidity should be periodically monitored within the classrooms to assure they are maintained at levels below 60%.[4] As discussed in the observations section above, some relative humidity measurements exceeded the recommended value of 60% at North Park, Mountain View, and Bridgeport Elementary School. However, this could have been influenced by the outdoor relative humidity as there was an unseasonal storm event during the inspection that resulted in elevated outdoor humidity.

- School district employees cleaning confirmed or possible fungal impacted surfaces should use a mild-detergent, such as Simple Green or the equivalent, to clean nonporous surfaces, provided the area is less than (<) 10 square feet.

Limitations

This assessment was limited to visible and accessible surfaces and the conditions that existed on August 1 and 2, 2017. We did not inspect interstitial spaces, such as above dropped ceilings, inside walls, and crawl spaces, and do not offer any opinions on the conditions of those spaces. The surface and air sampling reflected the conditions that existed at the time of this evaluation, and such conditions may be different at other times. If the District is aware of building materials or contents not specified within this report that are suspected of containing fungal growth, those materials should be evaluated as appropriate.

[4] U.S. EPA. 2008. Mold Remediation in Schools and Commercial Buildings. EPA 402-K-01-001.

Exponent investigated specific issues relevant to the evaluation as provided by the client. Therefore, the scope of services performed during this assessment may not adequately address the needs of others, and any re-use of or reliance on this report or the findings, conclusions, or recommendations presented herein is at the sole risk of the user. If any errors in this report are discovered, please notify us so that we can respond to any concerns.

This completes our focused evaluation of the Emblem, North Park, Mountain View, and Bridgeport Elementary Schools in Valencia, California. If you have any questions or require any additional information, please contact me via phone at 510-268-5077.

Sincerely,

Michael Posson, CIH
Managing Scientist

Attachment A: Photographs

Attachment B: Documents Reviewed

Tables

Table 1. Summary of Areas Inspected, August 1 and 2, 2017

School	Area/Classroom Number(s) Inspected	Activities	Reported Issue/Item Inspected
Emblem Elementary	25, 24, 37, 38, 39A/39B, 40, 41	-Visual inspection and odor observations. -Measurement of oudoor air supply.	-Ventilation/Outdoor air supply measurements for portable classrooms to be occupied for the 2017/2018 school year. -Indoor environmental quality.
North Park Elementary	Shared Utility Room between Kindergarden 1/Kindergarden 2	-Visual inspection and odor observations.	Remediation conducted upon discovering water leak at water heater relief drain.
	Atrium Near Reception Area	-Visual inspection and odor observations.	Potential water intrusion source.
	8, 26	-Visual inspection and odor observations. -VOC screening with PID.	Moisture under carpet tiles.
Mountain View Elementary	1, 19, 20, Meeting room between Rooms 1 & 2	-Visual inspection and odor observations. -Moisture meter measurements in construction materials.	Ongoing remediation around exterior window.
	10, 33, 48	-Visual inspection and odor observations. -Moisture meter measurements in construction materials.	Historical room remediated around window.
	24	-Visual inspection and odor observations. -VOC screening with PID.	Reported current odor
	34	-Visual inspection and odor observations.	Reported historical indoor air quality issues (odors) and reported health effects by teacher.
	Multipurpose Room (Roof)	-Visual inspection and odor observations.	Reported historical flooding on roof.
Bridgeport Elementary	Classrooms with Concrete Slab Remediation: A1, A4, A6, A8, A11, A76 C1, C2, C3 D1, D2, D3 E1A, E1B, E2, E3, E4 F1	-Visual inspection and odor observations. -Moisture meter measurements in concrete slab. -Relative humidity and temperature measurements. -VOC screening with PID.	Rooms inspected by Exponent in May 2017 and found to have visible staining or moisture under carpet tile. Rooms remediated during the Summer of 2017.
	Classrooms without Concrete Slab Remediation: A3, A70	-Visual inspection and odor observations. -Moisture meter measurements in concrete slab. -Relative humidity and temperature measurements. -VOC screening with PID.	Rooms inspected by Exponent in May 2017, but no further remedial activity occurred.
	Air handling units (AHUs) for Rooms A3 and A11	-Visual inspection. -Measurement of oudoor air supply.	-Elevated humidity measurements by School District Staff.
	C1, D3	-Visual inspection and odor observations. -Moisture meter measurements in construction materials.	-Reported possible fungal growth on vinyl wall paper that had been cleaned.

Table 2. Summary of Outdoor Air Supply Calculations for Select Air Handling Units (AHUs) (All ventilation measurement values are cubic feet per minute of outdoor air)

Classroom	Economizer Status	Primary AHU (CFM OA)	Secondary AHU (CFM OA)	Total CFM OA	Occupants	CFM OA/ Occupant
Emblem Elementary School						
Portable 24	Open	571	NA	571	27	21
Portable 25	Open	693	NA	693	25	28
Portable 41	Open	898	NA	898	32	28
Portable 40	Slightly open	395	NA	395	32	12
Portables 39A/39B	Open	458	354	813	11	74
Portable 37	Slightly open	176	NA	176	32	6
Portable 38	Slightly open	38	NA	38	32	1
Bridgeport Elementary School						
A3	Slightly Open (2 Fingers)	331	NA	331	36	9
A11 - pre-adjustment	Closed	80	NA	80	25	3
A11 - post-adjustment	Open (3 Fingers)	369	NA	369	25	15

**Occupancy values provided by Saugus School District. An increase in occupant # will decrease the CFM/Occupant.
CFM = Cubic feet per minute

OA = Outdoor air

Table 3. Summary of Observations, North Park Elementary School

Location	Odor	PID Readings[a] In Center of Room (ppb)	Visual assessment of stain/moisture[b]	Moisture meter reading[c]	Relative Humidity[d] (%)	Temperature[d] (°F)
Outside 1	None	0	NA	NA	65.7	81.8
Class 8	None	16-35	3	>6	64.8	74.4
Class 26	None	20-51	3	>6	45.4	67.2

[a] PID = photoionization detector; ppb = parts per billion; NA = no information collected

[b] 0 = no signs of moisture; 1 = visible staining under carpet; 2 = visible moisture under carpet

[c] Moisture meter readings were not taken in every room, but only in a few representative rooms

[d] Numbers provided are an average of three different readings

Table 4. Summary of Observations, Mountain View Elementary School

Location	Odor	PID Readings[a] In Center of Room (ppb)	Visual assessment of stain/moisture[b]	Moisture meter reading[c]	Relative Humidity[d] (%)	Temperature[d] (°F)
Outside 1[e]	None	0	NA	NA	65.7	81.8
Class 24	None	0-25	NA	NA	61.4	76.7

[a] PID = photoionization detector; ppb = parts per billion; NA = no information collected

[b] 0 = no moisture; 1 = visible staining under carpet; 2 = visible moisture under carpet

[c] Moisture meter readings were not taken in every room, but only in a few representative rooms

[d] Numbers provided are an average of three different readings

[e] Outdoor readings from North Park Elementary used as a point of comparison

Table 5. Summary of Observations, Bridgeport Elementary School

Location	Odor	PID Readings[a] In Center of Room (ppb)	Visual assessment of stain/moisture[b]	Moisture meter reading[c]	Relative Humidity[d] (%)	Temperature[d] (°F)
Outside 1 (ground)	None	0-5	NA	NA	25.4	106.5
Outside 2 (roof)	None	0	NA	NA	39.5	94.0
A6	None	151-152	0	4	47.5	79.6
A76	Slight musty	186-195	0	3.5	42.5	83.5
A70	None	150-156	0	4	46.9	81.5
A3	None	188-193	0	NA	49.9	78.5
A11	Slight musty	8-21	0	NA	58.3	76.2
A8	Slight musty	0-22	1	>6	54.3	74.3
A4	None	7-22	0	3	47.7	77.4
A1	None	44-45	0	2.5	49.4	74.3
C3	None	145	0	4	50.5	80.8
C2	None	119	0	4	53.2	79.6
C1	Slight musty	96-102	0	3.5	80.6	50.9
D3	Slight musty	68-69	0	4	51.4	78.4
D2	Slight musty	58-62	0	4	54.5	77.9

Table 5. Summary of Observations, Bridgeport Elementary School (continued)

Location	Odor	PID Readings[a] In Center of Room (ppb)	Visual assessment of stain/moisture[b]	Moisture meter reading[c]	Relative Humidity[d] (%)	Temperature[d] (°F)
E4	None	49-57	0	4.5	49.6	80.2
E3	Sweet, flowery	40-41	0	4	43.7	81.5
E2	None	31-32	0	3.5	51.4	77.0
E1A	Slight musty	27-28	0	3.5	49.7	75.9
E1B	None	27-29	0	4.5	53.3	75.3
F1	None	33-35	0	4	47.3	74.3

[a] PID = photoionization detector; ppb = parts per billion; NA = no information collected
[b] 0 = no moisture; 1 = visible staining under carpet; 2 = visible moisture under carpet
[c] Moisture meter readings were not taken in every room, but only in a few representative rooms
[d] Numbers provided are an average of three different readings

Table 6. Comparison of Environmental Conditions,

Bridgeport Elementary School

Sampling location	Temperature[a] (°F)	Relative Humidity[a] (%)
A11 – pre-AHU Adjustment	71.7	62.2
A11 – Post-AHU Adjustment	70.9	60.7
A3	69.4	59.3

[a] Numbers provided are an average of three different readings

Attachment A

Photographs

Photo 1. Condensate Line Dripping on Siding, Unit 39A, Emblem Elementary

Photo 2. Remediated Area, Classrooms 1 and 2, North Park Elementary

Photo 3. Remediated Area, Classrooms 1 and 2, North Park Elementary

Photo 4. Atrium, Staining on Concrete, North Park Elementary

Photo 5. Atrium, Possible Broken irrigation Line, North Park Elementary

Photo 6. Representative Downspout Outside of Classroom, North Park Elementary

Photo 7. Stain on Ground below Downspout, North Park Elementary

Photo 8. Possible Irrigation Water Stain on Building Exterior, North Park Elementary

Photo 9. Staining on Window Sill at Remediation Location, Mountain View Elementary

Photo 10. Wet Drywall Near Exit Sign, Classroom C1, Bridgeport Elementary

Photo 11. Hard Water Staining on Window, Bridgeport Elementary

Attachment B

Documents Reviewed

Documents Reviewed

Mountain View Elementary

1. A school map showing areas where historical repairs or planned repair or remediation activities are to occur (undated map).
2. An invoice from a third-party contractor for the repair of Room 10 drywall (March 28, 2017).
3. The Machado Environmental Corporation ("Machado") report titled "Cleaning one air conditioning system serving Mountain View Elementary School" (May 23, 2017).
4. Historical log of school work orders.
5. Invoices from third-party contractor for the repairs completed in Rooms 1, 10, 13, 20, and 19, completed in 2017.
6. Invoice from Machado Environmental Corp for duct and HVAC system cleaning (dated June 5, 2017).
7. Invoices from third-party contractor for repairs to drains, downspouts, and window seals/caulking in 2017.
8. Email communications regarding water intrusion at the school in 2017.
9. Email communications regarding water and possible fungal growth in Room 10 in 2017.
10. SUSD Letters regarding Complaint No. 1202305 (Various dates in 2017).
11. The Machado report titled "Inspection and Testing report" (dated May 5, 2017).
12. California Occupational Safety and Health Administration (Cal/OSHA) notice of complaint (March 30, 2017).
13. IAQ Tools for School Survey for 2014 through 2017.

North Park Elementary School

14. An invoice from a third-party contractor for repairs (dated July 12, 2017).