FACS
Forensic Analytical Consulting Services

February 21, 2020

Indoor Environmental Quality Assessment: Findings of Additional Assessment

John Muir Elementary School
Bungalow A
2526 Sixth Street
Santa Monica, CA 90405

Prepared for:

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FACS Project #PJ44957

Contents

Executive Summary

Forensic Analytical Consulting Services, Inc. (FACS) was retained by Ms. Toni Consolo of ASCIP on behalf of Santa Monica-Malibu Unified School District (SMMUSD) to perform a follow up indoor environmental quality assessment of Classroom Bungalow A at John Muir Elementary School located at 2526 Sixth Street in Santa Monica, CA. An indoor environmental quality assessment and destructive testing and inspection of the wall cavities at the exterior siding were performed in this follow up investigation to further evaluate for microbial growth. The investigation was conducted by Madeleine Dangazyan, Project Manager of FACS, on February 7, 2020. FACS conducted an initial mold and moisture assessment of the subject classroom on January 8, 2020 (see report dated January 28, 2020), following complaint of musty odor due to a moisture intrusion incident that reportedly occurred several months prior to FACS' assessment. Staff also reported experiencing adverse health symptoms (i.e. upper respiratory irritation).

Based on additional detailed information provided by staff on site, FACS performed an invasive inspection (removal of building materials) during the follow up investigation and areas of minor mold growth was identified behind the vinyl cove base (bathroom wall) and on the wall and metal support beam above the ceiling tiles (ceiling cavity) at the north wall, requiring corrective action. Based on the minor quantity of mold growth identified, and prior assessment findings, elevated mold spore levels in the air and on surfaces in the classroom is not suspected at this time.

Additionally, this investigation did find other conditions that have the potential to negatively impact indoor environmental quality and associated actions that can be taken to address them were identified along with other suggestions for generally improving indoor environmental quality. A summary of the primary causes of indoor environmental quality concerns considered, FACS' conclusions and related recommendations are provided in the table below. A more complete discussion of findings, conclusions and recommendations is provided in the body of this report.

FACS IEQ Evaluation Summary		
#	**Primary IEQ Concerns and Recommendations**	**Conclusion & Completion**
1.	***Are excessive levels of dust/particulates contributing to degraded indoor environmental quality?***	**Potential**
a)	*Consider an enhanced cleaning regimen of the classroom (quarterly or semi-annually) which may include detail cleaning of surfaces, including return registers. Cleaning should be performed by HEPA-vacuuming for rugs and other porous surfaces, and damp-wiping of vinyl flooring and non-porous surfaces. Settled dust should be removed from any surfaces where dust has accumulated, such as most horizontal surfaces, furnishings, carpets, and hard to reach corners. The use of specialized crevice tools may be necessary in order to remove dust that has settled in hard to access spaces. Avoid brushing off or "dusting" surfaces (dry dusting). Dry dusting does not physically remove dust and particulates; this technique only temporarily aerosolizes (makes airborne) the dust. Eventually, the particles will re-settle on the surfaces.*	❑
b)	*Regularly inspect and maintain all AHU's to ensure proper function including:* *1. Inspect/replace filter regularly (no current PM program). Based on inspection of the filters, the need for sooner change out may be deemed necessary;* *2. Clean dust accumulation to prevent introduction of potential allergens and irritants into the occupied spaces;* *3. Clean and maintain interior components including coils, condensate pan, drain lines to ensure cleanliness, proper function, and drainage;* *4. Ensure condensate drain line is appropriately positioned to prevent moisture impact of the siding; and* *5. Ensure the AHU's are operated continuously during regular occupied hours, check thermostat/controls to ensure proper function*	❑

FACS IEQ Evaluation Summary		
#	**Primary IEQ Concerns and Recommendations**	**Conclusion & Completion**
2.	***Is mold growth contributing to degraded indoor environmental quality?***	**Unlikely**
a)	*Investigate the source of water at the north wall, above the ceiling tiles*	❑
b)	*Remove impacted building material at the north wall, above the ceiling tiles identified with mold growth. Continue removal at a minimum of 18" past any visible mold. Clean the metal support beam identified with mold growth above the ceiling tile at the north wall.*	❑
c)	*Remove the vinyl cove base and the lower 1ft x 3ft. of the bathroom wall (common wall with classroom). Remove vinyl cove base and lower 1ft. x 1ft. of the west wall (adjacent the bathroom common wall). Following removal, inspect the exposed wall cavity for additional moisture impact and/or mold growth. If discovered, continue removing impacted materials in accordance with FACS remediation guidelines (Appendix F).*	❑
d)	*If applicable, remove and dispose of impacted insulation materials. Thoroughly clean the exposed wall cavity.*	❑
e)	*Install HEPA air filtration devices inside the room to assist in filtering the air*	❑
f)	*Perform a post remediation clearance assessment.*	❑
3.	***Is inadequate ventilation contributing to degraded indoor environmental quality?***	**Unlikely**
a)	*No recommendations at this time. Consider long-term monitoring if concerns regarding ventilation (i.e. stuffiness) arise.*	❑
b)	*Work with Maintenance and Operations personnel to check AHU thermostat/controls to ensure the AHU's proper function.*	❑
4.	***Are temperature and/or humidity conditions contributing to degraded indoor environmental quality?***	**Unlikely**
a)	*No recommendations at this time. Consider long-term monitoring if concerns regarding temperature and/or humidity arise.*	❑
a)	*Work with Maintenance and Operations personnel to set thermostat control to ensure proper function and achieve comfortable indoor thermal environment.*	❑
5.	***Are elevated carbon monoxide levels responsible for, or contributing to, the reported occupant symptoms?***	**Unlikely**
a)	*No recommendations at this time*	❑
6.	***Additional Items***	**--**
a)	*Investigate the source of moisture impact of the wood siding (skirt). FACS recommends removal of areas of damaged wood siding. If mold growth is present, continue removal in accordance with FACS remediation guidelines (Appendix F)*	❑
b)	*FACS recommends that all interested building occupants be informed of the results of this assessment. Communication with and between the occupants will be an important component in resolving these issues. FACS recommends all interested occupants be provided access to this FACS report.*	❑
c)	*If occupant symptoms persist, it is recommended that building representatives assess the need for additional inspection and testing.*	❑

Introduction

Forensic Analytical Consulting Services (FACS) was retained by Ms. Toni Consolo of ASCIP on behalf of Santa Monica-Malibu Unified School District (SMMUSD) to perform a follow up indoor environmental quality assessment of Classroom Bungalow A at John Muir Elementary School located at 2526 Sixth Street in Santa Monica, CA. FACS conducted an initial mold and moisture evaluation of the subject classroom on January 8, 2020; in which recommendations were provided to assist in improving indoor air quality (see report dated January 28, 2020). FACS was later contacted to perform an indoor environmental quality assessment of the classrooms as well as invasive inspection of wall cavities at the exterior siding to further assess for hidden mold growth. The follow up investigation was conducted by Madeleine Dangazyan, Project Manager of FACS, on February 7, 2020.

The purpose of the evaluation was to 1) further identify and evaluate potential explanations, sources and pathways for the symptoms or concerns reported by the occupant(s); 2) provide information for consideration in assessing risk to occupants; and 3) provide recommendations for additional investigation and corrective actions as necessary.

Site Characterization

The subject property is characterized as follows (characterization limited to areas inspected):

Address:	*2526 Sixth Street, Santa Monica, CA 90405*
Bldg. Type/Use:	*Portable classroom*
Foundation:	*Raised with crawl space*
Flooring:	*Vinyl tile throughout classroom; rolled vinyl in restroom*
Walls:	*Pressboard over gypsum wallboard*
Ceiling:	*2' x 4'suspended ceiling tiles*
Roof:	*Flat*
HVAC:	*Wall-mounted package air handling unit*
Setting:	*Residential neighborhood*
Landscaping:	*Light vegetation*

Site History

According to client representatives and occupants/employees, the following history was developed:

- The subject room is a preschool classroom with a dedicated restroom. Reportedly, a water leak occurred in the restroom several months ago.
- According to the teacher, the source of the water leak was a broken plumbing line in the wall of the bathroom (common wall to classroom) that resulted in water gushing out and flooding the classroom and bathroom floor during class instruction.
- Reportedly, the classroom was evacuated on the day of the incident and custodial staff immediately began mopping and drying efforts. It is unknown if fans were placed or any other efforts performed to assist with drying efforts.
- According to district representatives, the leak has since been repaired.
- Staff have reported musty/mildew odor, particularly when the room is first opened in the morning. Staff have reported experiencing adverse health effects while occupying the room (i.e. upper respiratory tract irritation, sore throat, headache, itchy and watery eyes). The symptoms reportedly subside when staff is away from the subject classroom (i.e. weekends)
- On January 8, 2020, FACS conducted an initial mold and moisture assessment of the subject classroom. Visible mold growth was not identified and based on assessment findings as well as air samples collected, elevated mold spore levels in the air and in settled was not suspected. Other notable findings were identified during the site assessment that included the observance of

heavy dust loading on horizontal surfaces and window tracks in the subject classroom. Excessive dust/particulates on settled surfaces can potentially become airborne if disturbed and may contribute to undesirable indoor air quality. Additionally, moss growth was observed on the floor near the air handling unit, conditions that warrant corrective actions (refer to FACS' report dated January 28, 2020).

- On February 7, 2020 FACS returned to conduct a follow-up assessment of the exterior siding (invasive inspection) and perform an additional indoor environmental quality assessment of the classroom. FACS observed similar conditions identified during FACS' prior investigation (i.e. heavy dust levels on horizontal surfaces) and advises that recommendations provided by FACS be performed prior to any further investigations.

Scope of Work

In the course of this project, FACS conducted the following scope of work:

- Development of a site characterization and history (see sections above).
- Interview of client representatives and staff to identify issues as well as develop additional relevant data.
- A destructive visual assessment of exterior north siding beneath the air handling unit.
- A non-destructive visual assessment of the classroom interior.
- Measurement of various indoor air quality parameters, including carbon dioxide levels, temperature, relative humidity and carbon monoxide, in the areas of concern.
- Collection of dust samples from areas of concern for particle identification analysis.
- Single-point measurement for PM10 (particulates ≤10 micron in diameter) and PM2.5 (particulates ≤2.5 micron in diameter). Samples were collected using a TSI DustTrak II aerosol monitor in the areas assessed.
- Collection of surface dust samples from areas of concerns for particle identification analysis.
- Collection of surface samples in locations of suspect mold growth.

The scope of work noted above was developed based on client/occupant concerns, background provided to FACS, and technical considerations. The data collected in the course of the investigation and supporting information is presented in this report as follows:

- Appendix A: Floor Plan
- Appendix B: Photographs
- Appendix C: Sampling Summary & Lab Results
- Appendix D: FACS Data Collection Methods
- Appendix E: FACS General Mold Assessment Guidelines
- Appendix F: FACS General Mold Remediation Guidelines

Conclusions and Recommendations

This investigation did not find hazardous conditions with regard to indoor air quality in the subject classroom, however, it did identify potential causes of some occupant concerns and symptoms. It is often the case that implementing a series of incremental improvements, coupled with appropriate communication and information sharing, can result in an overall improvement of indoor environmental quality and resolution of occupant symptoms and concerns.

In the course of collecting and analyzing the data from this investigation, FACS identified and evaluated various potential explanations for client and occupant concerns. A discussion of these potential explanations, along with related FACS conclusions and recommendations to improve indoor environmental quality are provided below.

Issue-by-Issue Discussion

1. ***Are excessive levels of dust/particulates contributing to degraded indoor environmental quality?***

Conclusion: CONFIRMED PROBABLE **POTENTIAL** UNLIKELY

Various particulates are common in indoor environments. Particles ("dust") from various indoor and outdoor sources (e.g. human skin, paper, dirt, clothing, building material) can accumulate in the indoor environment and result in degraded indoor air quality, i.e. ("dusty" air). Health problems that can be caused by breathing particulates include eye, nose, and throat irritation and increased risk for respiratory infections and allergic reactions. Acute exposure to particulates, such as can occur if settled dust is disturbed and aerosolized, can potentially cause irritation to building occupants and increase the risk of respiratory problems in sensitive individuals. Inadequate housekeeping and insufficient filtration by the HVAC system can exacerbate dusty environments. Occupants in these conditions may report symptoms such as coughing, sneezing, and discomfort.

The following are findings from the additional assessment:

- Visual inspection of the interior and immediately adjacent exterior areas of the building did not identify potential sources of significant airborne particulates.
- Similar findings identified during FACS' prior investigation.
- Visual inspection of the classroom interior indicated heavy dust loading on horizontal surfaces and window tracks.
- Heavy dust accumulation was observed on the return air grille.
- Staining was observed on the vinyl tile flooring and the backside of area rugs.
- Debris was observed on the area rugs.
- Inspection of accessible components of the AHU, including the cooling coils, filters, condensate pan, supply vents indicated acceptable maintenance with moderate dust/debris deposition of interior components. Reportedly, the MERV 8 pleated filters are changed based on maintenance staff availability. The condensate drain line was observed short and moisture impact of the wood siding near the skirt was observed. Additionally, green moss growth was observed on the floor near the AHU.
- Surface dust samples were collected for particle identification analysis by polarized light microscopy. Samples were collected from representative locations based on occupant concerns as follows:
    - Sample T03 was collected from the top of the white board located on the west wall.
    - Sample T04 was collected from the top of cabinet located at the east wall.
    - Analysis of the two dust samples collected indicated: Major (>10%) constituents in the dust samples that included dander (animal and human epidermal skin cells), synthetic fibers (from clothing and carpet), cellulose (from plant-based products including some types of paper and clothing), and inorganic detritus (soil minerals). Minor (1-10%) amounts of pollen and organic detritus identified. Trace amounts (<1%) various constituents were also identified.
    - In general, analysis of the dust samples collected indicated dust profiles that were typical for an indoor environment; with the exception of dander. Although commonly found indoors, the levels of dander identified in the settled dust samples were found to be at levels >10% (major) that could potentially result in degraded indoor air quality if airborne. Results summary and lab report are provided in Appendix D.
- Single-point measurements for airborne particulates (PM_{10} and $PM_{2.5}$) were collected in representative areas within the classroom and exterior locations (outdoor control) using a DustTrack II aerosol monitor. Measurements were collected for particulates less than 10 microns

in diameter (PM_{10}) which are considered inhalable particle. Measurements were collected for particulates less than 2.5 micron in diameter ($PM_{2.5}$) which are considered respirable particle. Particle concentration was collected in milligrams per cubic meter (mg/m^3).
    - In general, PM_{10} results ranged from 0.052 mg/m^3 to 0.320 mg/m^3 on the day of assessment and were above outdoor result of 0.037 mg/m^3.
    - In general, $PM_{2.5}$ results ranged from 0.042 mg/m^3 to 0.150 mg/m^3 and were above the outdoor result of 0.035 mg/m^3.
- Based on assessment findings, there is potential that excessive or unusual dust/particulates contributed to undesirable indoor environmental quality. In general, indoor airborne particulate levels should be lower than outdoor control levels where mechanical ventilation systems are running and constantly filtering indoor air. On the day of FACS' assessment, indoor airborne particulate concentrations (PM10 and PM2.5) in the classroom exceeded the outdoor levels. Visual observations of the subject classroom indicated heavy dust loading on windowsill/tracks and "hard to reach" surfaces or surfaces not subject to regular cleaning regimen. Although not hazardous, the levels of dander and inorganic detritus found in the dust samples collected are potential sources for degraded indoor air quality and may be a possible cause of occupant concerns and symptoms. As best practice, the following recommendations are provided to assist in improving indoor environmental quality.

Recommendations:

a) *Consider an enhanced cleaning regimen of the classroom (quarterly or semi-annually) which may include detail cleaning of surfaces, including HVAC registers. Cleaning should be performed by HEPA-vacuuming for rugs and other porous "soft" surfaces and items, and damp-wiping of vinyl flooring and "hard" non-porous surfaces. Settled dust should be removed from any surfaces where dust has accumulated, such as most horizontal surfaces, furnishings, carpets, and hard to reach corners. The use of specialized crevice tools may be necessary in order to remove dust that has settled in hard to access spaces. Avoid brushing off or "dusting" surfaces (dry dusting). Dry dusting does not physically remove dust and particulates; this technique only temporarily aerosolizes (makes airborne) the dust. Eventually, the particles will re-settle on the surfaces.*
b) *Regularly inspect and maintain all AHU's to ensure proper function including:*
    1. *Inspect/replace filter regularly (no current PM program). Based on inspection of the filters, the need for sooner change out may be deemed necessary;*
    2. *Clean dust accumulation to prevent introduction of potential allergens and irritants into the occupied spaces;*
    3. *Clean and maintain interior components including coils, condensate pan, drain lines to ensure cleanliness, proper function, and drainage;*
    4. *Ensure condensate drain line is appropriately positioned to prevent moisture impact of the siding; and*
    5. *Ensure the AHU's are operated continuously during regular occupied hours, check thermostat/controls to ensure proper function*

2. *Is mold growth contributing to degraded indoor environmental quality?*

Conclusion: CONFIRMED PROBABLE POTENTIAL **UNLIKELY**

Mold growth can occur when organic building materials or accumulated organic debris is impacted by moisture. This may occur within 24-48 hours from the time such materials become wet, hence it is critical that materials are substantially dried within this time frame in order to minimize the potential for mold growth to develop. Mold growth has the potential to elicit negative health effects in sensitive persons. This most frequently manifests as allergic respiratory symptoms which may range from mild to severe depending on individual sensitivities. Irritant and infectious effects are possible. It is generally accepted that mold growth in buildings should be removed following appropriate precautions to protect workers involved in the clean-up and the surrounding environment. Greater precautions are taken for greater

amounts of mold growth. In addition, the underlying cause of mold and moisture intrusion should be identified and corrected in order to minimize the potential for recurrent mold growth. Additional information can be found at the U.S. Environmental Protection Agency website (http://www.epa.gov/mold/).

The following are findings from the assessment:

- According to district representative and the teacher a plumbing line break in the dedicated bathroom resulting in flooding of the classroom and bathroom several months prior to FACS' assessment. The flood event occurred during class time. Reportedly, the classroom was evacuated, and custodial staff immediately began mopping of the impacted areas. It is not known if fans were placed to assist with drying efforts. No other significant water intrusion events (e.g. roof leaks) is known to have occurred in the classroom.
- Reportedly, the source of the leak (i.e. plumbing line) has since been repaired.
- FACS did not observe stained ceiling tiles or evidence of moisture intrusion from roof leaks in the subject classroom during the investigations.
- Moisture readings of areas assessed in the classroom indicated acceptable levels.
- Based on additional detailed information provided by staff regarding the flood event, FACS conducted invasive inspection (removal of building materials) in the area previously impacted by the flood event, FACS identified a minor amount of mold growth (approximately 3 linear feet) behind the vinyl cove base at the bathroom wall (common wall to classroom). Additionally, staff reported that reported symptoms worsen when she spent time near the hand washing sink at the north wall. Based on this information, FACS conducted an invasive inspection (removal of ceiling tiles) in the area and identified mold growth (approximately 2 square feet) on the wall and the metal support beam on the north wall above the ceiling tiles (ceiling cavity). Surface tape lift samples confirmed the presence of mold growth.
- Approximately 2.5ft. x 3ft. of the exterior wood siding and skirt was removed at the exterior north elevation (beneath the AHU). Inspection of the wall cavity did not identify visible mold growth. Moisture readings of the wood support beams in the wall cavity indicated acceptable levels.
- Moss growth was observed on the floor adjacent the AHU and beneath corroded and damaged rain gutters.
- Based on assessment findings, mold growth is present in the classroom. However, based on the amount of mold growth identified, its locations (behind building materials), elevated mold spores in the air and on settled surfaces that would degrade indoor air quality is not suspected.

Recommendations:

a) Investigate the source of water leak at the north wall, above the ceiling tiles.
b) Remove impacted building material at the north wall, above the ceiling tiles identified with mold growth. Continue removal at a minimum of 18" past any visible mold. Clean the metal support beam identified with mold growth at the north wall above the ceiling tiles.
c) Remove the vinyl cove base and the lower 1ft. x 3ft. of the bathroom wall. Remove vinyl cove base and 1ft. x 1ft. of the west wall (adjacent the bathroom common wall). Following removal, inspect the exposed wall cavity for additional moisture impact and/or mold growth. If discovered, continue removing impacted materials in accordance with FACS remediation guidelines (Appendix F).
d) If applicable, remove and dispose of impacted insulation materials. Thoroughly clean the exposed wall cavity.
e) Install HEPA air filtration devices inside the room to assist in filtering the air.
f) Perform a post remediation clearance assessment.

3. Is inadequate ventilation resulting in degraded indoor environmental quality?

Conclusion: CONFIRMED PROBABLE POTENTIAL **UNLIKELY**

Mechanical ventilation systems (a.k.a., HVAC systems) generally mix recirculated indoor air with outside "fresh" air. If the ventilation rate (i.e., amount of outside air) is too low, common indoor contaminants such as particles, odors, chemical vapors and exhaled carbon dioxide can accumulate and result in degraded indoor air quality. Occupants in poorly ventilated rooms will frequently describe the air as "stuffy" or "stale" and will more often report symptoms and discomfort related to indoor environmental quality. Cal/OSHA regulations (8CCR§5142) generally require that in mechanically ventilated buildings the HVAC system must be run continuously during working hours. The regulation further requires minimum outdoor airflows based on the building codes in place at the time of construction. The current minimum outdoor airflows called for in the building code are derived from guidelines by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ANSI/ASHRAE Standard 62.1--Ventilation for Acceptable Indoor Air Quality) and are calculated based upon the type of building space, number of occupants, size of the occupied area and other variables related to the design of the HVAC system.

In occupied buildings, carbon dioxide (CO_2) concentrations are typically higher then ambient outdoor concentrations due to exhaled air from people. As such, comparison of indoor and outdoor CO_2 levels are often used as a general indicator of indoor ventilation relative to human bioeffluents (i.e., body odor). ANSI/ASHRAE Standard 62.1 indicates that keeping indoor CO_2 levels less than 700 ppm above outdoor levels (about 400 ppm) will provide satisfaction to the substantial majority of people in the building relative to human bioeffluents. As a general rule of thumb, ventilating to keep indoor CO_2 levels below 1,000 ppm and closer to outdoor levels results in less occupant complaints regarding indoor air quality and "stuffy" or "stale" air.

The following are findings from the assessment:

- The door and windows of the classroom were open upon arrival. Reportedly, they are opened to help with general ventilation and assist in removing malodors. FACS closed the door and windows prior to measuring carbon dioxide levels.
- Point-in-time measurements of carbon dioxide levels were collected in the classroom and at an outdoor control location during a typical classroom instruction day. Indoor carbon dioxide levels generally ranged from 632 ppm – 733 ppm. The classroom was occupied during the assessment.
- Based on assessment findings, the carbon dioxide levels were below 1,000 ppm in all areas assessed, which indicated it is unlikely that inadequate ventilation is negatively impacting air quality.

Recommendations:

a) *No recommendations at this time. Consider long-term monitoring if concerns regarding ventilation (e.g. stuffiness) arise.*
b) *Work with Maintenance and Operations personnel to check AHU thermostat/controls to ensure the AHU's proper function.*

4. *Are temperature and/or humidity conditions resulting in degraded indoor environmental quality?*

Conclusion: CONFIRMED PROBABLE POTENTIAL **UNLIKELY**

The combination of temperature and humidity in a building is the primary driver of occupant thermal comfort. Occupant thermal discomfort is often associated with increased dissatisfaction with indoor environmental quality and may exacerbate occupant symptoms. Cal/OSHA does not regulate thermal comfort in buildings; however, the California labor code indicates that temperatures in work areas shall provide reasonable comfort consistent with industry-wide standards for the work performed. To this end, Federal OSHA recommends temperature control in the range of 68-76°F and corresponding relative humidity from 60-20%. Similarly, the American Society of Heating, Refrigeration and Air-conditioning

Engineers (ASHRAE) has developed widely accepted guidelines for managing temperature and humidity in buildings to help ensure the thermal comfort of occupants (ANSI/ASHRAE Standard 55). This guideline generally recommends 75-83ºF & 60-10%RH (warm weather) and 68-77ºF & 80-10%RH (cool weather). While these guidelines attempt to define conditions that are acceptable for approximately 80% of occupants, individual preferences may vary.

The following are findings from the assessment:

- The door and windows of the classroom were open upon arrival. Reportedly, the windows are opened because the classroom becomes too hot. FACS closed the door and windows prior to measuring temperature and relative humidity levels.
- Point-in-time measurements of temperature and relative humidity levels were collected in the classroom. The classroom was occupied during the assessment.
- Indoor temperature levels were measured ranging from 66ºF - 67ºF. The measured temperatures was slightly lower (less than 68 ºF) and not within the ASHRAE and OSHA guidelines.
- Indoor relative humidity levels were measured from 57% - 59%. The measured humidity levels were within ASHRAE and OSHA guidelines for comfort
- Based on assessment findings, it is unlikely that temperature and humidity conditions are negatively impacting air quality.

Recommendations:

a) *No recommendations at this time. Consider long-term monitoring if concerns regarding temperature and/or humidity arise.*
b) *Work with Maintenance and Operations personnel to set thermostat control to ensure proper function and achieve comfortable indoor thermal environment.*

5. *Are elevated carbon monoxide levels responsible for, or contributing to, the reported occupant symptoms?*

Conclusion: CONFIRMED PROBABLE POTENTIAL **UNLIKELY**

Carbon monoxide (CO) is produced from hydrocarbon combustion and may be introduced into an indoor environment by air heating elements, water heaters, stove oven burners and other sources. At low concentrations, CO can cause fatigue in healthy people and chest pain in people with heart disease. At higher concentrations, CO can result in impaired vision and coordination; headaches; dizziness; confusion; nausea and can be fatal at very high concentrations. No standards for CO have been agreed upon for indoor air. The EPA National Ambient Air Quality Standards for outdoor air are 9 parts per million (ppm) for 8 hours, and 35 ppm for 1 hour.

The following are findings from the assessment:

- FACS investigation identified a parking a street adjacent to the subject building, which is a potential source of carbon monoxide from the combustion of automobile gasoline/fuel.
- Carbon monoxide levels measured from 0.0 ppm in the areas assessed. All levels were below the EPA National Ambient Air Quality Standard for outdoor air (9 ppm).
- Based on assessment findings, it is unlikely that carbon monoxide is responsible for, or contributing to, the reported occupant symptoms.

Recommendations:

a) *There are no recommendations at this time*

6. *Additional Items*

a) Damage and warping of the wood siding near the skirt was observed at the north and east elevations. Moisture readings indicated elevated moisture levels at the skirt on the north and east elevations. Investigate the source of moisture impact of the wood siding. Potentially, the elevated

moisture level observed at the north and east sidings may be due to the areas not receiving direct sunlight and remain in the shade for the better part of the day. FACS recommends removal of areas of damaged wood siding. If mold growth is present, continue removal in accordance with FACS recommendations.

b) FACS recommends that all interested building occupants be informed of the results of this assessment. Communication with and between the occupants will be an important component in resolving these issues. FACS recommends all interested occupants be provided access to this FACS report.
c) If occupant symptoms persist, it is recommended that building representatives assess the need for additional inspection and testing (e.g. allergens).

Limitations

This investigation is limited to the conditions and practices observed and information made available to FACS. The methods, conclusions and recommendations provided are based on FACS' judgment, expertise and the standard of practice for professional service. They are subject to the limitations and variability inherent in the methodology employed. As with all environmental investigations, this investigation is limited to the defined scope and does not purport to set forth all hazards, nor indicate that other hazards do not exist.

Please do not hesitate to contact our offices at 310-668-5600 with any questions or concerns. Thank you for the opportunity to assist ASCIP and SMMUSD in promoting a more healthful environment.

Respectfully,
FORENSIC ANALYTICAL

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Reviewed by,
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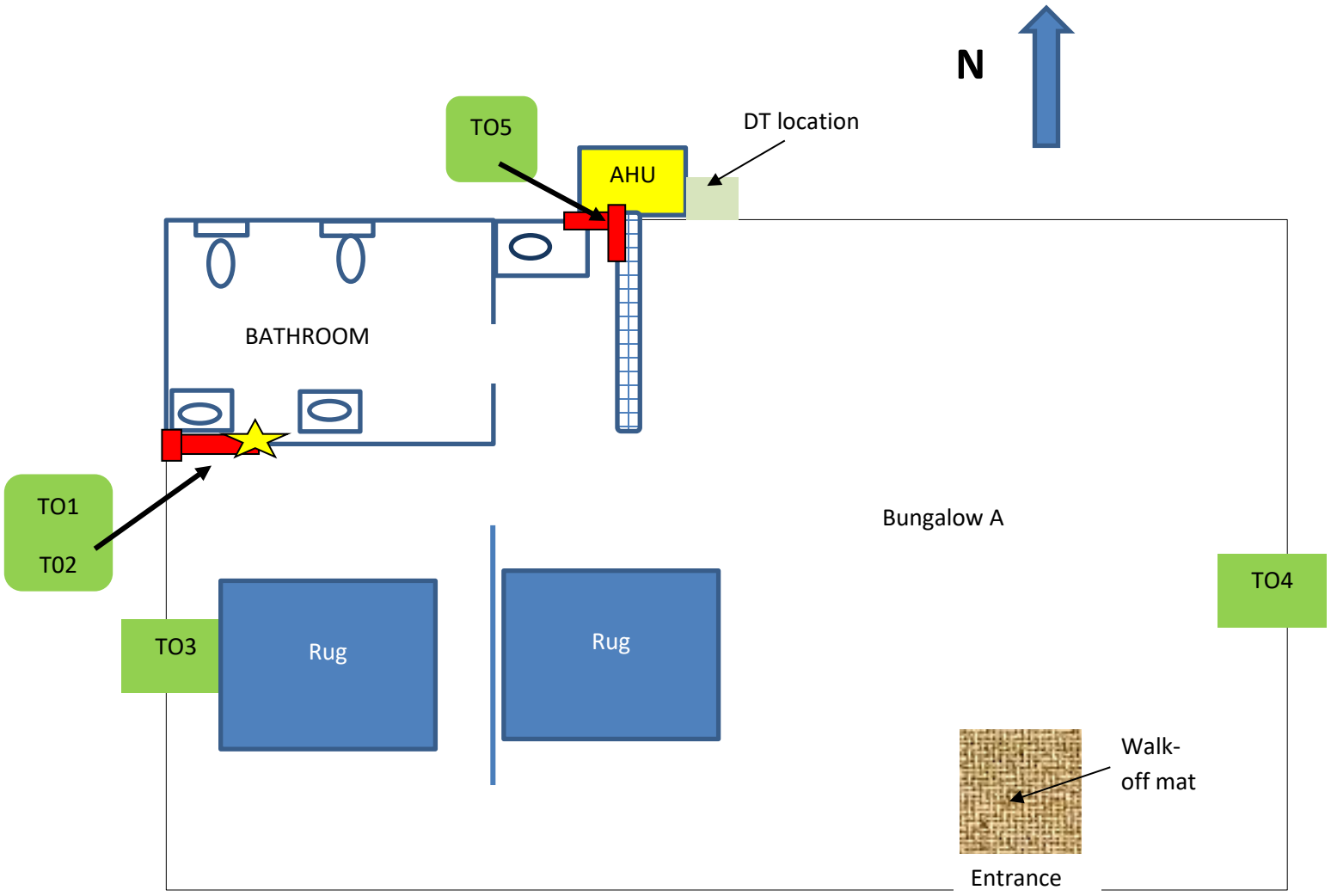
Appendix A
Floor Plan



LEGEND:

: Metal support beam

: Sample location

: Visible mold growth

: Sink

: Source of leak (plumbing)

Appendix B
Photographs

Photo #1: Classroom Bungalow A overview

Photo #2: AHU overview

Photo #3: Moss growth on floor near the AHU

Photo #4: Damaged/corroded rain gutter near the AHU

Photo #5: Destructive Testing (DT) location (north elevation) of siding and skirt beneath the AHU - overview

Photo #6: Close up of the DT at the skirt

Photo #7: No visible mold observed. Moisture readings measured acceptable levels of wood building members at the DT location

Photo #8: No visible mold observed. Moisture readings measured acceptable levels of wood building members at the DT location

Photo #9: No visible mold observed. Moisture readings measured elevated levels of at the skirt, north elevation (DT location)

Photo #10: Moisture readings measured elevated levels of at the skirt, north elevation (adjacent DT location)

Photo #11: Damage at the skirt on the northeast corner of the building

Photo 12: Damage at the skirt on the southeast corner of the building. Moisture readings measured elevated levels.

Photo #13: Classroom Bungalow A - overview

Photo 14: Overview of bathroom wall (common wall to classroom, NW side of the room) – source of plumbing leak

Photo #14: Visible mold growth behind the vinyl cove base at the bathroom wall (common wall with classroom)

Photo 16: Visible mold growth behind the vinyl cove base at the bathroom wall (common wall with classroom)

Photo #17: Visible mold growth on the north wall, above the ceiling tile (adjacent the metal support beam)

Photo 18: Visible mold growth on metal support beam at the north wall, above the ceiling tile

Photo #19: Staining of vinyl tile flooring and area rug

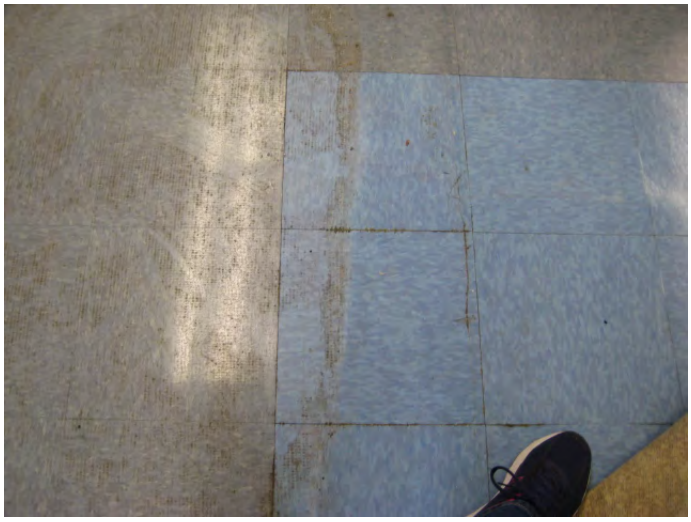


Photo 20: Staining of vinyl tile flooring

Photo #21: Staining of vinyl tile flooring and area rug

Photo 22: Heavy and dark opacity dust deposition observed on windowsill/track

Photo #23: Heavy dust deposition on high horizontal surfaces (top of white board – sample location)

Photo 24: Heavy dust deposition on high horizontal surfaces (top of cabinet – sample location)

Appendix C
Sampling Summary & Lab Results

Sampling results are summarized in the table below. Supporting laboratory reports and chain of custody forms are attached in the pages that follow in order of laboratory report number.

Table 1: Indoor Air Quality Comfort Parameter and Airborne Particulate Readings

Location	Airborne Particulates (mg/m^3)		CO2	CO	RH%	Temp (F)
	2.5 µm	10.0 µm	ppm	ppm		
Exterior S Elevation (outdoor control)	0.035	0.036	478	0	59	65
Exterior E Elevation (outdoor control)	0.035	0.037	437	0	56	65
Classroom Bungalow A						
Center	0.042	0.052	632	0	59	66
W. wall, on carpet (with kids)	0.095	0.158	664	0	59	67
W. wall, on carpet (with kids)	0.150	0.320	679	0	58	67
Entrance S elevation	0.109	0.250	733	0	57	67

Table 2: Mold Spore Surface Sample Results

Surface Tape Lift Samples (Lab Report # F131286)			
Sample Number	**Location**	**Substrate**	**Summary Finding**
T01	Interior (bathroom) wall, behind vinyl cove base	Gypsum Wallboard	**Abundant** ***Chaetomium*****, Hyphae,** ***Stachybotrys*** **Major** ***Penicillium/Aspergillus***
T02	Interior (bathroom) wall, behind vinyl cove base	Gypsum Wallboard	**Major** ***Chaetomium*****, Hyphae**
T05	Metal beam, N wall, ceiling cavity	Metal	**Abundant** ***Cladosporium*** **Major** ***Basidiospores, Hyphae*** Minor *Penicillium/Aspergillus*
Note: *Findings in bold considered elevated.*			

Table 3: Particle Identification Results (Lab Report # 024.01699)

Sample Number	Location	Particle Characterization
T03	Top of white board, W wall	*Major (>10%):* Dander (animal and human epidermal),, cellulose fibers (paper/wood products), inorganic detritus (soil minerals), synthetic fibers (carpet). *Minor (1-10%):* Pollen, organic detritus. *Trace (<1%):* Various
T04	Top of shelf, E wall	*Major (>10%):* Dander (animal and human epidermal), cellulose fibers (paper/wood products), inorganic detritus (soil minerals), synthetic fibers (carpet). *Minor (1-10%):* Pollen *Trace (<1%):* Various
Notes:		

FACS

MICROBIAL BULK SAMPLING CHAIN OF CUSTODY

Client #: LA05 FACS Los Angeles ASCIP	FACS Project #: PJ44957	Sampled by: MD	Project Manager: Madeleine Dangazyan	Date: 2/1/20

Site Address:
SMMUS- John Muir E/S Bungalow A - Moisture/Mold Assessment
2526 Sixth Street
santa monica CA 90405

Analysis Requested: ☑ NVB / ☐ Other:

Turnaround Time: ☐ Same Day ☐ 1-Day ☐ 2-Day ☑ 3-Day ☐ Other:

Calibrator & Serial Number:

Lab Instructions/Notes: **E-mail results to** E-mail results to mdangazyan@forensicanalytical.com and dina.canchola@forensicanalytical.com

Sample Number	Location (& Substrate)	Start Flow / Stop Flow	Start Time / Stop Time	Total Time	Total Area	Media / # Expiration Date	Accum. Activity	Visible Loading
T01	Interior wall - DW behind vinyl base cove				~3LF		☑ H ☐ L	☐ L ☑ M ☐ H
T02	↓ ↓ ↓				~3LF		☑ H ☐ L	☐ L ☑ M ☐ H
T05	Metal center beam, N. wall, ceiling cavity				~2SF		☑ H ☐ L	☐ L ☑ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H
							☐ H ☐ L	☐ L ☐ M ☐ H

Sampling Naming: T=Tape Lift, ~~S=Swab~~, M=Microvac, ~~B=Bulk~~.

Accumulation & Activity: High or Low.

Visible Loading: Light (no visible loading, light loading on surface), Moderate (minor visible loading, loading on surface), Heavy (heavy loading)

Relinquished by: [signature]	Date & Time: 2/10/20 1330	Received by: [signature] FIE	Date & Time: 2-11-20 9:10A
Relinquished by:	Date & Time:	Received by:	Date & Time:

SGS FORENSIC LABORATORIES

Final Report

Non-Viable Bulk Fungal Analysis

Forensic Analytical Consulting Svcs
Madeleine Dangazyan
2959 Pacific Commerce Drive

Rancho Dominguez, CA 90221

Client ID: LA05
Report Number: F137310
SGSFL Job ID: LA05
Date Received: 02/11/20
Date Analyzed: 02/11/20
Date Printed: 02/14/20
First Reported: 02/14/20

Sample Type: Tape Lift
Analysis: Direct Microscopy - Qualitative (visual area estimation); FALI Method IAQ 102
Job ID / Site: PJ44957; SMMUS- John Muir E/S Bungalow A - Moisture/Mold Assessment 2526 Sixth Street santa monica CA 90405

Total Samples Submitted: 3
Total Samples Analyzed: 3

Lab Number	**60215059**	**60215060**	**60215061**
Sample ID	**T01**	**T02**	**T05**
Location	Interior Wall- DW Behind Vinyl Basecove	Interior Wall- DW Behind Vinyl Basecove	Metal Center Beam, N. Wall, Ceiling Cavity
Sample Date	02/07/20	02/07/20	02/07/20
Organism	**Relative Density**	**Relative Density**	**Relative Density**
Basidiospores	ND	ND	**Major**
Chaetomium	**Abundant**	**Major**	ND
Cladosporium	ND	ND	**Abundant**
HYPHAE	**Abundant**	**Major**	**Major**
Penicillium / Aspergillus	**Major**	ND	**Minor**
Stachybotrys	**Abundant**	ND	ND
Particulate Density	**Abundant**	**Major**	**Major**
Comments			

2959 Pacific Commerce Drive, Rancho Dominguez, CA 90221 / Telephone: (310) 763-2374 (888) 813-9417 / Fax: (310) 763-8684

SGS FORENSIC LABORATORIES

Final Report

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Job ID / Site: PJ44957; SMMUS- John Muir E/S Bungalow A - Moisture/Mold Assessment 2526 Sixth Street santa monica CA 90405

Total Samples Submitted: 3
Total Samples Analyzed: 3

Explanations:

Relative Density	Relative amount of fungi present
ND	None Detected
Particulate Density	Amount of background particulate present
-	Not Applicable

Density Estimated As Follows:

Trace	1 (<5% Occluded) Very little present
Minor	2 (>5% & <25% Occluded) Present but not in large quantity
Major	3 (>25% & <50% Occluded) Present in most of sample
Abundant	4 (>50% Occluded) Covering almost entire sample
Overloaded	5 Covering entire sample

Guidelines For Interpretation of Non-Viable Bulk Results:

No accepted quantitative regulatory standards currently exist by which to assess the health risks related to mold exposure. Molds have been associated with a variety of health effects and sensitivity varies from person to person.

Several organizations, including: the American Conference of Governmental Industrial Hygienists (ACGIH); the American Industrial Hygiene Association (AIHA); the Indoor Air Quality Association (IAQA); the United States Environmental Protection Agency (USEPA); the Centers for Disease Control (CDC), as well as the California Department of Health Services (CADHS), have all published guidelines for assessment and interpretation of mold resulting from water intrusion in buildings.

SGSFL reports solely the organisms observed on the sample(s). The limit of detection is based on observing one spore/colony per area analyzed. This is not an inclusive list of the fungal types identified in the microbiology laboratory.

Vanessa Hurtado, Microbiology Laboratory Supervisor, Rancho Dominguez Laboratory

2959 Pacific Commerce Drive, Rancho Dominguez, CA 90221 / Telephone: (310) 763-2374 (888) 813-9417 / Fax: (310) 763-8684

EFI Global, Inc.
555 Menlo Dr., Suite D
Rocklin, CA 95765
Tel: 916-316-3316
www.efiglobal.com

February 14, 2020

Michelle Rosales
Madeleine Dangazyan
Forensic Analytical Consulting Services, Inc.
2959 Pacific Commerce Drive
Rancho Dominguez CA 90221

RE: ENVIRONMENTAL PRATICULATES AND FIBERS

Insured:	SMMUSD - John Muir ES
Incident Location:	2526 6th Street, Bungalow A, Santa Monica, CA 90405
Date of Inspection:	02-07-2020
Date Received:	02-12-2020
FACS Job Number:	PJ44957
EFI Global File No:	024.01699

At your request, EFI Global Inc. (EFI) has tested samples collected for common environmental particulates and fibers.

Analytical Overview

Tape Lift Samples

Two surface samples were collected from the test location listed above: A list of the sample locations is shown on the attached Chain of Custody form.

The samples were prepared with lactophenol cotton blue stain and examined using stereoscopic bright field microscopy at 100X - 1000X magnification.

Result

The results of our examination are shown in Table I:

Descriptions and Definitions

LD Limit of Detection Approximately 1 micron or one particle per field of view

Particulate categories

- Pollen: Plant, tree and grass pollen
- Mold: Mold spores and hyphae
- Smoke Particulates: Char, ash and soot
- Dander Animal and human skin cells, cluster and fragments

- Synthetic Fibers — Man-made fibers such as nylon, polyester, etc.
- Cellulose Fibers — Plant, paper and wood fibers
- Fibrous Glass — Fiberglass with and without resinous binder adhering
- Plant Tissue — Non-woody plant tissue
- Organic Detritus — Plant and insect particles, waste, fragments
- Inorganic Detritus — Soil, minerals and misc. dirt.
- Paint/Coatings — Paint and polymer coating chips and flakes
- Other: — Particles not compliant with the categories listed above

Sample loading (naked eye):

- Not Detectable — No visible particles
- Low — Visible upon close examination
- Medium — Visible particulates
- Heavy — particulates approaching opaque level
- Excessive — Sample opaque, limited useful data available)

Thank you for this opportunity to serve you. EFI will retain the samples for 30 days and then dispose of them unless otherwise requested by you. Please feel free to call our offices if you have any questions or if we can be of any additional assistance.

Respectfully submitted,
EFI Global

David J. Brien
Senior Chemist
IAQA #1199

EFI Global
Environmental Forensic Solutions

555 Menlo Dr. Ste C
Rocklin, CA 95765
Tf: 800-776-5932
Tel: 916-797-1503
Fax: 916-797-1114
www.efiglobal.com

CHAIN OF CUSTODY FORM

Job No: PJ44957
Client: SMMUSD - John Muir ES,
Insured:
Loss Location: Bungalow A 2526 16th Street, Santa Monica, CA 90405
Date Sampled: 2/7/20
Sampled By: Madeleine Dangayan
Weather: SUNNY

Sample	Sample Description	Area	Code	Notes
TO3	Top of white board	N Wall	4	Limited Particle I.D.
TO4	Top of shelf	E Wall	4	↓ ↓ ↓

Test Codes:

1	Viable Fungi - Culture (Count and Genus ID)		4	Tape Lift - Direct Exam
2	Bulk - (Culture and Genus ID)		5	Bulk Sample - Direct exam
3	Swab - (Culture and Genus ID)		6	Other

Chain of Custody:

	Date	By (Print)	Signature
Released	2/10/20	Madeleine Dangayan	
Received	2-12-20	Smith Parham	
Released			
Received			
Released			
Received			
Released			

PHOTOGRAPHS

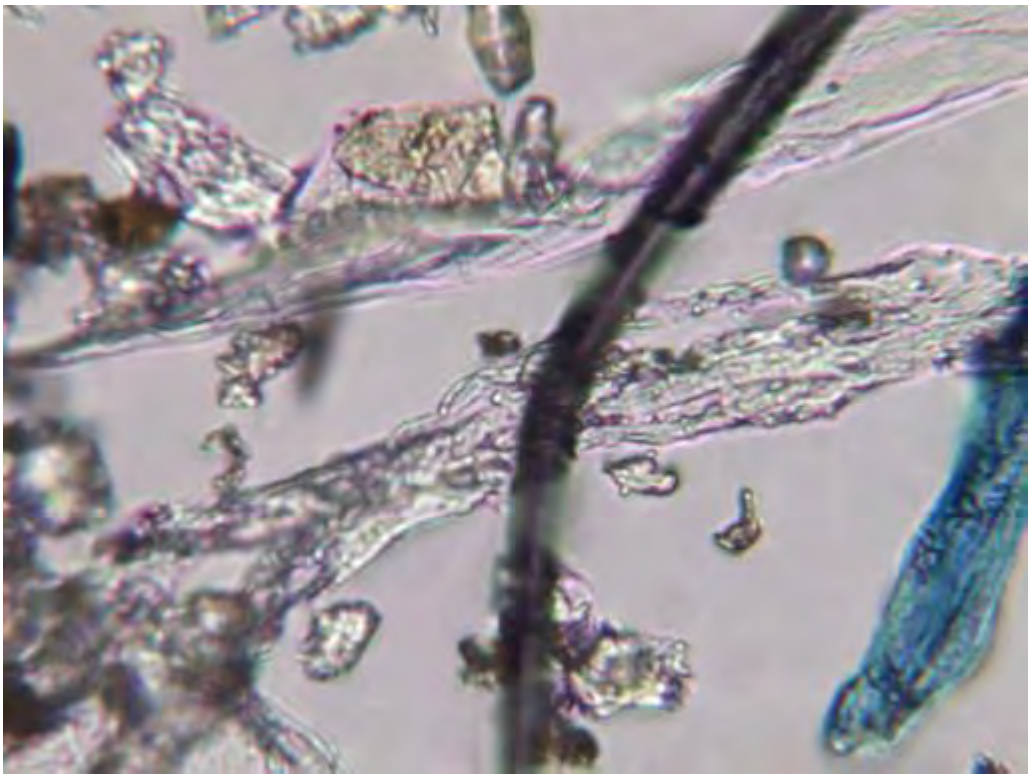

Photo No. 1: Micrograph: 400X Magnification: T03

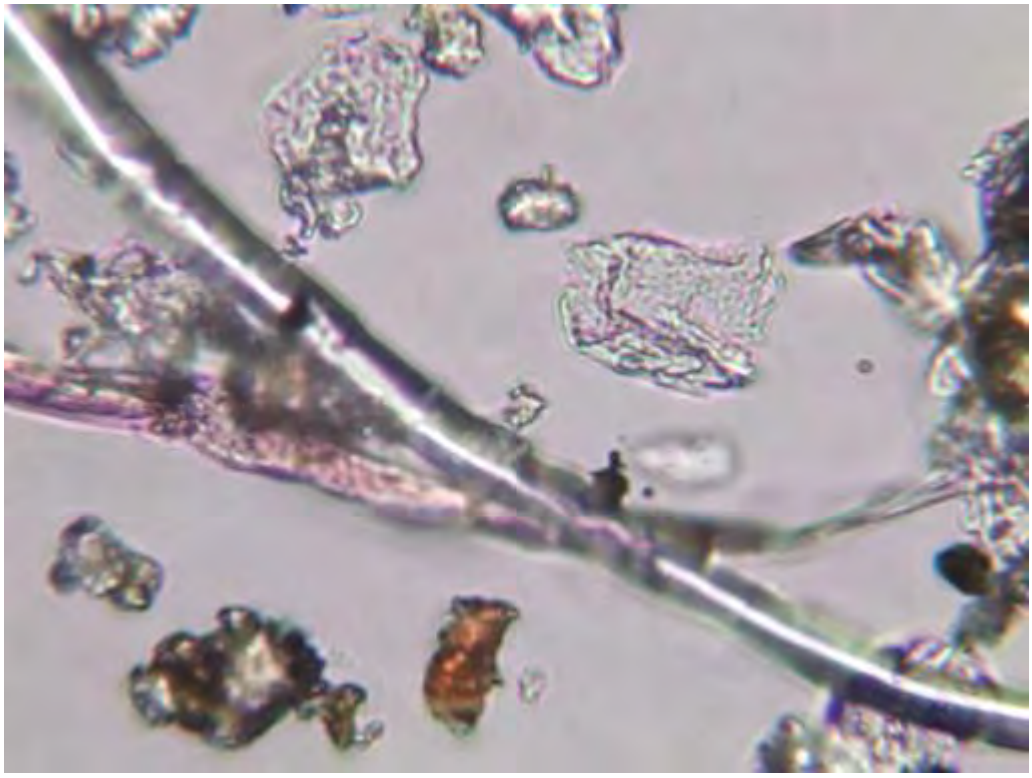

Photo No. 2: Micrograph 400X Magnification: Sample T04

TABLE I

SAMPLE	Level	Pollen	Mold	Soot/Char	Dander	Syn Fiber	Cel Fiber	Glass Fib	Plant	Organic	Inorganic	Paint	Other
T03	High	1	ND	ND	30	12	41	ND	ND	2	14	ND	ND
TO4	High	1	ND	ND	47	18	15	ND	ND	ND	19	ND	ND

ND = Not detected. Minimum detection limit is <1%

Appendix D
Data Collection Methods

Comfort Parameters Air Monitoring. Temperature, relative humidity, carbon dioxide (CO_2), and carbon monoxide (CO) measurements are collected using a TSI IAQ-Calc or Q-TRAK Indoor Air Quality Monitor. Measurements for carbon dioxide and carbon monoxide are expressed in concentration values of parts per million (ppm) with a detection limit of 1 ppm. Temperature results are provided in degrees Fahrenheit and relative humidity in percentage (%).

Particle Identification. Settled dust samples are collected using transparent adhesive tape or by vacuuming dust onto a filter (aka micro-vac). The surface dust samples are labeled with unique sample numbers and information recorded onto field chain of custody forms. The samples are submitted to EFI Global laboratory for analysis. In the laboratory, samples are analyzed by polarized light microscopy (PLM), which estimates the percentage of the visual area of the dust particulate composed of the various particulate types (a technique known as visual area estimation - VAE).

Particulate Air Monitoring. Airborne particulates are collected using a TSI DustTrask monitor. The monitor is set to collect particulates less than 2.5 microns in diameter (PM2.5) and less than 10 microns in diameter (PM10). Results are expressed in concentration values of milligrams per cubic meter (mg/m^3).

Moisture Meter Readings. The moisture content of various building substrates is evaluated using a direct reading instrument. FACS routinely uses a Delmhorst BD 2100 moisture meter or Tramex Moisture Encounter Plus. These instruments are capable of measuring the moisture content of wood, concrete/plaster and wallboard using preset factory scales. The factory pre-set ranges for the different substrates are as follows:

1) Wood range --- 8 % to 40 %
2) Plaster/Masonry --- 0 to 100 (reference scale – not percentage)
3) Gypsum board --- 0.2 % to 50 %

Tape Lift Surface Sampling. Transparent adhesive tape is pressed onto a surface with suspected fungal growth or contamination. The tape is gently lifted off of the surface and affixed to a clean microscope slide. The surface samples are labeled with unique samples numbers and information recorded on field chain of custody forms. The samples are promptly delivered to the laboratory for analysis. Samples are promptly delivered to SGS Forensic Laboratories for analysis. The laboratory is accredited by the American Industrial Hygiene Association (AIHA) Laboratory Accreditation Programs LLC in its Environmental Microbiology Laboratory Accreditation Program (EMLAP).

Appendix E
FACS General Mold Assessment Guidelines

Mold Growth Overview

Mold (a.k.a., "fungal") growth can occur when organic building materials or accumulated organic debris is impacted by moisture. This may occur within 24-48 hours from the time such materials become wet, hence it is critical that materials are substantially dried within this time frame in order to minimize the potential for mold growth to develop. Mold growth has the potential to elicit negative health effects in sensitive persons. This most frequently manifests as allergic respiratory symptoms which may range from mild to severe depending on individual sensitivities. Irritant and infectious effects are possible. It is generally accepted that mold growth in buildings should be removed following appropriate precautions to protect workers involved in the clean-up and the surrounding environment. Greater precautions are taken for greater amounts of mold growth. In addition, the underlying cause of mold and moisture intrusion should be identified and corrected in order to minimize the potential for recurrent mold growth. Additional information can be found at the U.S. Environmental Protection Agency website (http://www.epa.gov/mold/).

Occupant Exposure

In general, when considering the risk of occupant exposure to indoor mold growth, the following should be recognized:

- No accepted quantitative standards currently exist by which to assess the health risks related to fungal exposure. Since fungus and airborne fungal spores are common in the natural environment, most guidelines focus on the amount and location of visible fungal growth present and comparison of indoor and outdoor spore levels.
- Airborne fungal spore levels can vary greatly over time due to changes in environmental conditions and activity patterns. In addition, limitations inherent in commonly used fungal spore air sampling methods may mask differences between case and control samples. Based on these factors, air samples may only detect large differences between case and control environments.
- Based on these limitations, and on the potential presence of other adverse biological agents that may develop on moisture impacted materials, mold growth and dampness in buildings should be controlled and impacted areas should be appropriately addressed in order to promote a healthful indoor environment.

Causal Conditions

Conditions resulting in moisture impact upon organic building materials should be determined and corrected in order to prevent the development of mold growth. These findings should be reviewed and verified by an appropriately qualified construction professional in order to ensure accurate identification and correction of the causes of moisture intrusion issues.

Appendix F
FACS General Mold Remediation Guidelines

CONTENTS

GLOBAL MOLD REMEDIATION GUIDELINES

1. *General Practices*. All work, which may result in the disturbance of mold growth or contamination, should be performed using work practices that minimize the disturbance of affected materials and dispersion of mold spores. Measures should also be taken to protect the health and safety of individuals performing remediation activities. At a minimum, work should be performed in accordance with the following guidelines addressing mold/water intrusion remediation:

   - Environmental Protection Agency. (September 2008). *Mold Remediation in Schools and Commercial Buildings*. EPA 402-K-01-001**.**
   - New York City Department of Health. (November 2008). *Guidelines on Assessment and Remediation of Fungi in Indoor Environments.*
   - U.S. Department of Labor Occupational Safety and Health Administration (November 8, 2013). Safety *and Health Information Bulletin: A Brief Guide to Mold in the Workplace*. SHIB 03-10-10.
   - American Industrial Hygiene Association. (2008*). Recognition, Evaluation and Control of Indoor Mold.* IMOM08-679*.*
   - Institute of Inspection, Cleaning and Restoration Contractors*. (2015). IICRC 500 Standard and Reference Guide for Professional Water Damage Restoration.* Fourth edition.
   - Institute of Inspection, Cleaning and Restoration Contractors*. (2015). IICRC S520 Standard and Reference Guide for Professional Mold Remediation.* Third edition.

2. *Material Removal*. In the course of removing building materials, bulk quantities of visible mold growth shall be removed from all wood structural members or other materials. Materials should be cleaned or removed 18 inches past visible mold growth unless otherwise specified.

3. *Regulated Materials*. Prior to commencing remediation activities, building materials that may be disturbed should be assessed for asbestos and lead-based paint hazards per applicable regulations.

4. *Sources of Moisture*. Mold growth is most frequently caused by a failure to adequately control moisture. Thus, whenever mold remediation is performed, measures should be taken to correct the conditions resulting in excess moisture and mold growth.

GENERAL PROCEDURES

M0: General Procedures for De Minimus Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of ≤1 ft.^{2} of mold growth.
  - Surface cleaning of areas with light or minimal mold spore deposition/contamination.
  - Typical housekeeping activities.
- ***Personal Protective Equipment***
  - May include the use of an N-95 disposable respirator, gloves and eye protection.
- ***Containment Provisions***
  - None required.
- ***Work Practices***
  - Mist surface and wet-wipe in a manner that minimizes disturbance of growth.
- ***Post-Remediation Assessment***
  - Visual confirmation of removal of growth.

M1: General Procedures for Small Scale Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of >1 to <10 ft.^{2} of mold growth.
  - Aggressive removal of materials with ≤1 ft.^{2} of dense mold growth, or <10 ft.^{2} of sparse mold growth.
  - General construction dust control for removal of building materials.
- ***Personal Protective Equipment***
  - N-95 disposable respirator, gloves and eye protection.
- ***Containment Provisions***
  - Cover the immediate work area with plastic sheeting.
  - A floor to ceiling plastic barrier should be erected to further isolate the work area if greater than approximately 5 ft. of material is being aggressively removed (e.g., removal of drywall).
  - Ensure ventilation provisions in the area are turned off.
- ***Work Practices***
  - Remediation performed by maintenance/construction personnel with awareness training regarding proper clean up methods, personal protection, and potential health hazards associated with mold.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth and for general dust suppression (e.g., HEPA vacuum positioned at the point of operation/removal and misting).
  - If removal cannot be accomplished without significant disturbance of mold growth or more extensive mold growth is encountered, then work should stop and medium or large scale remediation procedures should be implemented.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area and immediately adjacent surfaces using a HEPA vacuum or wet-wiping.

- ***Post-Remediation Assessment***
  - Assessment by a designated individual familiar with these procedures and with mold awareness training.
  - Visual confirmation of removal of growth and absence of contamination and debris prior to removal of containment provisions.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.

M2: General Procedures for Medium Scale Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of 10 to <100 ft.^{2} of mold growth.
  - Aggressive removal of materials with >1 to <10 ft.^{2} of dense mold growth, or 10 to <100 ft.^{2} of sparse mold growth.
- ***Personal Protective Equipment***
  - ½-face respirator with HEPA filters, gloves, disposable coveralls and goggles. Consider the use of HEPA/organic vapor combination cartridges if strong musty odors are present.
- ***Containment Provisions***
  - Isolate the work area from the surrounding environment using 1 layer of plastic sheeting configured with a slit entry and covering flap.
  - Seal all penetrations to surrounding areas using plastic and tape (e.g., outlets, light switches, ventilation grills).
  - Negatively pressurize the work area and exhaust out of the work area with HEPA filtration.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth to the extent feasible.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area, immediately surrounding area, and worker egress pathways using a HEPA vacuum or wet-wiping.
- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.
  - Containment provisions remain in place until the work areas has passed the assessment criteria.

M3: General Procedures for Large Scale Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of ≥100 ft.^{2} of mold growth.

  - Aggressive removal of materials with ≥100 ft.^{2} of dense or sparse mold growth.
- ***Personal Protective Equipment***
  - Full-face respirator with HEPA filters, gloves, disposable coveralls with head and foot coverings and goggles. Consider the use of HEPA/organic vapor combination cartridges if strong musty odors are present.
- ***Containment Provisions***
  - Isolate the work area from the surrounding environment using 2 layers of plastic sheeting configured with a decontamination area between two slit entries with covering flaps.
  - Seal all penetrations to surrounding areas using plastic and tape (e.g., outlets, light switches, ventilation grills).
  - Negatively pressurize the work area and exhaust to the outdoor environment with HEPA filtration.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth to the extent feasible.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area, immediately surrounding area, and worker egress pathways using a HEPA vacuum or wet-wiping.
  - Mist surface and wet-wipe in a manner that minimizes disturbance of growth.
- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.
  - Containment provisions remain in place until the work areas has passed the assessment criteria.

MC: General Procedures for Removal of Mold Spore Contamination/Deposition

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Removal of secondary mold spore deposition from surfaces and contents resulting from the presence of mold growth reservoirs in the shared environment.
  - Note: Areas of light or minimal contamination may be cleaned in accordance with procedure M0.
- ***Personal Protective Equipment***
  - Minimum of N-95 disposable respirator, gloves and eye protection. More extensive protective equipment may be appropriate depending on the severity of contamination.
- ***Containment Provisions***
  - Not generally required, however conditions of severe contamination may necessitate containment provisions depending on conditions in surrounding environments.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean horizontal and vertical surfaces in place.

- Wet-wipe hard, non-porous surfaces.
- HEPA vacuum soft, porous surfaces. Disposal of porous materials exhibiting growth may be necessary.
- Launder or dry-clean textiles.
- Consider use of HEPA filtered negative air machines to purge or scrub the air in the area.

- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.

ME: General Procedures for Exterior Mold Remediation

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Cleaning of ≥10 ft.^{2} of mold growth from exterior surfaces.
  - General construction dust control for the exterior removal of building materials.
  - Note: Cleaning of <10 ft.^{2} of exterior mold growth may be conducted in accordance with procedure M0.
- ***Personal Protective Equipment***
  - Minimum of N-95 disposable respirator, gloves and eye protection. More extensive protective equipment may be appropriate depending on the severity of growth or intensity of removal activities.
- ***Containment Provisions***
  - Prior to commencing work, close all windows and doors in or adjacent to the work area and seal interior window and door penetrations with tape (easy release or painters tape).
  - If removal of exterior building materials is to occur, seal all wall penetrations (i.e., electrical outlets and light switches) and base of wall on the associated interior wall being repaired with tape (easy release or painters tape).
- ***Work Practices***
  - Remediation performed by maintenance/construction personnel with awareness training regarding proper clean up methods, personal protection, and potential health hazards associated with mold. The use of a professional mold remediation contractor may be appropriate depending on the severity of mold growth.
  - Proceed with exterior cleaning or building material removal using dust control methods (e.g., misting).
  - Inspect the back of exposed interior wall systems for evidence of mold growth. If mold growth is observed, proceed with cleaning or removal in accordance with procedures M0-M3 as appropriate.
  - Use a HEPA vacuum to remove excess debris from the wall cavity prior to reconstruction.
- ***Post-Remediation Assessment***
  - Assessment by a designated individual familiar with these procedures and with mold awareness training.
  - Visual confirmation of removal of growth and absence of contamination and debris prior to removal of containment provisions.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.

MT: General Procedures for Invasive Inspection for Mold

The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.

- ***Example Applications***
  - Removal of building materials in areas where there is the potential for mold growth (i.e., the presence of mold growth has not been confirmed).

- ***Personal Protective Equipment***
  - May include the use of an N-95 disposable respirator, gloves and eye protection as appropriate for general construction activities.
- ***Containment Provisions***
  - Follow practices for general construction dust control (see M1 above). No special provisions for controlling mold growth are required.
- ***Work Practices***
  - Remove a small area of building material from the area in question to facilitate visual inspection (e.g., <1ft.^{2}).
  - In the course of removal, proceed in a manner that minimizes disturbance of potential concealed mold growth reservoirs. For example, cut around and gently remove a section of drywall as a single piece rather than demolishing the area with a hammer. A HEPA vacuum nozzle placed at the point of removal may further control potential releases.
  - Continue removal of materials in a stepwise fashion in order to perform desired construction repairs or to determine if any hidden mold growth exists.
  - If mold growth is encountered in the course of removal, immediately stop and proceed in accordance with mold remediation procedures as appropriate (see M0-M3 above).
- ***Post-Remediation Assessment***
  - No assessment is necessary if no mold growth is encountered. If mold growth is encountered, follow the appropriate post-remediation assessment guidelines as discussed in M0-M3 above.

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