

Fire Damage Remediation Protocol

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REPORT DATE:	November 28, 2018
CLIENT:	George Hills & Company Insurance Attn: Cameron Dewey; Claims Manager 530-276-5322 cameron.dewey@georgehills.com Claim No. WFIA-0159A9
JOB SITE ADDRESS:	Sierra House Elementary School 1709 Remington Trail South Lake Tahoe, CA 96150



Prepared by:

Premier Environmental Consulting (PEC)

Nate Seward, PE, CIH
EPA & IICRC Instructor (WRT & AMRT)
Professional Mechanical Engineer (M31978)
Certified Industrial Hygienist (9582 CP)
Certified Radon Tester #108180RT
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Fire & Smoke Restoration Technician (IICRC)



Mold, Asbestos

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Radon, IAQ

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November 29, 2018

Attn: Billy Wessell; Lake Tahoe Unified School District

C/o Cameron Dewey; Claims Manager
530-276-5322 / cameron.dewey@georgehills.com
Claim No. WFIA-0159A9

Subject: Fire Damage Remediation Report & Protocol
Sierra House Elementary School
1709 Remington Trail
South Lake Tahoe, CA 96150

Dear Mr. Wessell,

At your request, Mr. Nate Seward, Certified Industrial Hygienist and Rick Malone, Senior hygienist of **Premier Environmental Consulting** (PEC) performed a preliminary assessment to determine the site conditions as it relates to fire damage combustion by-products from the electrical fire that started on November 11, 2018 at approximately 10pm. Fire restoration work has been ongoing by Servpro and includes general cleaning of various surfaces within obvious impacted rooms, the use of HEPA filtration equipment in some areas and the application of deodorization products. As of November 28, 2018, Belfor has now taken over the project and will continue with the final phases of remediation/cleaning.

November 12, 2018 – A limited asbestos inspection was performed by Environmental Testing and Consulting within the Teamwork Trail and Compassion Court Rooms along with the hallway area. According to the lab results, all materials tested were none detect for asbestos. No lead paint sampling was performed. Since this survey was limited at the time, additional sampling for asbestos and lead paint will be performed by PEC in other areas of the subject site that are scheduled for demolition (PEC completed 11/29/2018; waiting on results).

November 27, 2018 – During our preliminary inspection, rooms impacted by the fire damage were visually inspected for signs of black soot, ash & char contamination. Many of the large horizontal surfaces appeared to have been cleaned early in the process, however some residual combustion by products were still noted in some areas. This may likely be from cross contamination of circulating particles that became airborne over the past two weeks. Areas within the attic space were a major focus of our inspection which can often harbor trapped particles and odors, especially within porous items. During our assessment, no negative air pressure was established and only 2-3 HEPA air scrubbers (scrub mode) were placed inside the source area, however none of these scrubbers were operating during the initial part of our assessment.

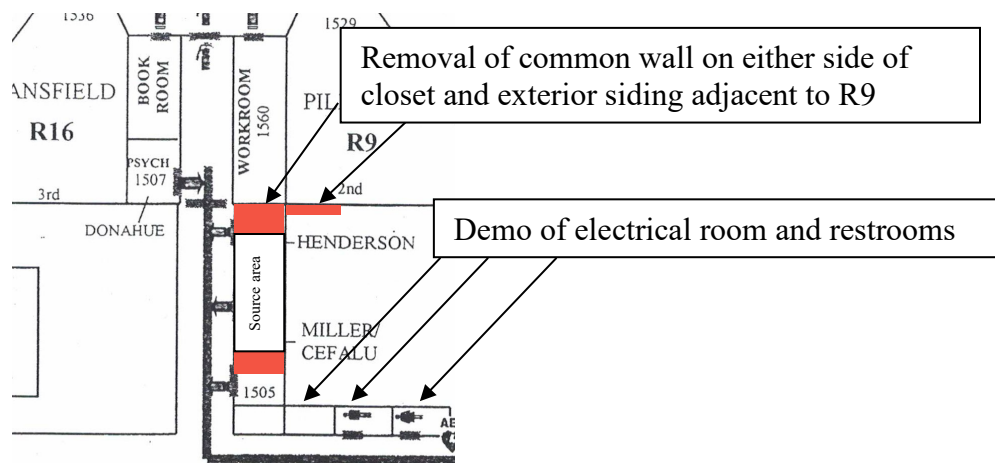
Immediate concerns from PEC assessment (completed as of 11/28/2018) – PEC recommended that the source area and adjacent hallway be placed under proper negative pressure of at least -5Pascals or -0.02" of water. In addition, the current amount of HEPA equipment was not sufficient at the time of our inspection and additional equipment including charcoal/HEPA filters was recommended to be installed to control airborne particulates. This included placing scrubbers

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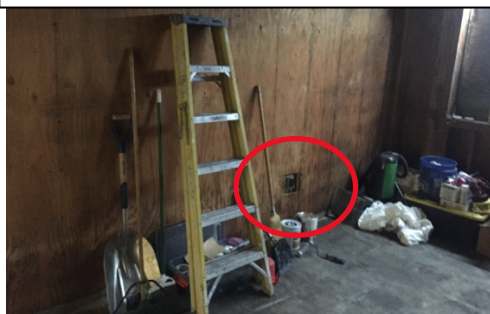
outside of containment and negative air machines exhausting out of the source room. As of November 28, 2018, the negative pressure containment was erected and the HEPA filtration equipment was installed.

Demolition – The walls, ceiling and flooring materials within the source room where the fire originated have been removed. According to Servpro, they performed sand blasting of the ceiling material to remove the heavy char. The common wall where the fire originated contains a plywood sheer wall with insulation still inside (see picture below). On the adjacent wall is a storage closet with built in cabinets. It was explained that this area and wall was extinguished using water by the fire department and may still contain moisture. Based on this condition, we are recommending the removal of the cabinets, drywall, insulation and drywall/sheer wall from floor to ceiling (see figure below). The sheer wall is considered to be a structural item and any removal should be verified and confirmed by an architect, engineer or other professional.

Room R9/Pillsbury – The a portion of the back wall within room R9 shares the common wall with the source burn area. The exterior siding in this area should be removed to assess the condition inside the wall cavity to determine if the built in cabinets in R9 need to be removed.



Source of electrical fire; common wall



Source Hallway – The ceiling lid and the wood paneling walls will need to be removed to access the wall behind for cleaning and deodorization. In an attempt to minimize demolition, start with the

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hallway adjacent to the source room and determine if other walls will require demolition. Note: The wood paneling might be cleanable and salvageable depending if the backside is finished or unfinished.




Restrooms and electrical room across from Multipurpose – Heavy odor was observed within these rooms during our assessment. It appears the HVAC duct work that came from the source room was connected to the restrooms. According to Servpro, the ductwork was severed inside the source room in order to isolate the restrooms, however it did not appear any cleaning of the interior of the ducts were performed. The ceilings in each restroom were painted with a sealer in hopes to lock down the smoke odor, however the odor was still considered heavy. It is likely that the odor is trapped within the drywall paint and sealer and likely inside the walls, which may have insulation inside. Our recommendation is to remove the remainder of the ductwork that goes to the restrooms (all work related to HVAC systems should be performed in accordance with National Air Duct Cleaning Association or NADCA standards). Demolition of the ceiling and exterior outer walls in each restroom should be performed to determine the extent of smoke damage within these cavity spaces. Depending on the extent and type of building materials within these restrooms, full demolition of all walls may be warranted in order to clean and deodorize.

The electrical room will require all contents to be removed for cleaning and/or disposal. The walls inside the electrical room were not painted and therefore will absorb smoke odor much more readily. It is recommended that air washing of interstitial spaces be performed inside containment with negative air pressure using HEPA filtration equipment. This will dislodge smoke/soot particles in areas that cannot be reached. If odor is still present, other options may need to be explored, including the last resort which is removing the drywall within the electrical room. All work within this room and any work related to electrical wiring, panels, etc. should be performed in accordance with OSHA and electrical safety codes. It is recommended that an electrician be onsite or available to de-energize anything that could pose an electrical safety hazard.

Soot/Ash/Char Assessment – The evaluation of the site conditions was broken up into classifications based on our professional judgement and level of cleanliness (See Table 1). The 3 classifications are Light Soot/Odor, Moderate Soot/Odor and Heavy Soot/Odor which are also color coded accordingly. The objective of this assessment was to determine the specific cleaning protocols for each area. See the Figure 1 showing the different rooms and their classification.

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Table 1

Classification of Soot particulate concentrations		
Light Soot/Odor (LS/LO)	Light concentration of particulates found on horizontal surfaces and/or light smoke odors.	
Moderate Soot/Odor (MS/MO)	Medium amount of particulate matter and smoke related odors with	
Heavy Soot/odor (HS/HO)	Significant concentration of particulate matter and/or a strong smoke odor	
Note; surface contamination related to fires are typically dark in color are consistent with fire combustion by-products (i.e. soot, ash, char). The color code classifications are indicated on the following map.		

Lower Pod, Office area, Rooms P1-7 – These areas of the school did not reveal any visual evidence of combustion by-products, however, PEC is recommending air scrubbing be performed in each room for a minimum of 4hrs using HEPA filtration equipment as a precautionary measure only (See Figure 2). The purpose is to remove any airborne particles that may have drifted into these areas during the initial restoration process.



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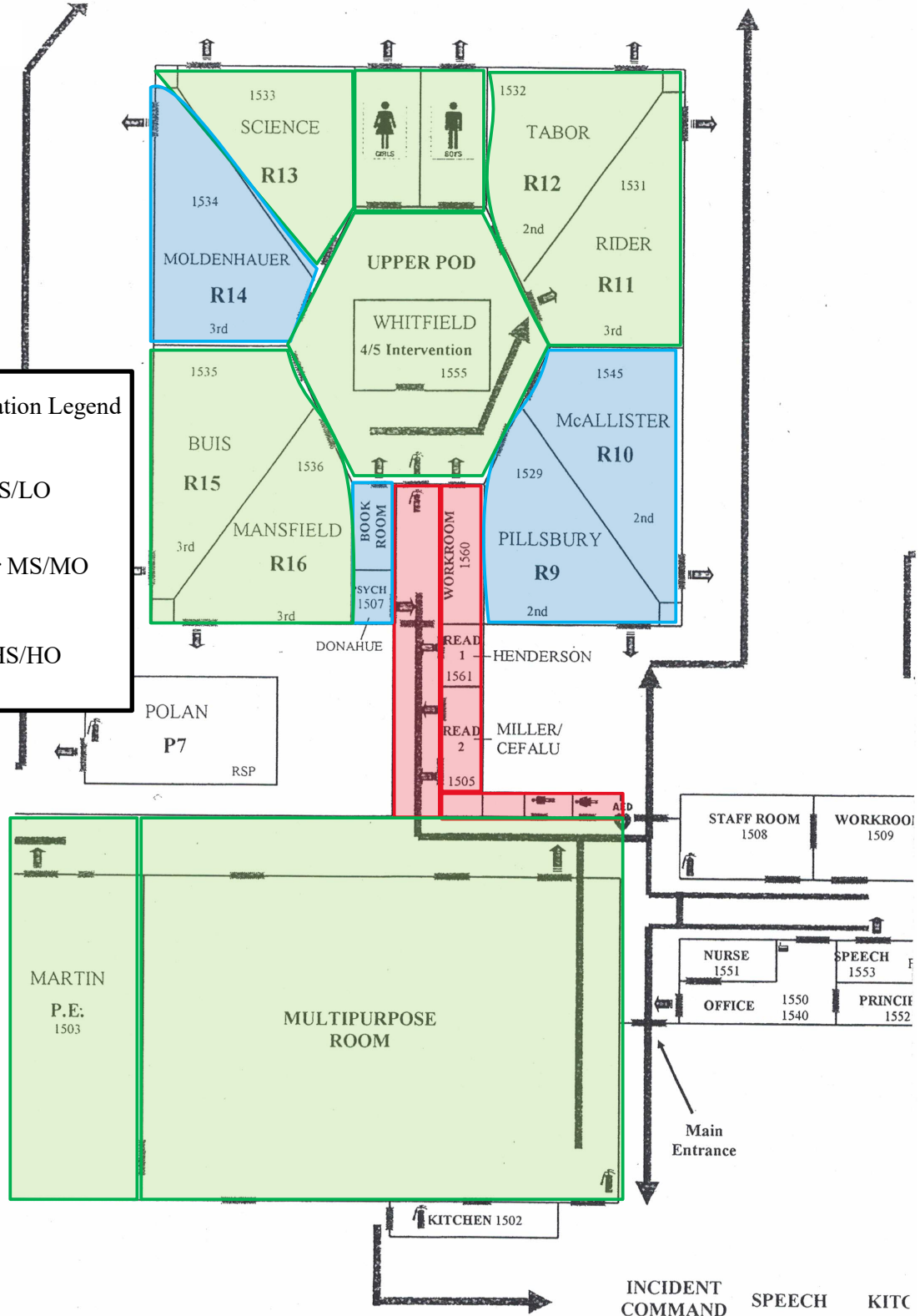
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Figure 1





Environmental PEC of mind

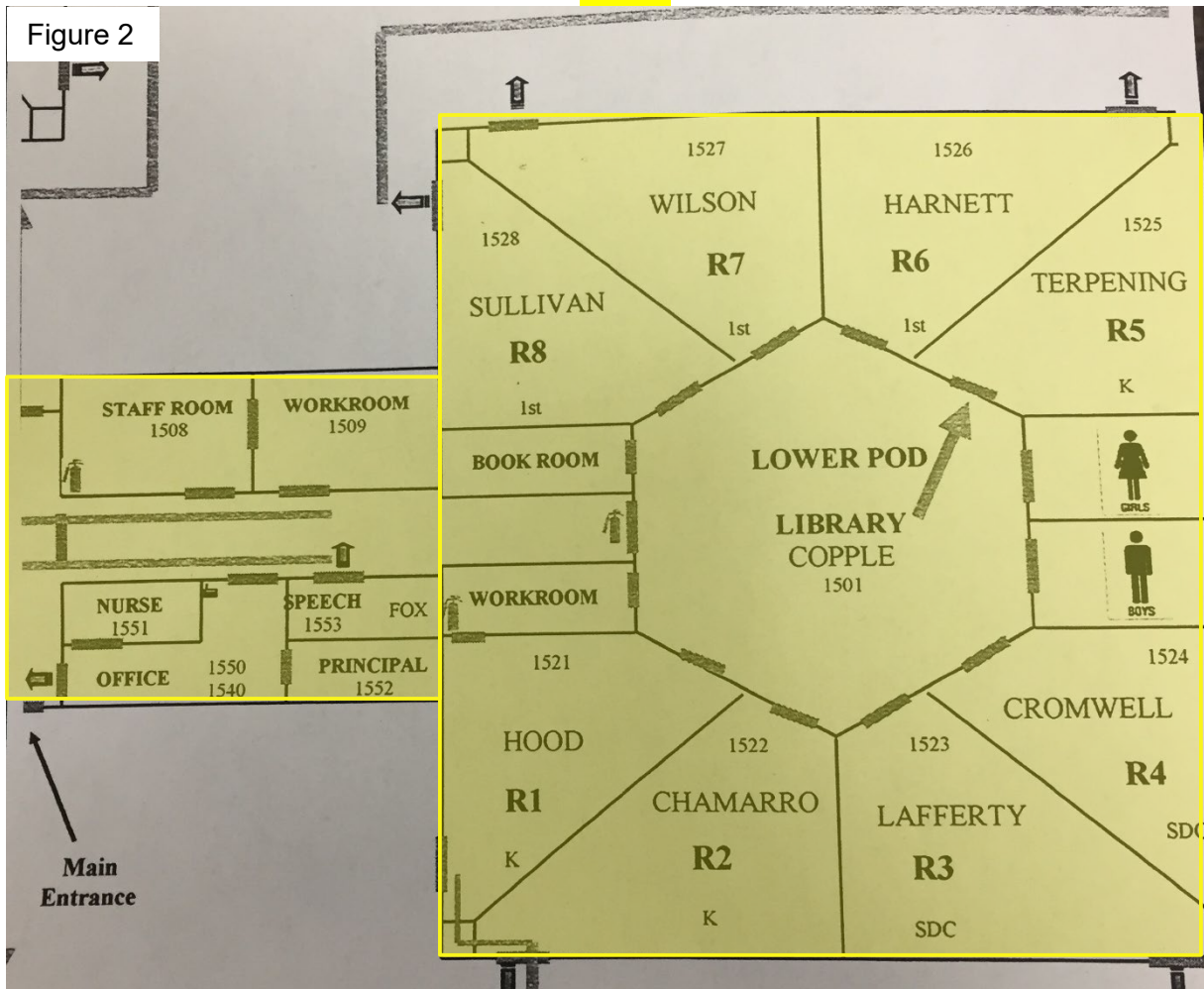
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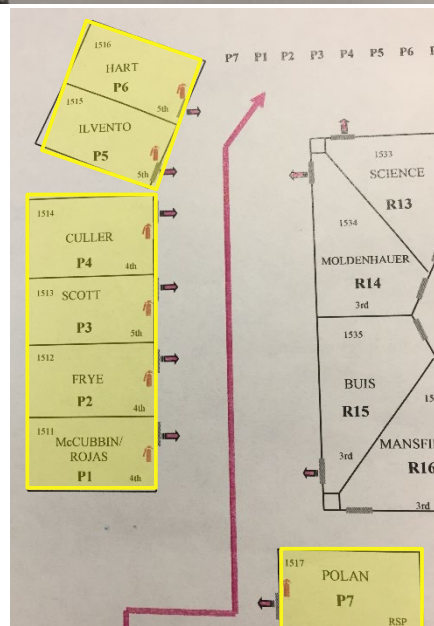
Figure 2



Precautionary Air scrubbing



Air Scrubbing (HEPA)

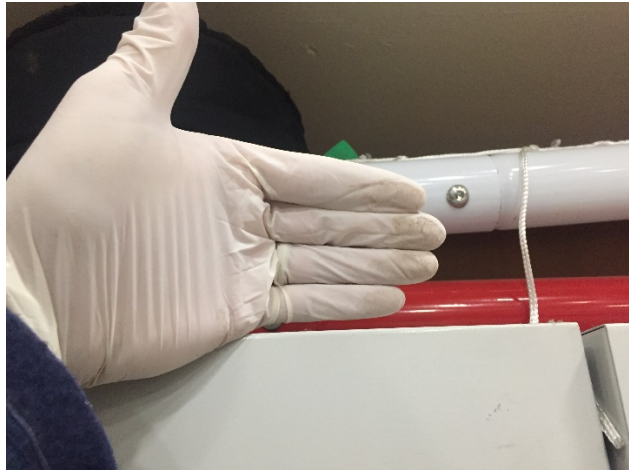


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Site photos



Hallway bathroom HVAC vent w/ Heavy odor.



Light residual particulate found inside of multi-purpose room



Fire origination (source room)



Attic space showing fiberglass insulation.

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Insulation wrap with exposed insulation



Ceiling tiles in source hallway



Condition in attic showing light particulates on 2x4 tiles

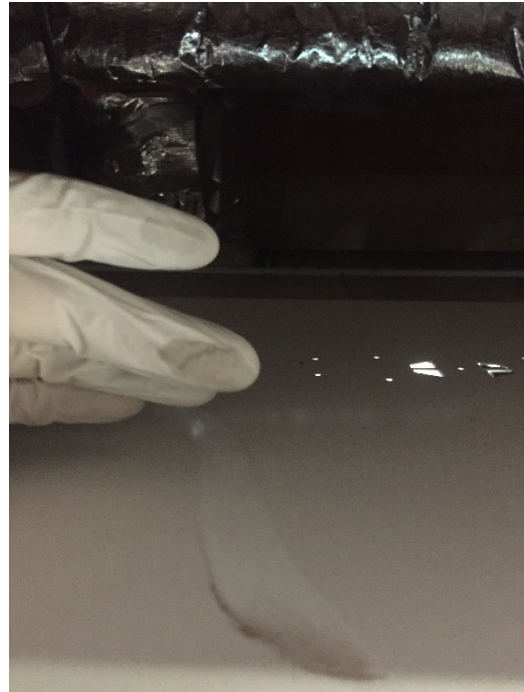


Attic space showing particulate on ceiling tiles.

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Condition inside attic space with HVAC components



Particulate residue found on attic side of light fixture



HVAC duct in source room



Heavy soot found inside HVAC duct in source room.

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Remediation and Cleaning Protocol

Restoration options related to fire damage projects generally fall into 3 categories: Clean, Resurface or Replace. Regardless of which option is chosen, a determination of reasonable value and costs related to these options should be determined, including real value, appreciated value and sentimental value.

Light Soot/Odor Cleaning Protocol	
Light Soot/Odor (LS/LO)	<u>Porous Items (horizontal and vertical)</u> <ul style="list-style-type: none"> • Ceiling tiles (12"x12" and 2'x4') & fiberglass insulation – Restoration of these items may be difficult due to their porosity and may not be financially feasible. Attempts to restore can be made using air washing techniques and/or HEPA vacuuming, however removal and replacement should be considered. Ceiling metal grid systems can be air washed (depending on how sticky) and/or wiped down using a mild alkaline detergent. • Books/other porous school items – HEPA Vacuuming and/or air washing within containment. Hard cover books and items and be wiped down using a mild alkaline detergent or similar. • Carpet & bullpen walls, porous bulletin boards – HEPA vacuuming of vertical surfaces. Carpets should be HEPA vacuumed followed by professional carpet cleaning. Cleaning & restoration costs for carpet should be compared to replacement to determine most feasible option.
	<u>Semi Porous Items (horizontal surfaces only)</u> <ul style="list-style-type: none"> • Wood items – Cleaning using a mild alkaline detergent (less than 10 pH) or general purpose cleaning agent or smoke odor counteractant.
	<u>Non Porous Items (horizontal surfaces only)</u> <ul style="list-style-type: none"> • Metal, glass, plastic, etc. – Cleaning using a mild alkaline detergent (less than 10 pH) or general purpose cleaning agent or smoke odor counteractant if needed.
	<p>HVAC – As it relates to restoration of the HVAC system, light soot particles can likely be cleaned using a push-pull system with HEPA filtration equipment. If this method is not effective, disassemble and clean using a combination of HEPA vacuuming, mechanical cleaning using brushes or whips. HVAC modification and cleaning should be done in accordance with NADCA standards. All filters should be replaced after thorough cleaning. All components of the system should be evaluated and cleaned as necessary including registers, ductwork, plenums, boots, coils, motors, etc.</p>



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Medium Soot/Odor Cleaning Protocol	
Medium Soot/Odor (MS/MO)	<p><u>Porous Items (horizontal and vertical)</u></p> <ul style="list-style-type: none"> • Ceiling tiles (12"x12" and 2'x4') & fiberglass insulation – Recommend removal and replacement due to the porosity and difficulty of cleaning. Ceiling metal grid systems can be air washed and/or wiped down using a mild alkaline detergent. • Books/upholstery or similar school items – HEPA vacuuming and/or air washing within containment. Hard cover books and items can be wiped down using a mild alkaline detergent or similar product compatible with the item. • Carpet & bullpen walls, porous bulletin boards – HEPA vacuuming of vertical surfaces. Carpets should be HEPA vacuumed followed by professional carpet cleaning. Cleaning & restoration costs for carpet should be compared to replacement to determine most feasible option. <p><u>Semi Porous Items (horizontal & vertical surfaces)</u></p> <ul style="list-style-type: none"> • Wood paneling, etc. – Cleaning using a mild alkaline detergent (less than 10 pH) or similar. May include using dry cleaning sponges or towels. <p><u>Non Porous Items (horizontal & vertical surfaces)</u></p> <ul style="list-style-type: none"> • Metal, glass, plastic, etc. – Cleaning using a mild alkaline detergent (less than 10 pH) or similar. May include using dry cleaning sponges or towels. In hard to reach locations, air washing may be used to dislodge particulates in interstitial spaces. <p>Note: Be careful of incompatibility of cleaning agents and surfaces</p> <p>HVAC – If mechanical HVAC components are restorable, disassemble and clean using a combination of HEPA vacuuming, mechanical cleaning using brushes or whips. HVAC modification and cleaning should be done in accordance with NADCA standards. All filters should be replaced after thorough cleaning. HEPA equipment using "push – pull" system should be considered during the cleaning to remove airborne particles. All components of the system should be evaluated and cleaned as necessary including registers, ductwork, plenums, boots, coils, motors, etc.</p>

Heavy Soot/Odor Cleaning Protocol	
Heavy Soot/Odor (MS/MO)	<u>Porous Items (horizontal and vertical)</u> <ul style="list-style-type: none"> • Ceiling tiles (12"x12" and 2'x4') & fiberglass insulation – Recommend removal and replacement due to the porosity and difficulty of cleaning. Ceiling metal grid systems can be air washed and/or wiped down using a mild alkaline detergent. All light fixtures (mainly attic side), metal beams, wiring/cables should be thoroughly cleaned. • Books/upholstery or similar school items – HEPA vacuuming and/or air washing within containment. Hard cover books and items can be wiped down using a mild alkaline detergent or similar product compatible with the item. • Carpet & bullpen walls, porous bulletin boards – Recommend removal and replacement due to the porosity and difficulty of cleaning. Any cleanable porous item may also need to be professionally cleaned, depending on the severity.
	<u>Semi Porous Items (horizontal & vertical surfaces)</u> <ul style="list-style-type: none"> • Wood framing, paneling, etc. – Within the attic space, air washing as a cleaning method under negative pressure may be the most efficient option of dislodging particulates, especially in interstitial spaces. If cleaning of large surfaces areas is performed, cleaning using a mild alkaline detergent (less than 10 pH) or similar is recommended.
	<u>Non Porous Items (horizontal & vertical surfaces)</u> <ul style="list-style-type: none"> • Metal, glass, plastic, etc. – Cleaning using a mild alkaline detergent (less than 10 pH) or similar. May include using dry cleaning sponges or towels. In hard to reach locations, air washing may be used to dislodge particulates in interstitial spaces.
	<p>Note: Be careful of incompatibility of cleaning agents and surfaces</p> <p>HVAC – As it related to restoration of HVAC ductwork in the source area, heavy soot and smoke were observed inside. Cleaning this branch of ductwork within the source area and possibly adjacent areas (i.e. restrooms) will not likely be feasible and it is recommended to be removed and replaced. HVAC components in the hallway should be evaluated to determine the feasibility of cleaning the HVAC system. If mechanical HVAC components are restorable, disassemble and clean using a combination of HEPA vacuuming, mechanical cleaning using brushes or whips. HVAC modification and cleaning should be done in accordance with NADCA standards. All filters should be replaced after thorough cleaning. All components of the system should be evaluated and cleaned as necessary including registers, ductwork, plenums, boots, coils, motors, etc.</p>

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As it relates to restoration, soot particles tend to stick or magnetize to metal ducting, registers and components. PEC is unclear on how the current HVAC system is configured within the impacted areas. Apparently the HVAC system has been evaluated by an independent contractor and therefore it may be necessary to coordinate with this contractor to strategize the cleaning and restoration efforts.

Structural Deodorization

Cleaning does not necessarily remove odors, however deodorization is an important aspect of the smoke restoration process. There are various methods for deodorizing smoke impacted structures including hydroxyl units or ozone generators, however it is not recommended to be used inside of a school, in our opinion. Deodorization starts with source removal, especially with porous items. Once items have been removed and cleaned, wet or hot fogging can be considered followed by sealing or encapsulation products. Due to the length of time that has transpired (over 2 weeks) in conjunction with the aggressive negative air exchanges and carbon filtration equipment being used, the intensity of the smoke odors have significantly reduced according to staff members. Introducing additional heat/temperature, if possible, will also help increase the rate of odor removal by way of thermal expansion. Unfortunately there is no analytical test that can determine the presence of odors, therefore we will rely on olfactory senses as a primary methodology to determine if residual smoke odors are still present. In addition surface sampling and "white glove" test will be performed to evaluate the surface cleanliness. Alternative and/or combination deodorization techniques should be deployed as necessary to eliminate the smoke odor. As a final option, applying a sealant or encapsulant over wood framing and other building materials may need to be performed. Within the source area, we recommend increasing temperature to help drive off odors and reverse the thermal expansion process.

Verification Sampling and assessment

PEC will perform onsite monitoring during the remediation activities, especially during school hours to ensure proper practices are being utilized. It is our recommendation that we take periodic air sampling, such as weekly, within the occupied part of the school to ensure engineering controls (containment, negative pressure, HEPA filtration equipment, etc.) is working properly. At the conclusion of the project, final verification sampling should be performed by PEC to ensure cleaning protocols have been conducted and that air quality levels are within background. Air and surface sampling will likely be performed to document concentrations along with a visual and olfactory assessment.

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LIMITATIONS STATEMENT

The data compiled and evaluated as part of this assessment was limited and may not represent all conditions at the subject site. Fire damage projects are often complex and create numerous challenges for successful remediation, including odor abatement which can be subjective. Air and surface sampling can provide some guidance and assistance, but should not be considered definitive. This assessment reflects the data collected from specific locations to identify surface contamination and therefore, should not be considered comprehensive or all encompassing. The findings from this report have been based solely upon the subjective evaluation of limited data collected during this assessment. All data collection, findings, conclusions and recommendations presented by PEC within this report are based upon limited data using current standard practices accepted within the industry in conjunction with professional judgement.

The data collected during this assessment and any resulting recommendations shall be used only by the client for the site described in this report. Any use or reliance of this report, including any of its information or recommendations by a third party without the explicit authorization of Premier Environmental or the client shall be strictly at the risk of the third party.

Currently there are no federal or state standards for the assessment or remediation of fire related contaminated sites. No acceptable thresholds or health standards have been implemented for exposure. Particulate matter found at elevated concentrations have the potential to cause impacts to human health. These impacts may be limited to allergic reactions such as nasal congestion, watery eyes, runny nose, sneezing, coughing, itching or similar responses. Other responses may include fatigue, headaches, or more serious health problems such as asthma, viral infections, fevers, various forms of pneumonia, and similar respiratory problems. Responses will differ greatly between individuals depending on a number of factors, such as the sensitivity of the individual to a particular particulate/pollutant and their pre-existing health conditions. Premier Environmental Consulting cannot and will not provide medical advice or opinions as to the associated health problems encountered from exposure to these pollutants. If individuals are experiencing symptoms they should consult their personal physician or an appropriate medical care provider.

If you have any questions or concerns regarding the information provided, please do not hesitate to call us at 775.298.2679 or my cell phone at 805.432.4888.

Respectfully submitted,

Premier Environmental Consulting (PEC)

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