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CONSULTING ENGINEERS, PA
CIVIL, MUNICIPAL & STRUCTURAL ENGINEERS

2317 Professional Drive
PO Box 7966
Rocky Mount, NC 27804
Office: 252.972.7703

March 6, 2025

Andrew Delonno, Town Manager
adeionno@springhope.net
Town of Spring Hope
118 W. Railroad Street
P. O. Box 87
Spring Hope, NC 27882

Ref: IAQ Field Assessment
Inspection Date/Time: February 27, 2025; 11:30 AM to 1:30 PM
Spring Hope Community Center
103 N May St.
Spring Hope, NC

Field Assessment Summary

General:

1. Upon arriving, 3 HOBO monitors were deployed; one on the front porch, one in the basement and one on the interior inside meeting hall. The monitors recorded the current ambient temperature and relative humidity (RH) during the inspection for a snapshot of conditions during the inspection.

Monitor Results:

Front Porch:		**Basement**:		**Meeting Hall**:	
1. Temp:	72.9°	a. Temp:	53.9°	a. Temp:	62.1°
2. RH:	19.9%	b. RH:	70.8%[A]	b. RH:	61.4%[A]
3. Dew Point Temp:	28.8°	c. Dew Point Temp:	[B]42.6°	c. Dew Point Temp:	45.7°

[A]An RH greater than 60% is conducive to the development and/or exacerbation of mold. The acceptable RH range is 40% to 60% max with 50% the design target for optimum IAQ).
[B]The closer the dew point temperature to the ambient temperature, the higher the relative humidity (RH); an indication the air is nearly saturated with moisture (meaning the air is holding close to its maximum capacity for water vapor at that temperature).

Surface Observations:

Exterior:

1. Mildew observed on exterior vinyl siding.
   a. Primarily on the western and northern exposure (rear wall) and to a lesser degree on the south wall under the front porch

Basement:

1. On the main level timber floor framing, surficial brown mold was very prominent with sporadic isolated splotches of white mold (photo at right).

Main Floor Level:

1. **East Wing**:
   a. On the knotty pine wall wainscoting paneling, greenish and whitish surface mold was very prominent,
   b. On topo of furniture, tables,
   c. The hardwood floors in this wing were observed to be cupping,
   d. Ceiling paint is flaking,
   e. Some thin laminate siding on interior walls was observed to be warped, most likley due to excessive humidity.
   f. Roof leak ceiling stains were evident where the lower roof of east wings abuts gable end of meeting hall structure. At the time of the visit, we could not determine if leak is active or inactive.

2. **West Wing**:
   a. Sporadic white mold growth was observed inside some section of the kitchen wall cabinets.
   b. On and around the northern door and door casings.

3. **Meeting Hall**:
   a. On wainscoting wall panels throughout meeting hall,
   b. On and around the doors and door casings,
   c. On walls paneling and around the lower return air registers (the last place one would want to observe mold),
   d. Cupped lay-in ceiling tile with surficial mold,
   e. Damp HVAC return air filters,
   f. Most floor registers exhibit extensive corrosion,
   g. Corroded wall outlet panels with surface mold growth and corrosion (the latter indicative infiltrating moisture-laden air via the wall outlet box condensing out on the cooler interior surfaces.)

   General: Beneficially, all windows appear to have been replaced with later-date double glazed vinyl replacement windows. Blinds cover most Meeting Hall windows (blinds closed at time of inspection).

4. **Swab Samples Taken**:
   Due to the proliferation of surface mold, there was no need to air test the facility; instead, five swab samples were taken at the locations noted/shown below to determine the spore types. The samples were submitted to ESML Labs for testing (lab test report attached; Exhibit B).

Sample #1:
Door to East Wing
(Label 760)

Results:
Cladosporium-High

Sample #2:
Inside Kitchen Cabinet
(Label 407)

Results:
Acremonium-High
Penicillium/Talaromyces-High

Sample #3:
North Wall of Meeting Room on Wall panel above chair rail
(Label 795)

Results:
Aspergillus-High
Penicillium/Talaromyces-High

Sample #4:
Knotty Pine wainscoting on East Wing
(Label 749)

Results:
Penicillium/Talaromyces-High

Sample #5:
Back of Vinyl Chair in Meeting Room
(Label 505)

Results:
Cladosporium-Medium
Aspergillus-High

Category: Count/per area analyzed - Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000
Report: See Exhibit B, attached

Due both to the proliferation of surface mold observed throughout the building and the presence lining in the metal ducts, it is my opinion that these lined metal ducts are not a candidate for mold cleaning/remediation, negating the need for air sampling.

Opinion on Primary Causes:

1. **Air Infiltration**:
   a. There are considerable air infiltration pathways present from floor and wall penetrations, from around doors throughout the structure, at perimeter electrical outlets, panned joist supply/return ducts, at wall-to ceiling and wall-to-floor joints, floor registers/boots, duct

leakage, etc. Lower interior pressure caused by wind washing and stack affect can create a pressure differential that can induce unwanted infiltration of unconditioned outside air.

2. **Thermal Envelope**: In most cases, a thermal envelope (i.e., walls, floors and ceilings) needs the ability to adequately permit the movement of vapor through the 3 elemental envelope planes during all seasons without trapping moisture withing those planes. Adequate insulation and/or properly placed vapor retarders are measures that are often employed in the envelope. When a structure is renovated or updated (such as when going from an unconditioned building to a conditioned building), what may have originally been compatible before the HVAC system was installed becomes incompatible following installation. We see this condition occur with older timber-framed homes located in coastal counties are upfitted with HVAC systems.

   Existing conditions:

   i. Floor: The floor is comprised of conventionally uninsulated timber framing.
      1. Both the West wing and Meeting room floor finish is comprised of either an asbestos floor tile (AST) or vinyl floor tile (VCT) covering; both can tend to restrict moisture movement.
      2. The East wing has hardwood floors.

   ii. Ceiling:
      1. Both the West Wing (Kitchen) and Meeting Room have a lay-in ceiling with faced batt insulation laid on top. This method is no longer a method approved by the Building Code. Based on what was visible of the two wings, the upper meeting hall roof is likely trussed and covered with a plank board celling (to be confirmed).
      2. The East wing has a v-groove timber plank ceiling. Sounding the ceiling confirmed there is no insulation above this ceiling (also to be verified).

   iii. Exterior North Wall Opening:
      1. Meeting Hall: The portal opening on the north wall, near mid-length of meeting hall room, consists of uninsulated 2x4 walls with 1" nominal diagonal sheathing on exterior and painted T&G v-groove timber plank boards (vertical orientation). The portion of the walls above the chair rail appears to be gypsum on interior surface overlaid with thin laminate wall paneling.
      2. The east wing is similar in construction except timber plank wainscoting was used below the chair rail primarily on the east wing interior walls and a possibly a wall gypsum panel above the chair rail.
      3. The west wing appears to be predominantly gypsum wall board.
      4. Other than the likelihood of felt paper on the exterior of the exterior diagonal wall sheathing, there was no evidence of an interior vapor retarder.

   Vapor Transmission Analysis:

   We ran a vapor transmission analysis and a condensing surface calculation on the exterior wall, ceiling, and the floor. Fortunately, as built, the walls, floors and ceilings tend to breath and dry in both directions, which is preferred; unfortunately however, there are no thermal elements (insulation batts or rigid foam) within any of these exterior planes to mitigate moisture from condensing out on the interior cool surfaces. There was no indication inside

the wall cavity or in the floor framing system of the development of mold caused by warm side condensation.

If the HVAC system is properly sized based on the existing thermal envelope conditions, the HVAC system will tend to be very inefficient and expensive to operate both for cooling and heating. The extent of mold development that has occurred inside this building is not a surprise.

Results of Vapor Transmission Analysis:

Summer Design Conditions:		**Winter Design Conditions:**	
Interior Temp	76ºF	Interior Temp	72ºF
Interior R.H.:	50%	Interior R.H.:	50%
Exterior Temp:	91ºF	Exterior Temp:	21ºF
Exterior R.H.:	75%	Exterior R.H.:	25%

Ceiling:

1. Modeled with R-42 Blown fiberglass insulations added.
   Results: No interior surface condensation expected. Interior surface is warm with new insulation.

Floor:

1. Modeled with R-19 Kraft-faced fiberglass insulation batts added.
   Results: No interior surface condensation expected. Interior surface is warm with new insulation.

Exterior wall below chair rail in meeting hall:

1. Modeled with R-21 closed-cell spray foam insulation (R-value of 6/inch; 1.7 pcf density) added in 4-inch walls. Spray foam will seal gaps and holes.
   Results: First Condensing Surface is the exterior ¾" sheathing when RH>34% at 72ºF set point during heating season; mean winter temperature = 40.1ºF. No interior surface condensation is expected when HVAC system is operating. Interior surface is warm with new insulation.

   Prior to adding insulation (current conditions), condensation development on the interior face of the ¾" wall planking occurs when the RH was greater than 72% at 72ºF set point during heating season (design exterior RH=25%). Similarly, when the mean January exterior temperature is 38.6ºF or lower, with a corresponding interior material surface temperature 63.6ºF or lower, that surface can tend to develop condensation. Findings confirm that existing conditions support the development of mold on interior surfaces as observed.

3. **Chimneys**: Though the fireboxes appear to have been bricked up in the not too distant past, typically a chimney can be a significant source of direct communication with the exterior; allowing unconditioned air to enter and conditioned air to exit. With the fireboxes bricked up, the infiltration via the chimneys has likley been abated.

4. **Sunlight**: Though not a primary cause, the absence of sunlight. The blinds tend, it appears, to be closed in the meeting hall. UV radiation from sunlight inhibit growth and eventually kill

the organism. A prime example of this phenomena is the west wing. The west wing receives more direct sunlight (Kitchen) and exhibited significantly less evidence of surface mold growth than the meeting hall and east wing.

5. **HVAC/Mechanical Observations**

a. The HVAC system significantly contributes to undesirable infiltration as during operation the return ducts/air return plenum, operating under a negative pressure, communicate directly with the crawl space and the attic; drawing unconditioned outside air into the building as well as mold spores from the crawl space. During the warmer spring and summer months, humidity levels can easily increase if the system is not cooling and drying out the air sufficiently. The HVAC should create a slight positive pressure inside the building to be able to prevent outside air from entering.

We occasionally find buildings with a lower internal air pressure which can draw in unwanted unconditioned air. Oversized systems can short cycle without completing a cooling (and drying) cycle, elevating the building RH. An undersized system can lead to elevated RH and poorer indoor air quality as well.

Ceiling fans (air movers) were not operational at time of visit. Ceilings fans should always be operational during periods of vacancy as the ceiling fans can aid in evaporation of moisture from interior surfaces.

Note: An HVAC system is essentially a dehumidifier providing dehumidification of indoor air during the warmer spring and summer months. Similarly, systems operating during swing seasons (transition from summer to winter and winter to summer) may not provide the proper dehumidification even when units are set to operate year around.

b. **HVAC Operation**: With a public building such as this, the hours of operation and periodic occupancy can greatly affect the indoor air quality (IAQ). The building should operate continually for no other reason than to regulate the indoor relative humidity to within acceptable limits. Without such operation, condensation and mold canl tend to develop and proliferate.

c. Other potential HVAC related observations:

1. There may be too few (and too small) supply diffusers in the meeting hall considering the potential occupant load. If the unit and ductwork is replaced, evaluation of occupant load based on the intended use, operation frequency, humidity control, and proper sizing will need to be considered.
2. There appears to be poor air distribution throughout the building.
3. The returns have been fabricated from both sheet metal and timber framing. As a result, there is considerable air leakage. Furthermore, this is a questionable code issue as I understand the Mechanical code does not permit the return to be constructed of combustible products (wood in this case).
4. There are air returns located on the west end of the meeting hall situated both high and low. Typically, if the supply diffusers are located low, the returns are located high and vice versa. The preference would be to have the air returns located high to capture the warm air. Consult with a Mechanical Engineer.

Specific Mechanical Observations

d. **West End Wall Air Return**: The air returns observed freely communicate with both the wall cavity and crawl space (photos below). Air returns are under a negative pressure when the HVAC is operating; drawing unconditioned air (and humidity) into the ductwork from both the adjacent wall cavity and crawl space. As framed, the wall cavity freely communicates with both the attic and crawl space.

Wall gap in front of Air Return plenum: Note floor sheathing (top of photo) projecting into wall cavity (center of photo)

Note wall cavity between air filter and metal return plenum. Wall cavity communicates with crawl space

e. **Lined Metal Ducts**: Interior lined metal ducts (i.e., duct liner) were observed and the observable portions have a significant dust buildup on the interior surface of the duct liner. Such buildup can commonly lead to the development of mold on the duct liner (example photo at right). Lined metal ducts cannot be safely cleaned/disinfected and should always be replaced.

f. **Supply Duct Floor Boots**: Floor boots have not been thermally sealed off at floor penetration and duct insulation stops short of (with an open end) of the floor. See photo below.

g. **Supply floor registers, interior of metal ducts:** We removed some corroded metal floor registers and found various degrees of corrosion from light rust discoloration to extensive flaking rusted metal. This condition is indicative of elevated moisture in ducts.

Similarly, corroded metal wall outlet and switch plates, metal return grills, was also apparent.

Recommendations

Our approach to the mold problem typically is to first determine the cause and then offer recommendations for preventing the recurrence. Secondly, we recommend remediating mold in areas within the habitable building envelope and, where the potential for growth has been abated, leave concealed spaces (such as crawl spaces) untouched (except where isolated spaces might be opened up for envelope modifications). Note: Though dormant or dead mold can pose a problem to immune suppressed sensitive individuals, if the mold is undisturbed such that mold spores cannot become airborne, all the literature and research we have read tend to indicate that it poses no health threat (until moisture from elevated humidity or roof or pipe leaks is re-introduced).

The primary approach to controlling the mold problem in this structure is to:

- Control the relative humidity on the interior of the building,
- Have the HVAC system operate with a slight positive internal pressure,
- Seal the thermal envelope to minimize infiltration,
- Thermally isolate the habitable space from the exterior as well as from both the crawl space and basement, and
- Making the necessary improvements to the thermal envelope planes to control the moisture migration through the exterior surface planes by allowing moisture to move in either direction without condensing out and onto any material or surface regardless of the dominant vapor pressure.

A. Mechanical System

a. An evaluation, design, and an engineered plan needs to be developed to address the thermal envelope and HVAC system for this building. Positive pressure is desired inside the building to prevent infiltration and to prevent entry of unconditioned outside air, moisture, radon, soil gas and other pollutants as well as mitigate back draft of combustion appliances (such as fireplaces) and toilet exhaust fans.

b. To assist in the control mold growth, the aim should be to keep the interior relative humidity around 50 percent (no less than 40% and no more than 60%). My recommendation is to employ a NC Licensed Mechanical Engineer to design a new system and then have an experienced Licensed HVAC contractor perform the removal and replacement of the HVAC system, including, if possible, cleaning the existing units if that is possible. Both compressor units are Trane with a manufacturer's date of September 2017; not too old for a Trane.

c. Connections between grilles, registers, and ducts at ceilings, floors or walls typically leak where the boot does not tightly seal to the grill, wallboard, or floor framing. If the gap is kept to less than 3/8 inch, a bead of sealant or mastic can be used. Where gaps are larger then 3/8 inch, fabric and mastic should both be used. Do not paint any supply diffusers or return grills. The paint provides a food source for mold to develop on such elements when condensation occurs.

d. Upon completion of an HVAC system, conduct a pressure test, especially on the return system; sealing all joints with the appropriate sealant/tape as required by code. Builders do not accept leaky plumbing systems and they should not accept leaky duct systems. As

stated earlier, mold spores can be drawn into the ducts through leaky return duct joints and conveyed to the living space. Furthermore, leaky air handlers and leaky ducts typically result in a 20 percent to 40 percent energy penalty to the overall performance to the building and lead to significant humidity control problems. Limit leakage to no more than 10% or as requred by Code.

e. Along with the thermostat, we recommend wiring a humidistat in parallel to allow for separate activation based on individual settings (i.e., system turns on when either the thermostat or humidistat reaches its respective set point). Both comfort and humidity are addressed. Please discuss with the Mechanical Engineer.

B. Electrical: When the ceiling tiles/grids/light fixtures are removed and replaced, an electrical plan will be required and should be designed by a PM& Engineer and coordinated with the suspended ceiling grid. Other elements that should be considered in the electrical plan include exterior wall outlets, wall switches, ceiling fans, emergency lighting and lighted exit signs, etc. existing electrical panels/disconnect and service, etc. and other items that may be required by local inspections.

C. Building Envelope (likley the most important issue):

a. **Sealing Salls**: If and where wall paneling, wainscoting and drywall is removed and replaced, seal the following areas:
   1. Along top plates on exterior walls
   2. Around rough openings of windows and doors,
   3. Along bottom plate on exterior walls,
   4. At top plate where wall is adjacent to an unconditioned air space,
   5. At "T" posts connecting to the exterior walls, seal drywall to both sides of the first stud in the partition, and
   6. Caulk holes and around wires in electrical boxes.
   7. To minimize infiltration, replace exterior door weather stripping and ensure that the door-to-threshold joint is weathertight as well.
   8. Seal wall to floor joints.
      i. Remove and replace all ceiling tile and insulation batts on top of lay-in tile; ensuring adequate insulation meeting current code is installed per code. Do not place insulation on top of ceiling tile but in the appropriate location as required by code.
      ii. Once the ceiling tile has been removed, call us for further inspection to determine what other improvements may be needed for sealing the thermal envelope.
      iii. Replace ceiling tile and grid with a new tile meeting the code requred flame spread rating. We recommend using moisture resistant ceiling tile.

b. If retrofitting closed cell foam in wall cavities, most of the above will be addressed by the foam.

c. **If New Drywall is installed**: Wood moves. Drywall does not move. The more you attach drywall to wood, the more cracks you will have (applies to plaster walls and plasterboard too) and the more chance you have to create paths for infiltration. To minimize cracks, attach the drywall to less wood, and, in a way, that will allow the wood to move.

D. Crawl space:

a. Remove all timber debris from crawl space. Rake smooth.

b. We recommend consideration of sealed crawl space system vs. a vented crawl space system. The code permits either. The vented crawl space is less expensive.
c. Seal foundation wall/floor plumbing pipe penetrations.
d. Prior to placing R-19 batted floor insulation and/or installing a sealed crawl space system, seal as many of the floor penetrations as possible.
e. Install new perimeter floor band sill insulation per code.
f. For a vented crawl space option, add a vapor barrier over the crawl space surface as outlined in the building code. We recommend a minimum of 20 mil vinyl reinforced with white side up. With this option, we also suggest considering adding lights in the crawl, space wired to a main switch located at the access entry point.
g. For a sealed crawl space system, seal the foundation vents to minimize/prevent entry hot humid air into the crawl space.

E. ACT or VCT Floor Tile:

Due to the age of this structure, in both the west wing and Meeting Hall, we recommend having the floor tile and floor adhesive tested for Asbestos. We can perform that test for you if you do not already have a contact for asbestos testing. If no Asbestos Containing Materials (ACM) are found, the floor will need to be cleaned of mold the same as other interior surface materials.

To minimize the potential for future mold development, avoid carpet.

F. Interior Treatment of exposed Mold:

Use a recognized mold remediation contractor to clean up the interior of this facility. That includes any and all furniture, fixtures, exposed surfaces, blinds, chairs, etc. disposing of items that will no longer be used.

If you need the name and contact number for one or more remediation contractors, let me know and we will provide that information to you.

G. Chimney Considerations:

a. Though it appears that the persistent roof leak issue may have been addressed for the time being, the construction of this chimney and the conduit it offers along its perimeter in contributing to permitting unconditioned air in and conditioned air out, can be significant.

b. Due to the past issues with leakage at the roof plane and though the firebox has been blocked up, we recommend removal of the upper chimney down to below the roof rafters and then capping the stack (on top of the remaining chimney). Alternatively, the chimney could be removed in its entirety to below the floor framing.

H. Code Considerations:

a. Prior to obtaining a building permit, consult with your Building Code officials/Inspection Services to determine if additional requirements will be required with this renovation/remediation (i.e., Appendix B summary Sheet applicable provisions of the latest version of the NC State Building Code: Existing Building Code).

b. There may also be ADA requirements, outside of those normally required in the renovation, based on a percentage of the total construction costs (usually up to 20% of the renovation cost over and above the renovation costs). If so, such increased costs can be applied starting on the exterior grounds first such as adding ramps, parking space(s) and signage, etc.).

I. Remediation Estimate: The pervasiveness of the mold will require at least the following for mold remediation elements. This is not an exhaustive remediation plan but gives an idea as to the extent of remediation that should be considered:

a. Building Envelope (assuming perimeter walls are acceptable in composition [i.e., no remedial measures requred to open up perimeter walls]):

i. **Hazmat** (not necessarily listed in the order of application):

1. Test floor tile for the presence of asbestos. If present, have an asbestos remediation contractor remove, abate and clean facility. Coordinate with mold cleanup/abatement.
2. Temporarily install dehumidifiers and air movers, establish a negative pressure within building, exhaust interior air via HEPA filters following typical mold remediation protocol.
3. Remove window blinds, items in cabinets, all loose furniture and elements not fixed to structure, cleaning and storage until building is safe for their replacement. Dispose of contaminated vinyl chairs and other such items that cannot be easily cleaned or replaced.
4. Scrape loose flaking paint from ceilings in east wing.
5. Removal of all HVAC Ducts, supply registers, and return registers.
6. Remove ceiling tile and dispose of all ceiling tile and associated light fixtures. If grid is to remain, wipe down and treat along with other surfaces.
7. Removal and/or cleaning in place of only those mechanical air handling systems deemed salvageable and "cleanable; by conventional and verifiable decontamination means; consult with your Mechanical Engineer. If permitted to be left in place, verify adequacy of cleaning with compliance testing). Note that Ideally, air handling units should be located within the building thermal envelope.

8. Removal and replacement of all warped or loose wall paneling
9. Wiping, cleaning and application of biocides on all interior surfaces, windows, etc. where the mold hyphae has not penetrated the strata requiring material removal and replacement.
10. Remove/lower chimneys to below roof and repair roof accordingly.

ii. Air Sealing
1. Seal all floor, ceiling and wall penetrations (wire, pipe, ducts, etc.) as previously noted. Ensure penetrations to unconditioned space are fully sealed with solid blocking or flashing as needed and gaps are sealed with caulk or foam (applies to duct/flue shafts, plumbing/piping, electrical wiring, and exhaust fans). Seal switch boxes and electrical outlet boxes per code.
2. Recessed light fixtures adjacent to unconditioned space are ICAT-labeled (Insulation Contact Air Tight") and fully gasketed.
3. All sill plates adjacent to conditioned space are sealed to sub-floor with caulk.
4. At top of walls adjoining conditioned space, continuous top plates are used or sealed blocking using caulk or foam.
5. If applicable, rough openings around windows and exterior doors are sealed with caulk or foam.
6. Doors and windows next to ambient or unconditioned space are gasketed/weather-stripped to be substantially air tight.
7. Attic access panels/doors and fully insulated and gasketed to produce a continuous air seal.

iii. Put back (not listed in the order of installation/put back):
1. If called for on remediation plan, install new insulation and vapor barriers in floors and ceiling (walls as applicable).
2. Existing Floors: Clean existing wood floors thoroughly or sand and reseal wood floors. If existing floor tile does not contain asbestos, thoroughly clean and sanitize VCT floor.
3. We suggest replacing the existing exterior doors with new insulated doors/frames.
4. Provide new weatherstripping on existing exterior doors to remain.
5. Replace all surface finishes removed during remediation. Any cavity filled over, must pass a compliance test before overing cavity.
6. Install new vapor barrier over crawl space grade per code.
7. Pressure wash exterior siding.
8. If the Town decides to repaint the interior upon completion of remediation:
   a. First verify if any oil based paint was used on exterior walls and,
   b. If existing interior paint contains lead. If so, properly abate or encapsulate.
   c. New Paint: Repaint with a semi-permeable breathable paint such as latex (perm rating of 2 to 3+).

iv. Mechanical:
1. After framing prep, install a new machinal system and new ductwork per code.

2. Seal all boot to floor and duct to boots, ensuring insulation vapor barriers are terminated to meet code.
3. Employ a NC Licensed Mechanical Engineer to design a new HVAC system; system to be installed by a Licensed HVAC Contractor.
4. Check any and all exhaust fans for compliance and presence of a backflow damper. If not damper, replace. Seal accordingly.
5. In toilets, we suggest placing the fan on a timer (presets ranging from 1 to a maximum of 30 minutes operation) to ensure the fan does not operate continuously when building is unoccupied.
6. Perform a pressure test on duct system.
7. Mechanical Contractor should be requested to obtain a mold compliance air test upon completion of HVAC installation (as a benchmark).

v. Blower Door Test:
   1. Upon completion of all putback, perform a blower door test of completed structure:
   2. Perform a final passing mold compliance air test prior to turn over of facility.

vi. Other:
   1. If a change of use is proposed, the building must be evaluated and conform to the new design load requirements as well as other applicable code provisions with regard to the proposed new use.

b. **Estimated Mold Remediation Cost**: See Exhibit A, attached for both estimate and exclusions.

Limits of Inspection

This report comprises a limited cursory risk inspection and assessment. The inspection and assessment has been made to readily accessible areas of the building which is limited to visual nondestructive observations of apparent conditions existing at the time of the review or inspection. Latent deficiencies are excluded from the items and system units have not been removed or dismantled, furniture, appliances, or storage items moved. This investigation and report covers an effort to determine the cause of the mold problem and offers general recommendations for remediating the cause. Furthermore, the development of a comprehensive remediation plan is not part of this report. However, a remediation plan can be developed for the Town if requested.

A thorough and complete inspection and analysis of the structure was not performed. However, where suspicious elements were observed during the normal course of our inspection, we have made note. This evaluation is limited only to areas discussed above. This inspection is not intended to provide a guarantee or certification of proper future performance of the structure or its components, even where remedial measures are suggested. Appian Consulting Engineers, PA will not assume responsibility for defects in structures built and supervised by others or for repairs or remediation methods and procedures performed and supervised by others. Rather, the purpose of this inspection is to provide Appian Consulting Engineers' opinion concerning the conditions observed based on a limited visual cursory inspection at a particular point in time. This report is the exclusive property of both the Town of Spring Hope and was prepared for the sole purpose of aiding them in determining the general condition of the building with regard to mold associated problems. The use of this report for any other purpose is prohibited. We are available

for guidance and assistance if and when you or someone else should decide to proceed with any of the aforementioned repairs.

I trust the information we have provided above will be helpful. ***Appian*** appreciates the opportunity to have provided you with this service. If you have any questions regarding any of the above statements or opinions, please call me.

Sincerely,
Appian Consulting Engineers, PA
NCBELS# C-0562

Bobby L. Joyner, PE
Principal Engineer

NORTH CAROLINA PROFESSIONAL SEAL 8421 ENGINEER BOBBY L. JOYNER

3/6/25

PHOTOS

Flaking corrosion extends down boot into metal duct elbow...note corrosion at bottom duct elbow

Typical surface corrosion on metal floor registers

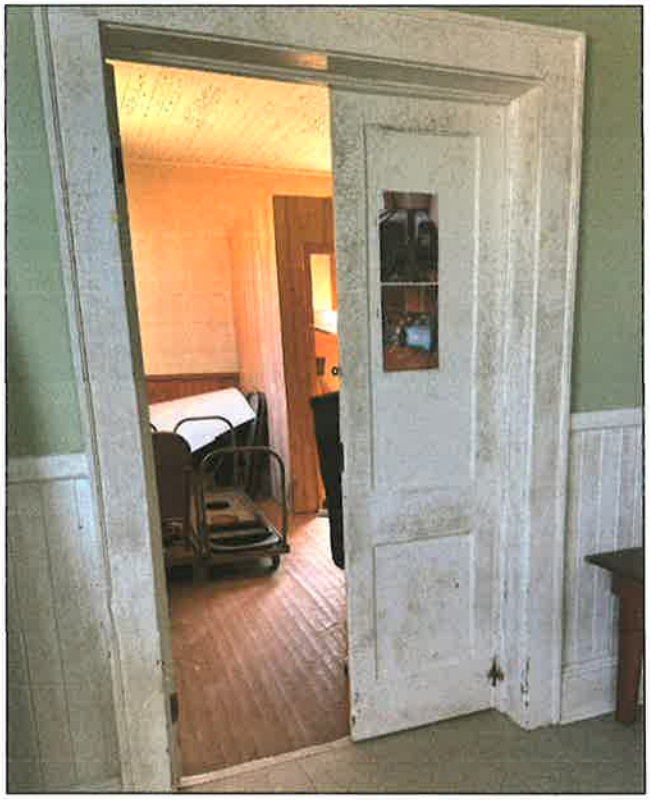
Entry into West Wing

Both Chimney Fireboxes blocked up
Note mold on wainscoting both sides of Chimn

Corroded return grill, extensive mold development around air returns; mold spores pulled into air handling unit and conveyed throughout entire building

Cupped hardwood flooring on east wing

In meeting hall, cupped 2'x2' ceiling tile (with fiberglass insulation batts on top. Condition is; frequently indicative of elevated humidity in building



Entry into East Wing.
This Condition exists at all accesses into/our of wings

An example of the pervasiveness of mold in this building (below). Wall outlet plate corrosion is apparent source of air infiltration

Apparent attempts to mitigate leaks around chimney

Cupped ceiling tile, above , stained light fixtures, staining on chimney surface from roof leaks

Mold-Help Glossary of Terms

- **Acceptable indoor air quality:** The physical and chemical nature of indoor air (as delivered to the breathing zone of the building occupants) which produces a complete state of mental, physical, and social well-being of the occupants, not merely the absence of disease and sickness.
- **Acremonium:** Acremonium is a group of molds that can frequently be found indoors and several of its species are known human pathogens. They have worldwide distribution and can be found in soil and on decaying plant material in nature. However, they are well suited to indoor environments and are amongst the most common fungal colonizers of homes and offices. They are commonly found in buildings that have suffered water damage. These molds are present in a wide variety of structural materials, such as concrete, wood, fiberglass, plywood, drywall, plaster and wallpaper. Due to their relatively high requirement for water, Acremonium often develops in air conditioning systems, humidifiers, cooling coils, drain pans and window seals.
- **Allergen:** A substance capable of causing an allergic reaction because of an individual's sensitivity to that substance.
- **Allergic rhinitis:** inflammation of the mucous membranes of the nose.
- **Allergy (adj. allergic):** an abnormal response of a hypersensitive person to chemical and physical stimuli; allergic manifestations of major importance occur in about 10 percent of the population (adjective form: allergic).
- **Alternaria sp.:** Extremely widespread and ubiquitous. Outdoors it may be isolated from samples of soil, seeds, and plants. It is commonly found in outdoor samples. It is often found in carpets, textiles, and on horizontal surfaces in building interiors. Often found on window frames. The species Alternaria alternata is capable of producing tenuazonic acid and other toxic metabolites which may be associated with disease in humans or animals. Alternaria produces large spores having sizes between 20 - 200 microns in length and 7 - 18 microns in width, suggesting that the spores from this fungi are deposited in the nose, mouth, and upper respiratory tract. It may be related to bakers asthma. It has been associated with hypersensitivity pneumoniti, sinusitis, deratomycosis, onychomycosis, subcutaneous phaeohyphomycosis, and invasive infection. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.
- **Asthma:** common disease of the lower respiratory system with episodic bronchial restrictions.
- **Aspergillus sp.:** A genus of fungi containing approximately 150 recognized species. Members of this genus have been recovered from a variety of habitats, but are especially common as saprophytes on decaying vegetation, soils, stored food, feed products in tropical and subtropical regions. Some species are parasitic on insects, plants and animals, including man. Species within this genus have reported Aw's (water activities) between 0.75 - 0.82. All of the species contained in this genus should be considered allergenic. Various Aspergillus species are a common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms. Chronic cases may develop pulmonary emphysema. Members of this genus are reported to cause a variety of opportunistic infections of the ears and eyes. Sever pulmonary infections may also occur. Many species produce mycotoxins which may be associated with disease in humans and other animals. Toxin production is dependent on the species or a strain within a species and on the food source for the

fungus. Some of these toxins have been found to be carcinogenic in animal species. Several toxins are considered potential human carcinogens.

- **Aureobasidium pullulans -** A cosmopolitan fungus with the main habitat apparently on the aerial parts of plants. Frequently found in moist environments. This fungus should be considered allergenic. This species has been associated with deratitis, peritonitis, pulmonary infection, and invasive disease in AIDS patients. Probably acquired by traumatic implantation. May be recovered as a contaminant from human cutaneous sites. No toxic diseases have been documented to date.
- **Basidiomycetes** - One of the major classes of fungal organisms. This class contains the mushrooms, shelf fungi, puffballs, and a variety of other macrofungi. It is extremely difficult to identify a specific genera of mushrooms by using standard culture plate techniques. Some basidiomycete spores can be identified by spore morphology, however; some care should be exercised with regard to specific identification. Many basidiomycete spores are reported to be allergenic.
- **Bacterium (pl. BACTERIA):** Microorganisms, mostly single-celled; their DNA is naked rather than being enclosed in a nucleus.
- **Cladosporium sp. (Hormodendrum sp.):** Aw (water activity) in the range of 0.84 to 0.88. Most commonly identified outdoor fungus. The outdoor numbers are reduced in the winter. The numbers are often high in the summer. Often found indoors in numbers less than outdoor numbers. It is a common allergen. Indoor Cladosporium sp. may be different than the species identified outdoors. It is commonly found on the surface of fiberglass duct liner in the interior of supply ducts. A wide variety of plants are food sources for this fungus. It is found on dead plants, woody plants, food, straw, soil, paint and textiles. It can cause mycosis. Produces greater than 10 antigens. Antigens in commercial extracts are of variable quality and may degrade within weeks of preparation. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.
- **Colony:** a single point of growth of mold or bacteria.
- **Colony forming unit:** See CFU.
- **Curvularia sp.:** Reported to be allergenic. It may cause corneal infections, mycetoma and infections in immune compromised hosts. **centration:** the quantity of one part in a defined amount of another.
- **Epicoccum sp.:** Conidia (spores) dimensions 15-25 microns. A common allergen. It is found in plants, soil, grains, textiles, and paper products.
- **Fungus (pl. fungi):** non-photosynthesizing parasitic lower plants that secrete enzymes and absorb food, producing and living inside branched tubes called hyphae (includes molds, mildew, yeasts, and mushrooms)
- **Penicillium sp.:** Aw (water activity) 0.78 - 0.88. A wide number of organisms have placed in this genera. Identification to species is difficult. Often found in aerosol samples. Commonly found in soil, food, cellulose, and grains. It is also found in paint and compost piles. It may cause hypersensitivity pneumonitis and allergic alveolitis in susceptible individuals. It is reported to be allergenic (skin). It is commonly found in carpet, wallpaper, and in interior fiberglass duct insulation (NC). Some species can produce mycotoxins. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.
- **Rhinitis:** inflammation of nasal mucous membranes; "runny nose"
- **Rhodotorula sp.:** A reddish yeast typically found in moist environments such as carpeting, cooling coils, and drain pans. In some countries it is the most common yeast

genus identified in indoor air. This yeast has been reported to be allergenic. Positive skin tests have been reported. It has colonized in terminally ill patients.

- **Stachybotrys sp.:** Aw (water activity) - 0.94, optimum Aw (water activity) - >0.98. Several strains of this fungus (S. atra, S. chartarum and S. alternans are synonymous) may produce a trichothecene mycotoxin - Satratoxin H - which is poisonous by inhalation. The toxins are present on the fungal spores. This is a slow growing fungus on media. It does not compete well with other rapidly growing fungi. The dark colored fungi grows on building material with a high cellulose content and a low nitrogen content. Areas with relative humidity above 55% and are subject to temperature fluctuations are ideal for toxin production. Individuals with chronic exposure to the toxin produced by this fungus reported cold and flu symptoms, sore throats, diarrhea, headaches, fatigue, dermatitis, intermittent local hair loss, and generalized malaise. The toxins produced by this fungus will suppress the immune system affecting the lymphoid tissue and the bone marrow. Animals injected with the toxin from this fungus exhibited the following symptoms: necrosis and hemorrhage within the brain, thymus, spleen, intestine, lung, heart, lymph node, liver, and kidney. The mycotoxin is also reported to be a liver and kidney carcinogen. Affects by absorption of the toxin in the human lung are known as pneumomycosis. This organism is rarely found in outdoor samples. It is usually difficult to find in indoor air samples unless it is physically disturbed. The spores are in a gelatinous mass. Appropriate media for the growth of this organism will have a high cellulose content and a low nitrogen content. The spores will die readily after release. The dead spores are still allergenic and toxigenic. Percutaneous absorption has caused mild symptoms

EXHIBIT A
Estimated Mold Remediation Cost

Exhibit A

Spring Hope Community Center

Preliminary Remediation Cost Estmate

By: BLJ

Date: 3/7/2025 7:26 AM

		Q	Unit Price	Ext		Ext
1	Mold Remediation/Building related minor framing improvements[A]			$ 100,000	to	$ 200,000
2	Mold Remediation Plan Development, Bid proposal documents, Pre-bid Conf, Pre-Con Conf, minutes of same, RFI's			$ 7,850	to	$ 12,500
3	New HVAC Design, sealed documents			$ 4,500	to	$ 6,000
4	Installation of HVAC inspection/observations			$ 1,250	to	$ 3,500
5	Installation of new HVAC			$ 22,000	-	$ 25,000
6	Electrical Sealed drwgs (for ceiling fixture removal/replacement; excludes service replacement)			$ 1,500	to	$ 3,250
7	Remediation Inspection Services (Appian, 10%)			$ 10,000	to	$ 20,000
8	Building Permit Fee			$ 1,000	-	$ 1,000
9	Dumpster/Trash/Poly on floors			$ 2,500	to	$ 3,500
10	Repainting interior			$ 12,800	-	$ 14,000
11	New ceiling grid lighting (LED)			$ 9,700	-	$ 12,000
12	Ceiling Tile R&R, new ceiling grid	3,605	$ 5.00	$ 18,025	to	$ 21,630
13	Crawl space vapor barrier 10 mil	3,605	$ 0.50	$ 1,803	-	$ 1,803
14	Ceiling Insulation, R-42, blown	3,605	$ 2.00	$ 7,210	-	$ 7,210
15	Floor Insulation, R-19 fiberglass faced batts	3,605	$ 1.75	$ 6,309	-	$ 6,309
16	Wall Insulation: R-21 Closed Cell Foam, 4" studs[H]	3,605	$ 6.50	$ 23,433	-	$ 23,433
17	Budget for Construction Lab Testing, Compliance test services			$ 1,500	to	$ 5,000
			Subtotal:	**$ 231,379**	**to**	**$ 366,134**
17	5% Contingency			$ 11,569		$ 18,307
18	20% ADA improvement contingency			$ 46,276	to	$ 73,227
			Estimate Grand Total:	**$ 289,223**	**to**	**$ 457,667**

Exclusions:[A]

A Ex wall finishes removal and replacement, wall insulation upgrade

B Asbestos Floor Tile Remediatiion/Replacement
C Bid Proposal Documents to be appended to Town's own bid documents; Town to bid
D Latent framing improvements (found or requuired once areas opened)
E Base or wall cabinet removal and replacment
F Structural engineering design services/plans
G Chimney lowering/capping
H Wall surface removal and replacement not included. Spray foam in walls to be installed via ports between studs.

C:\Users\User\Documents\Winword Documents REPORTS - 1\MOLD Inspection Reports\Spring Hope Comm Ctr Mold Insp 2025\[Estiamte Rough for Remediation Plan.xlsx]Sheet1

EXHIBIT B

EMSL Analytical, Inc. Test Report

EMSL Analytical, Inc.

2500 Gateway Centre Blvd., Suite 600 Morrisville, NC 27560
Tel/Fax: (919) 465-3900 / (919) 465-3950
http://www.EMSL.com / raleighlab@emsl.com

EMSL Order: 292501336
Customer ID: APPI63
Customer PO: 24-104
Project ID:

Attention: Tonya Nelms
Appian Consulting Engineering
154 Roundabout Court
PO Box 7966
Rocky Mount, NC 27804
Project: Spring Hope Community Center, 103 N May Street

Phone: (800) 248-9290
Fax: (252) 972-7638
Collected Date: 02/26/2025
Received Date: 02/28/2025
Analyzed Date: 03/06/2025

Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Swab Samples (EMSL Method MICRO-SOP-200)

Lab Sample Number:	292501336-0001	292501336-0002	292501336-0003	292501336-0004	292501336-0005
Client Sample ID:	760	407	795	719	505
Sample Location:	Meeting Room	Kitchen Cabinet	North Wall Mtg Room	East Wing Well	Back of Vinyl Chair Mtg Room
Spore Types	Category	Category	Category	Category	Category
Alternaria (Ulocladium)	-	-	-	*Low*	-
Ascospores	-	-	-	-	-
Aspergillus/Penicillium++	Rare	-	-	-	-
Basidiospores	-	-	-	-	-
Bipolaris++	-	-	-	-	-
Chaetomium++	-	-	-	-	-
Cladosporium	*High*	Rare	-	-	*Medium*
Curvularia	-	-	-	-	-
Epicoccum	-	-	-	-	-
Fusarium++	-	-	-	-	-
Ganoderma	-	-	-	-	-
Myxomycetes++	-	-	-	-	-
Pithomyces++	-	-	-	-	-
Rust	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-
Zygomycetes	-	-	-	-	-
Acremonium++	-	*High*	-	-	-
Aspergillus	-	-	*High*	-	*High*
Penicillium/Talaromyces	-	*High*	*High*	*High*	-
Hyphal Fragment	-	-	-	-	-
Insect Fragment	-	Rare	-	-	-
Pollen	-	-	-	-	-
Fibrous Particulate	Rare	-	-	-	Rare

Category: Count/per area analyzed - Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

- Denotes Not Detected.
++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.
* = Sample contains fruiting structures and/or hyphae associated with the spores.

Billy Barnes, Laboratory Manager
or other Approved Signatory

No discernable field blank was submitted with this group of samples.

Initial report from: 03/06/2025 02:25 PM

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com