



Monomoy Regional Middle School Air Quality Testing Report

Reason for Testing: Siding Replacement Project

Date of Testing: July 29-31, 2024

Description: Testing of the building envelope: These tests were conducted as part of the siding replacement project

Conducted By: Raymond Design Associates (Architectural firm), and sub-contractors

Summary of Findings: Evidence of water damage and water intrusion around windows.

Indoor air quality within acceptable human comfort range however concerns related to ventilation system and water damage.

District Response: Long-term project to replace building siding and roof.

Survey, repair, and maintenance of exhaust fans in classrooms.

Removal and replacement of window sills.

Patching of building exterior where possible.



RAYMOND DESIGN
ASSOCIATES
ARCHITECTURE & PLANNING

MONOMOY REGIONAL MIDDLE SCHOOL

Siding Replacement Feasibility Study

Presented by
Raymond Design Associates, Inc.

For the
Monomoy Regional School District

October 10, 2024

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EXECUTIVE SUMMARY

Raymond Design Associates (RDA) is pleased to present this Feasibility Study for Siding Replacement at the Monomoy Regional Middle School (MRMS), for the Monomoy Regional School District (MRSD). Prior to RDA becoming involved with the project, MRSD identified the need for siding replacement due to clear visual evidence of age-related deterioration and had received numerous complaints from MRMS staff about poor interior air quality, “mustiness,” and elevated humidity levels. We understand that as MRSD responded to complaints with spot repairs to various exterior and interior finishes, concerns were raised about the inherent integrity and useful life of the school building envelope.

In response to these concerns, MRSD engaged RDA to perform a limited review of the building envelope to primarily assess the air and water tightness of the exterior siding. While siding is the primary focus of this Study, we expanded our review to include limited review of foundation slap conditions, roofing, windows, and doors as they relate to building envelope conditions in order to ascertain root causes of reported interior humidity and confirm wall and roof termination flashing details which are often points of water infiltration.

Monomoy Regional Middle School is generally attractive, reflective of the local architectural vernacular, and light filled. However, the building suffers from a failed exterior wall envelope that shows consistent signs of severe deterioration throughout all areas and elevations, which has led to active water infiltration. Severely deteriorated wood trim and expired wood shingle siding are evident. We documented consistent inadequate window and wall flashings that appear to stem from original 1996 exterior wall construction methods. While windows, roofing and exterior door systems are nearing the end of their useful life spans, overall they do not appear to be in need of immediate repair or replacement compared to the siding. Siding replacement should be considered high priority because deterioration will accelerate as trim continuous to rot away, and the building could experience considerable damage in the near future.

Our findings support MRSD’s determination that the siding and trim has reached the end of their useful life and are in need of complete replacement. As a baseline for feasibility analysis, we recommend replacement in kind with new air/water barrier, associated flashings, sealant around all window openings, fire treated cedar shingles, and PVC composite trim to maintain the existing building aesthetic. We have also included options for composite siding materials anticipated to result in cost savings. The total estimated construction cost for the baseline (cedar shingle replacement) option is \$4,841,415.00. Please note that this construction cost estimate does not include project sofit costs which typically include but are not limited to design fees, Owner’s Project Manager fees, Owner’s construction contingency, printing, and advertising. Based on the level of rot and deterioration observed, we strongly recommend that MRSD prioritize this project.

It is our intent that this study is used as tool for communication with the School Committee and Towns of Chatham and Harwich, to provide written documentation of the existing conditions, and to support MRSD’s advocacy for appropriate funding.

Sincerely,



Molly Parris

Raymond Design Associates, Inc.



Steven Watchorn

Raymond Design Associates, Inc.

SECTION 1: EXISTING CONDITIONS

I. Property Description

Monomoy Regional Middle School (MRMS) was originally constructed in 1963 as the Town of Chatham's High School and then underwent a major renovation in 1996 to become the Chatham Middle-High School. The renovation included substantial alterations to the original building including complete reconstruction of the exterior walls, window and door replacements, and a large two-story addition. In 2014, the Monomoy Regional School District was established, a new regional high school was constructed, and the middle/high school became MRMS. Located at 425 Crowell Road in Chatham, Massachusetts, the school is situated on a site of approximately 30 acres of open space that includes the MRMS Baseball Fields, Tennis Courts and Basketball Courts. The property is an important educational and recreational resource.



Aerial map of the Monomoy Regional Middle School property.

II. Typical Existing Conditions

RDA performed selective exterior investigative test cuts with contractor assistance in order to document as-built exterior wall and roof assemblies, and the condition of materials concealed behind shingles, trim, and membrane roofing. While the primary focus of this project is exterior siding, RDA reviewed the condition of other building systems as they relate to overall building envelope condition, as a measure of due diligence to gain a holistic understanding of the building in light of recent water infiltration, interior humidity, and previous pest problems reported by MRSD. The following is a summary of the condition of each existing system.

Please refer to Appendix B: Photo Index for existing conditions photos that correspond to the following descriptions.

A. Foundations

1963 and 1996 portions of the building have concrete slab-on grade foundations with perimeter strip footings. There is a crawlspace boiler room near the maintenance office, but no other basement spaces were identified. The distance from top of foundation to exterior grade varies from approximately 3-

inches to 24-inches. Original 1963 foundation walls have an overhanging chamfered edge (See Photo 1). 1996 addition foundations are flat-faced and extend slightly up behind exterior skirt trim.

Foundation walls and slabs exposed to view appear to be in good to fair condition. No large cracking, concerning spalls or other signs of severe deterioration were observed. However, there are several locations where the concrete is discolored, stained and worn by repeated exposure to water on its surface, mainly from leaking downspouts and air-conditioning condensate run-off (Photos 2 & 3). Removal of a base cabinet in one E-Wing classroom (c. 1996) performed by MRSD

prior to our investigation exposed a small hole in the slab which appears to have been left unfilled during original construction and may have been a sub-standard footing pocket installation (Photo 4). The void does not appear to have negatively affected the surrounding slab area but did allow rodents to nest and damage exterior wall insulation.

For this study, four (4) total cores were extracted from concrete floor slabs in order to sample the general condition, thickness, and to confirm whether or not a vapor barrier was installed below slabs installed in 1996. Two (2) cores were extracted from the 1963 building area two (2) cores were also extracted from the 1996 building area. Test locations are marked in red on the building footprint diagram on this page.

The two (2) cores from 1963 slabs consisted of a 3 to 4-inch thick structural cast-in-place concrete slab with no vapor barrier. The concrete appeared to be in stable condition. Both test cuts revealed apparent plumbing and/or mechanical trenches below the floor slab with a second lower concrete slab beneath the equipment. Structural drawings from the 1996 renovation show continuous footings that snake around the entire 1963 building area. It is likely these trenches run continuously under classrooms and connect water piping to the mechanical room, and that the remainder of floor slabs within the 1963 footprint bear directly onto dirt and gravel subgrade.

Based on construction drawings, 1996 concrete floor slabs were designed with a continuous below-grade vapor barrier and 2-inch thick perimeter rigid insulation. The perimeter insulation extends approximately 3-feet from foundation walls under the slab. Based on the two (2) test cores extracted and observation of the previously mentioned footing pocket hole in Room E114, below-slab poly-vapor barrier and rigid insulation were installed in accordance with the design intent. The condition of compacted gravel and subgrade were not investigated in order to limit interior destructive testing. Typical slab-on-grade construction throughout 1996 building areas consists of a 4-inch thick structural cast-in-place concrete slab with thickened edges around the building perimeter. The concrete appeared to be in good condition.

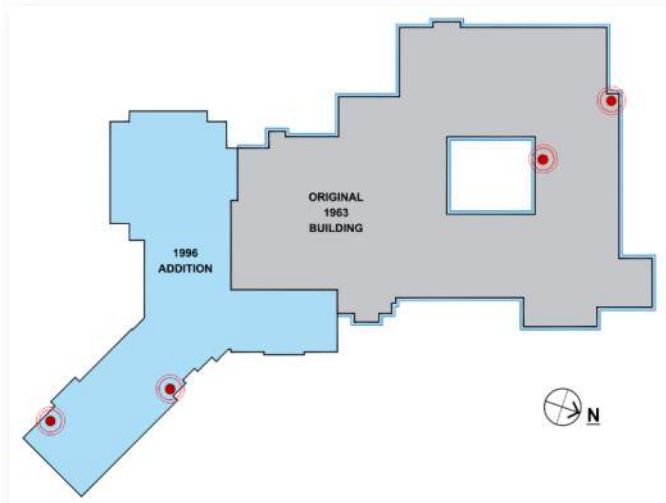


Diagram of original circa 1963 building footprint (gray) and 1996 addition footprint (blue) and exterior wall renovation (blue). Red points represent slab core extraction locations.

Construction details in the 1996 drawings required exterior faces of new foundation walls to be coated with liquid-applied dampproofing membrane below grade but did not call for it at 1963 foundation walls. This coating is black in color and is visible on the northeast “E-Wing” end wall (Photo 5), but it is otherwise not visible above grade. It is likely all foundation walls installed in 1996 were coated but additional excavation is required which is outside the scope of the intent of this evaluation of the siding system.

The Middle School site is located approximately 49-feet above sea level, surrounded by higher terrain on two sides, and lower wet-land terrain on the opposite two sides. Based on cursory review of the surrounding geography, the property appears to be within a drainage area where higher elevations likely drain through the site toward nearby Frost Fish Creek. Particularly, the landscape area surrounding E-Wing was observed to have moss growth in the grass areas and felt slightly wet underfoot. This indicates moisture-rich soil which may contribute to elevated humidity within and around the E-Wing.

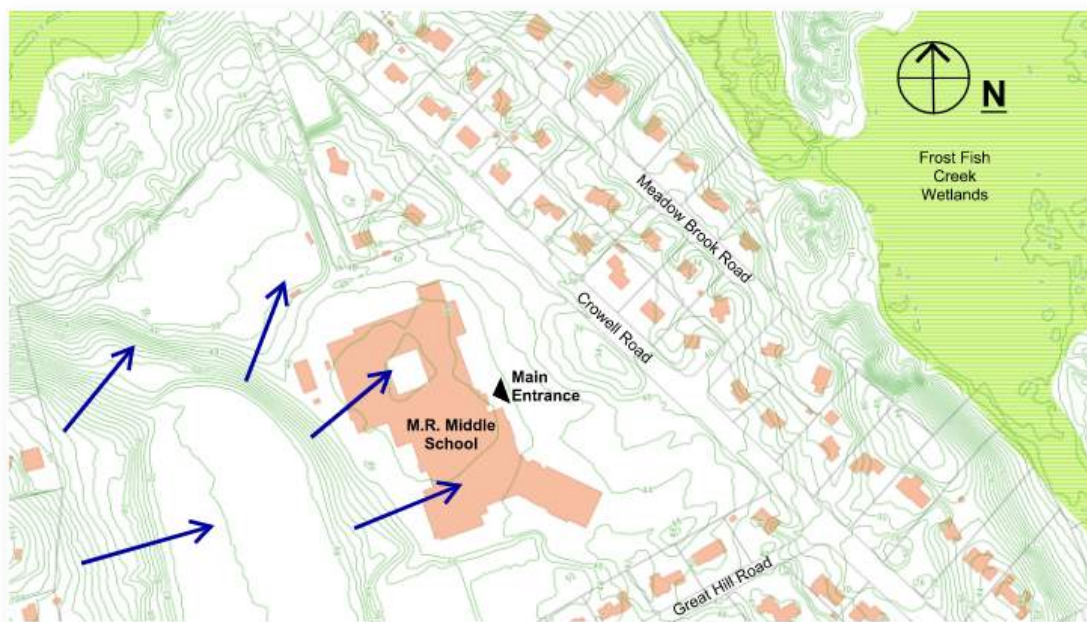


Diagram showing the general slope of terrain adjacent to the MRMS, and general direction of site drainage.

B. Exterior Walls

Typical exterior wall construction can be categorized into metal-framed stud walls and concrete masonry unit (CMU) walls (Photo 6). Most original 1963 exterior walls were composed of metal curtain-wall window and door systems which were demolished in 1996 and replaced with insulated metal stud walls of similar construction to the addition's steel and metal stud structure. Then, the entire building was clad with shingle siding and consistent trim scheme to unify original and new areas and achieve a more familiar “Cape Cod” aesthetic.

Exterior stud construction consists of: 5-inch exposure fire-treated cedar shingles, mechanically fastened air-infiltration barrier (building wrap), 5/8-inch thick fire-treated exterior grade plywood, 6-inch lightweight steel stud framing with fiberglass batt insulation, 6-mil polyethylene vapor barrier, and

interior finish. Interior finishes vary, but most common is gypsum wall board (GWB) consisting of 5/8-inch thick gypsum board and ½-inch thick veneer plaster with painted finish.

Exterior CMU wall construction generally consists of fire-treated cedar shingles (matching metal stud wall siding), air-infiltration barrier, 5/8-inch thick fire-treated exterior plywood, 3-inch thick rigid insulation secured with “Z” purlins fastened to 8-inch nominal (7-5/8” actual) CMU back-up. Interior finishes vary, but interior face of CMU is most commonly exposed with painted finish.



Elevation at Library showing typical siding and trim components.

Cedar shingles at all siding areas have reached the end of their useful lifespan and are deteriorated beyond repair or refinish. A high percentage of shingles are cupped, warped, loosening, soft, and hosting considerable lichen and algae growth. Many elevations are missing shingles that have fallen off entirely (Photos 7 through 13).

Air-infiltration barrier at several test cut locations was observed to be Typar brand (Photo 14), which is a well-known manufacturer of spunbonded polypropylene weather membrane still widely used in 2024. The Typar product was likely installed in most areas, but two (2) test cuts revealed alternative products that appear to be competing brands. We noted a blue and white-colored product that may be Tyvek brand (another well-established building wrap manufacturer), suggesting multiple products were used at the time of construction. This is not in line with best industry practices because performance of assorted brands can vary slightly, may not be compatible with each other, and can negatively impact product warranties. Best practice dictates that a single brand of a particular product should be approved by the Architect and installed as opposed to a patchwork of similar materials.

Plywood sheathing condition varies from good (Photo 17) to poor (Photo 18), depending upon the condition of nearby shingles and trim. At areas where wood trim and window casings are severely deteriorated, plywood was found to be damp, stained and in some cases rotted through (Photo 19). Such conditions were uncovered at various scattered test cut locations, indicating that similar deterioration is common throughout all building elevations. On the other hand, plywood appeared to be in good condition where trim and siding deterioration is less severe. The plywood has also been affected in some areas by mildew growth resulting from insufficient window flashing which is detailed later in the report.

Fiberglass Batt insulation appears to have been installed at all exterior walls in accordance with the 1996 construction drawings. Based on our observations and MRSD's reports of previous exterior wall repairs, it is likely that a percentage of the insulation below the first-floor window line has been damaged by water infiltration and pests, as well as below second floor windows where trim is severely deteriorated (Photo 20).

Poly-vapor barrier was installed in most areas but a consistent gap of approximately 2-inches (Photo 21) was observed between the bottom cut edge of the plastic sheet and the subfloor. At another test cut, a large tear from 1996 installation was uncovered which is substandard workmanship and introduces a path for moisture migration onto interior wall finishes (Photo 22). At an interior window stool that was removed for a window water infiltration test, the vapor barrier did not extend or was found to wrap the opening to the metal window. Current building envelope standards require a continuous vapor barrier wherein the membrane is uninterrupted and sealed from foundation to roof, and around the entire building perimeter. Proper quality products, controlled building ventilation, and sufficient weeping allow the system to breath and shed any moisture that manages to infiltrate. When the membrane is discontinuous, air is able to migrate through the breaks and edge gaps into wall cavities. Most often, interior and exterior air temperatures and humidity levels differ, so when moisture-laden air meets cold surfaces, condensation forms. This condensation can damage critical building materials within walls, along foundations and at structural intersections by rusting metal components and storing moisture in porous materials such as gypsum wall board, insulation, and wood.

In the case of MRMS, the consistent gap above the foundation wall may be contributing to mildew and humidity issues in classrooms as infiltrating moisture vaporizes and rises into occupied spaces. We also observed oxidation (rusting) of metal studs and structural steel components which is further indicative of moisture within wall cavities (Photos 23 & 24).

At soffits, the vapor barrier does not extend beyond the exterior wall height which suggests that air is able to infiltrate into attic spaces with little to no barrier other than wood trim components. Visible effects of the air barrier absence include premature rusting of corrugated metal decking and steel support angles was confirmed by test cut (Photos 25 & 26).

Interior wall finish is painted gypsum wall board (GWB) with plaster finish in most rooms. Some areas have wood paneling or exposed painted CMU. While repair to interior finishes will not be included in siding replacement work, the condition of GWB throughout the building further evidences patterns of water infiltration. Painted finishes are in generally good condition, but water damage to finishes at window sills and heads was observed at many locations throughout various areas of the building (Photo 27). Evidence of moisture damage on the cavity-facing surface of the GWB finish at one (1) test location

was observed where an interior wood window stool was removed, which has since been further investigated and repaired separately by MRSD (Photos 28 & 29). Consistency of visible window sill water damage and observation of similar water damage on exposed undersides of other existing wood stools (Photo 30) suggests GWB finish in other locations may be similarly affected. While damage to interior finishes will not be resolved by a siding replacement project, these conditions lend further evidence of active water infiltration.

Exterior painted wood trim is installed throughout all building areas and is an integral part of the exterior aesthetic. According to the 1996 construction drawings, all trim is fire-treated. The trim scheme generally consists of skirt board, water table, corner boards, frieze board, window casing, door casing, running band, and roof soffit, rake, and fascia (Photos 31 through 33).

Condition of existing wood trim is generally poor, particularly at and below window sills, near grade, and within tree shade canopies. We observed many locations where trim has rotted away to the extent of exposing the air-infiltration barrier behind it (Photo 34). All trim has reached the end of its expected lifetime, has peeling paint, and is expected to continue deteriorating at an accelerated rate due to active water infiltration (Photos 35 through 42). Wood trim in a coastal environment, unless repaired and repainted every 10 years or so, is not expected to last more than 30 years.

Some horizontal trim is fitted with wood drip cap which is not in line with current building practices and is in disrepair. We did not observe drip cap metal flashings or base flashings which are now a design standard to protect top edges of trim surfaces from rain and standing water, with exception of a handful of locations (Photos 44 through 47). It is likely that lack of drip cap flashing has allowed water to soak the tops and backsides of trim boards, so many have rotted from the inside out. This is evidenced by seemingly intact paint finishes that crumble to the touch because the wood behind the paint has rotted through. We observed some trim locations where the paint enamel was the only material left standing, giving the illusion of mass without any solid material behind it.

Four (4) Tuscan-style architectural columns, located at the two (2) front entrances, are constructed fully of wood and are in fair to poor condition, but appear to be repairable (Photos 48 & 49). Based on the original drawings, the wood is decorative and conceals central structural steel columns. Wood columns of this era were typically constructed with vertical planks joined and sealed to form the column shaft. Slight splitting and separation of the planking was observed along with rot at capitals and plinths.

C. Windows

All existing exterior windows were installed in 1996 and are composed of aluminum frames and sash with insulated glazing. There are nearly forty (40) window types, but most are consistent in proportion and style. Typical classroom, office and cafeteria windows are awning-over-fixed-over-hopper type, awning-over-fixed, and/or fixed-over-hopper units with fixed screens (Photos 50 & 51). Fixed window types compose various clerestory window arrangements. There are several double, triple and quadruple-wide units with common mullions, two (2) bay window assemblies, and one (1) greenhouse window assembly (Photo 52).

All window units appear to be in good condition considering their age and are reportedly operating as designed. At nearly 30 years old, they are reaching the expected lifespan for aluminum windows of about

30 to 40 years. Most aluminum sills are equipped with integral weeps to allow any trapped water to drain to the exterior, and water testing of one (1) window unit showed no detectable leaking through the unit itself. With exception of bay windows, glass is typically clear which indicates glazing seals are intact. Condensation forming between the interior and exterior glass panes indicates that the glazing seals have failed, and the window is no longer providing the insulative protection intended. This also creates unsightly fogging and staining. Once the seals have failed, the window is effectively past its useful life and beyond repair. Exterior window sealants appear to be original and are in poor condition as the sealant has surpassed its expected lifespan of approximately 15-20 years. Observed sealant was typically cracked, “alligatored,” stained, and de-laminated (Photo 53).

Despite the apparent integrity of the window units, rough openings are not flashed or insulated in accordance with current accepted building envelope practices. Several test cuts revealed absence of sill, jamb, and head flashings, and it appears that the continuous backer rod detailed in the 1996 construction drawings was not installed. We found the air-infiltration barrier to be simply turned into the rough opening and sealant was installed superficially between window frame and wood trim (Photo 54). It does not appear that the rough openings were intended to be insulated, but we did observe batt insulation at one (1) jamb location (Photo 55). Sills are fitted with aluminum “flashing” with hemmed drip edge, but the aluminum is only tucked in behind the front leg of the window frame and therefore is limited in preventing water infiltration that might occur deeper in the window opening. Continuous jamb, sill, and head flashings with end dams at sills to protect the entire depth of the rough opening, with proper weeping strategies incorporated, is modern standard practice for capturing infiltrating water and returning it to the exterior before it can soak and damage internal building components. In this case, interior building components have been damaged by infiltrating water because there is an inadequately designed flashing system to manage it (Photo 56).

The three (3) existing bay windows are in disrepair with failed seams, leaking joints, and deteriorating bases. The window units and mullions are beyond repair and in need of replacement (Photo 57 & 58).

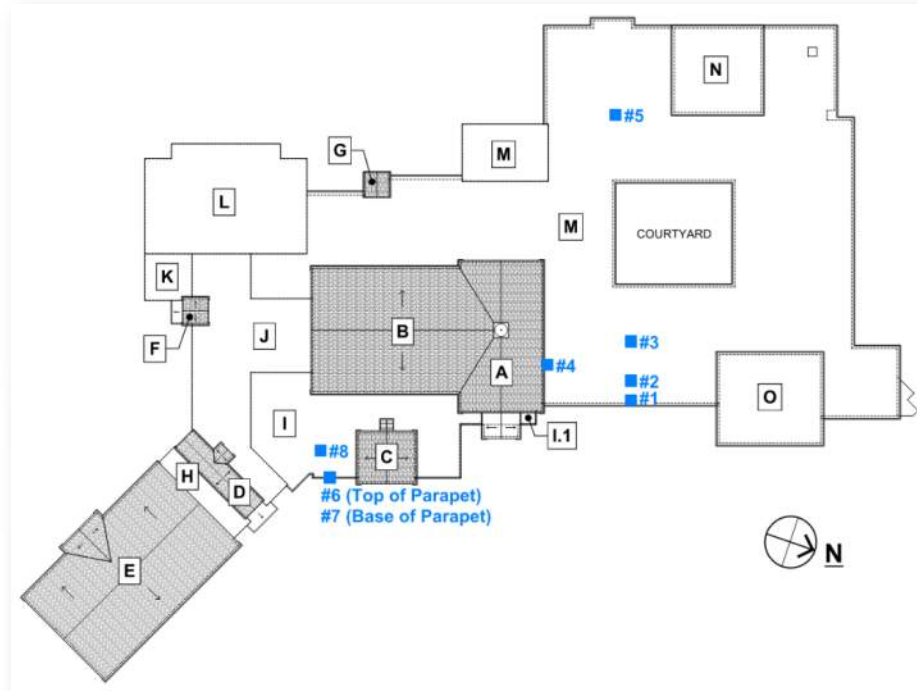
Due to considerable and consistent moisture and water infiltration at window sills, many interior wood stools are stained, warped, cracking, and in some cases rotted through (Photo 59).

D. Roofing

Existing roofing systems include asphalt shingle, standing seam metal, PVC (polyvinyl chloride) membrane, and EPDM (ethylene propylene diene monomer) membrane (Photo 60). Refer to roof plan (attached). Roof types include sloped gables, flat with flush edge, and flat with parapet walls. Asphalt shingles, standing seam, EPDM and selective PVC systems were installed in 1996. Most PVC roofing was installed prior to 1996, but there is no available record of the installation year. MRSD reported that the roofs are inspected and repaired to extent practicable on a quarterly basis which has helped to prevent active leaking, but there are several areas of concern.

RDA performed eight (8) test cuts with contractor assistance at various flat roof locations throughout the building in order to determine whether or not leaking through roofing materials is contributing to moisture within exterior walls, and to confirm presence of a vapor barrier. Based on test cut sampling,

rigid insulation below membranes is generally dry. We did not perform test cuts through asphalt shingle roofing because the sloped roof assemblies are less prone to non-visible leaks.



Roof key plan showing Roof Areas and eight (8) investigative test cut locations.

Asphalt shingle roofing is installed at all gables and, per 1996 construction drawings, generally consists of fiberglass-reinforced architectural asphalt shingles, continuous 15lb. felt underlayment, adhered bituminous leak barrier membrane, CDX plywood sheathing, 1x3 pressure-treated strapping to create continuous 3/4" ventilation channels, and 3-inch thick rigid insulation installed directly on the roof deck. Decking types include wood planks and corrugated steel.

Generally, all asphalt shingle roofing has reached the end of its expected life span at nearly 30 years old (Photos 61 through 65). While appearing to be water tight with shingles consistently in place, surface granules that protect the shingle from exterior elements are wearing away and some heaving was observed. The "ventilated" roof deck design may not be functioning as intended because soffit and ridge vents required by the 1996 construction documents do not appear to have been installed at Roof Area E (as identified on the roof key plan above), and soffit vents were installed but no ridge vent at Roof Areas A and B. Insufficient roof panel ventilation can cause premature failure, heaving and buckling of roofing shingles.

Three inches of rigid insulation above the roof deck does not meet the thermal resistance requirements of the current energy code and contributes to an overall inefficient building envelope. There is no true "attic" above E-Wing second floor rooms because there is only an acoustic tile ceiling barrier between finished rooms and unfinished gable attic. The combined effect of air infiltration through gaps in the

building envelope and insufficient insulation may contribute to measurable heat loss from classrooms in the winter, and heat gain to interior in warmer months.

PVC membrane roofing over original 1963 building areas, based on its condition and composition, was likely installed between 1990 and 1995. The typical system consists of heat-welded white PVC Sarnafil roofing membrane, 1-inch thick (minimum) rigid polystyrene insulation over remnants of original built-up-roofing (BUR), over flat roof decking. Decking types at PVC roof areas are wood plank and Tectum. Tectum is a bonded wood-fiber based panel product commonly used as roof decking in areas with high sound reverberation such as auditoriums and gymnasiums. The original BUR roofing would have been ballasted with gravel which appears to have been removed at the time of PVC membrane installation. While no vapor barrier was observed below PVC membranes, the tar associated with BUR roofing can often serve as a sufficient barrier.

PVC roofing over 1996 addition areas consists of typical PVC roofing membrane, 1-inch thick (minimum) rigid insulation tapered at 1/8-inch per foot, and continuous vapor barrier over corrugated metal decking. With exception of newer insulation requirements and cover board application, this system aligns with current building practices, including the continuous vapor barrier.

PVC roofing components observed appeared to be in functional condition but have reached the end of their expected life span and will most likely begin to require more frequent repair. It is beneficial that MRSD already has an active quarterly inspection and maintenance plan in place to help prevent accelerated deterioration (Photos 66 & 67).

EPDM membrane roofing is located at 1996 flat roof addition areas which comparatively small compared to the PVC membrane areas (Photo 68). The typical assembly consists of a black EPDM roof membrane, 1-inch thick (minimum) rigid polystyrene insulation tapered at 1/8-inch per foot, and continuous vapor barrier over corrugated metal decking. With exception of newer insulation requirements and the application of cover board below the membrane, this system is in line with current building practices, including continuous vapor barrier.

EPDM roofing components appeared to be in functional condition but are nearing the end of their 30 year expected life span and, similarly to PVC membrane areas, may begin to require more frequent repair.

Roof flashing investigation was limited, but one test cut revealed “backwards” base flashing at the intersection between a standing seam metal low roof and vertical wall where building wrap was tucked behind the vertical roof base flashing. Flashings at membrane roofing areas were generally intact, but several tears and potential weak spots were noted (Photos 69 through 71).

Roof Drainage. Most roof areas are drained by continuous gutters with downspouts. Additional drainage measures include through-wall scuppers with downspouts, and cast-iron area drains on flat roofs. 1996 sloped roof gutters are 7-inch K-style aluminum with 3-inch x 4-inch aluminum downspouts, and 1968 low roof gutters are 8-inch box-style copper with 4-inch x 6-inch copper downspouts. No gutter guards were observed. About half of the downspouts drain into below-grade drain lines via corrugated plastic adapters at grade. The other half outlet at grade onto either concrete splash blocks or directly onto the finish grade. At some locations without connection to below-grade drainage, ravines have been formed in the soil by frequent runoff.

Aluminum gutters and downspouts are in fair to good condition with scattered minor dings and dents but are clean and appear to be functioning. Seams are beginning to stain, and some appear to have been re-sealed, suggesting some leaking is occurring. Evidence of minor downspout leaking was observed including algae growth and staining on siding shingles (Photo 72).

Copper gutters are in fair condition but appear to be generally functioning. They withstood decades of coastal weather but have reached the end of their expected life span at over 60 years in most areas (Photos 73 & 74) and are showing their age in dents and oxidation.

Several downspouts do not reach the corrugated plastic drainage adapters, leaving a gap of several inches between bottom of downspout and top of the adapter. Staining and algae growth on nearby exterior materials demonstrates that stormwater often splashes onto walls and foundations (Photos 75 & 76). This condition was observed at 1996 and 1963 portions of the building. Where downspouts do not have available below grade drainage connections, they typically outlet close to the building foundation (Photos 77 through 79). Ideally, downspouts would be equipped with rain leader extensions to release storm water at least three feet away from the foundation wall to prevent standing water adjacent to concrete.

E. Exterior Doors

Inspection of existing exterior doors is not the focus of this project scope, but we observed them to be generally in good condition and working order. All exterior doors were installed in 1996 and are painted hollow metal with painted hollow metal frames. The door panels are likely not insulated with polystyrene as would be recommended today, but the 1996 drawings do not indicate door core materials. Hardware is ADA-compliant lever style, and it appears MRSD has upgraded access hardware over time to incorporate electronic access (Photo 80). Door panels and frames are in good condition, glass is clear indicating in-tact seals, and the openings do not appear to be causing leaks into the interior. When properly maintained and protected with periodic repainting, sealing and inspection, exterior metal doors can last up to 50 years. Exterior paint finishes on doors are in generally good condition and appear to have been re-painted within the last few years (Photo 81). Due to lack of insulation in the frames, there is most likely heat loss and gain through the highly conductive metal which transfers heat easily from interior to exterior.

F. Heating, Ventilation and Cooling

Review and inspection of existing mechanical, electrical, plumbing, fire protection by a professional was not included in this Feasibility Study which is focused on the Siding Replacement. RDA and Vertex provided a general visual review of existing heating, ventilation and air-conditioning systems (HVAC) to gain understanding of how they may be influencing interior humidity and evident damage to existing building envelope materials. Generally, the equipment is reported to be functioning, albeit with increasing annual maintenance and repair costs, and is similar to equipment technology installed in schools in the 1990's throughout New England.

Classrooms and Selective Offices are heated by below-window electric through-wall unit ventilators (U.V.'s) and fin-tube baseboard radiators. U.V.'s are an acceptable system in schools, and have been for decades, because they tend to achieve comfortable interior air for most of the school year. However, units manufactured at this time are more efficient than equipment from 1996 and as average spring and

autumn temperatures continue to rise it becomes more difficult for traditional unit ventilators to maintain comfortable interior air without an air conditioning/cooling function (Photos 83 & 84).

Unit ventilators draw outside air into the unit, heat it by means of a fan coil, and release it into the interior. A balanced ventilation system will then draw used air out of the room via ductwork that most often exhausts through the roof. Based on observations and Vertex's report (attached), it appears that some equipment is either not working or has been turned off. If unit ventilator is not functioning, negative pressure can develop (doors might easily slam) as more air is drawn out than the unit is bringing in; and conversely if the exhaust fan is not working a build-up of carbon dioxide rich air with lower oxygen (students might not be as alert).

Mini-split air conditioning systems are installed in selective offices throughout the building. Each mini-split unit generally consists of an exterior compact condenser connected to an interior wall-mount electric cassette by flexible refrigerant and condensate piping (Photo 85). The interior cassette has heating and cooling functions operable by remote control which. Mini-split technology has gained popularity in the northeast United States because the units tend to be energy efficient, relatively affordable, capable of providing cooling to buildings where ductwork is infeasible and are entirely powered by electricity. Frequent cleanings and balanced humidity levels are critical to proper mini-split system function because their parts are susceptible to surface condensation and mildew growth.

Based on feedback from MRSD, mini-split units were installed to provide cooling to administrative offices without unit ventilators that are often occupied during warmer months. In most cases, introduction of an efficient air conditioning unit would help to dry out the air and balance the space. However, the existing units at MRMS appear to have had an opposite effect, causing excessive condensation on the refrigerant and condensate piping above ceilings. Water droplets that condense on the piping appear to frequently drip onto acoustic ceiling tiles causing visible mildew growth on the exposed side of ceiling tiles directly above wall cassettes (Photos 86). If the entire school is viewed as a single volume that, as discussed is generally humid and warm throughout, the mini-split cooling units become small cold spots. As the intended room cools, adjacent humid unconditioned air will also cool which can result in condensation on porous surfaces vulnerable to mold and mildew growth, as evidenced nearby the mini-split cassettes.

Related to the siding project, we noted that exterior mini-split condensing units are installed quite close to exterior walls and reduced air circulation between the unit and exterior wall appears to have accelerated decay of siding and trim (Photo 87). Copper condensate lines were observed to have continuous flow which indicates a high level of condensation occurring indoors, supporting observations already described. As discussed in the Foundations section, the exterior concrete foundation walls are showing early signs of damage caused by exposure to constant condensate run-off.

G. Accessibility

The Americans with Disabilities Act (ADA) was enacted in 1990 and previous versions of the Massachusetts Architectural Access Board (MAAB) standards of 521 CMR were established at the time of the 1996 renovation. Therefore, a certain level of accessibility measures was required but subsequent

updates to the ADA Design Guidelines and MAAB 521 CMR introduced more stringent rules and dimensional requirements.

521 CMR requires building owners to upgrade public facilities to be fully compliant with all sections of its latest edition when the cost of renovations within any three-year period exceeds 30% of the building's full and fair cash value. The full and fair cash value is determined by dividing the assessed building value (not including land assessment) by the Commonwealth of Massachusetts' assigned *Equalized Value Ratio* for the Town of Chatham which is .95. According to the Town of Chatham's Assessor's Database, the 2024 assessed building value is \$24,741,400. Therefore, the equalized value is \$26,043,579. This means that if renovation costs related to any and all permitted work within the present three-year period exceeds \$7,813,074, the whole building must be brought up to full compliance. Per the Town of Chatham's online permit records, the last building permit issued for 425 Crowell Road was in 2017 which is outside of the current three-year period, so no other projects appear to be included in the equation.

Based on cursory review of major accessibility components, MRMS appears to conform in most regards with 521 CMR including, but not limited to, door hardware, ramps, handrails, reach ranges, and presence of first floor lobby toilet rooms. If a project budget is established that passes the 30% threshold, a detailed accessibility assessment will be required. It should be noted that the MAAB has authority to accept a multi-year compliance plan and/or approve variances should upgrades required prove cost prohibitive.

H. Hazardous Materials

Professional sampling and testing of suspected asbestos-containing materials was performed as part of this study. Please review Vertex Companies' report (Appendix E: Limited Asbestos Sampling Reports) for detailed description and results. Exterior paint was tested for lead due to the age of the wood trim. Asbestos was prohibited in the United States for use in manufacturing building products in 1980, but asbestos is often detected in products installed in the 1990's, and also in new imported products. Therefore, asbestos-testing is an important planning step for renovations to existing buildings of any age.

Asbestos and lead were not detected in any siding or roofing materials tested that would be affected by siding replacement work. These findings considerably reduce potential construction costs. However, it is in MRSD's best interest to maintain a cost contingency for abatement of any suspect materials exposed during the course of construction at original 1963 areas. A preliminary hazardous materials contingency is included in the enclosed Construction Cost Estimate (Appendix A).

Vertex Companies also performed a limited Moisture Mold-Related Assessment, the findings of which support documented evidence of consistent water infiltration through the existing siding system. Please review the enclosed report (Appendix F: Mold & Moisture-Related Assessment) for detailed findings.

III. Existing Conditions Conclusion

Severely deteriorated wood trim, expired wood shingles and inadequate window and wall flashings have caused active water infiltration which is the primary contributor to the siding system failure described herein and is contributing to poor interior air conditions. Deficiencies are systemic along all elevations, apparently

due to 1996 construction methods that are consistent throughout. It is likely that additional external factors such as ultra-violet (sun) exposure, tree shade and air conditioning issues have caused air quality to diminish in some spaces more quickly than others, but it should be understood that additional “problem areas” may develop as building envelope conditions continue to deteriorate. In fact, the deterioration would be expected to accelerate because rot caused by water infiltration tends to be exponential in nature, speeding up as the rot allows additional leaking.

In addition to the immediate critical deficiencies observed in exterior walls and trim, all windows, roofing and exterior door systems have reached or are nearing the end of their expected life spans. However, in contrast to the siding they are in generally stable condition and do not appear to be in need of immediate repair or replacement.

Please refer to Attachment B: Photo Index, for a catalogue of representative documentation of the existing conditions described herein.

SECTION 2: RECOMMENDATIONS

I. Siding Replacement

Based on the depth and consistency of accelerated deterioration of exterior wall envelope components observed throughout the building, the appropriate repair prescription is complete replacement of the entire siding system on all elevations. For feasibility purposes, the proposed replacement siding system is a baseline recommendation to match the existing building architecture. However, additional options can be explored as funding allows. Please refer to Appendix C: Scope of Work Summary.

First, all existing exterior wood shingles, painted wood trim, air infiltration barrier and wall flashings should be demolished to fully expose existing plywood sheathing and rough openings. The exposed sheathing should be inspected to identify all locations requiring selective replacement due to severe rot and decay. We recommend including replacement of approximately 40% of the total wall sheathing area based on the amount of decay observed during the investigation. This work can be included as unit pricing in the eventual bidding documents to allow a refund to MRSD at the end of construction for any unused quantities. Exterior exposure grade, fire-rated Douglas Fir plywood. CDX plywood is not recommended for commercial construction due to its propensity to prematurely decay.

Batt insulation replacement should be included as part of the plywood sheathing replacement unit price based on pest and water damage to existing insulation observed during the investigation and replaced in kind with new unfaced fiberglass batts. Providing continuous exterior insulation without thermal breaks is current standard practice for new construction, meaning that a layer of insulating material spans continuously floor-to-floor in a similar footprint to exterior sheathing. For existing construction, this can be achieved by installing rigid polyisocyanurate board insulation over the existing sheathing, with a second outer layer of plywood over the rigid insulation for nailing of siding and trim. The challenge, however, is that the entire façade then

“bumps out” at least 1-5/8 inches (1 inch rigid insulation plus 5/8 inch outer sheathing) which can conflict with existing roofing and window elements scheduled to remain in place.

In order to add continuous rigid insulation to the exterior of MRMS without replacing all windows, a complicated trim return detail would be required which would still result in thermal breaks at every window opening. The thermal break occurs at the resulting gap between new rigid insulation and existing batt insulation and the total insulative value is therefore substantially diminished, especially on facades with extensive fenestration like MRMS. The existing 6-inch thick batt insulation provides sufficient thermal comfort, so additional exterior rigid insulation serves mainly for energy efficiency. If windows were replaced, new units can be installed to better align with new rigid insulation and rough openings can be insulated to bridge thermal gaps. Roofing edge metal replacement would also be required at all flat roof edges without overhangs. We do not believe the high construction cost of custom detailing around each window to remain balances with potential increase in insulative value given diminished performance due to thermal breaks that will remain even with such custom detailing. However, if the district elects to replace all windows during the siding project, additional rigid insulation is recommended.

New commercial grade, high performance air-infiltration barrier with properly taped seams and reinforced corners should be installed over sheathing. All wall bases, roof and wall intersections, window and door openings and other penetrations should be properly flashed with metal and adhered membrane flashings. If new cedar shingles are specified, the air barrier should be a draining type such as HydroGap by Benjamin Obdyke (or equivalent), wood strapping, or drainage mat should be installed over the air barrier to allow cedar shingles to breathe and drain.

Siding replacement will not address deficiencies in the existing poly-vapor barrier described in Section 1. In order to repair or replace the membrane and achieve a continuous barrier, all interior wall finishes along exterior walls and many ceiling areas would need to be demolished and rebuilt. The associated cost does not balance with potential performance improvement. A new modernized siding system is expected to provide excellent protection against infiltration of exterior air, thus reducing the risk of vapor within wall cavities.

New trim can be designed to match the existing trim scheme using algae-resistant cellular PVC composite trim or primed and painted wood trim. Trim boards should be rabbeted to accept the new siding, and all horizontal boards should be capped with continuous aluminum drip cap flashing. There are advantages and disadvantages to PVC composite trim vs. traditional wood trim. Advantages include lower cost, lower maintenance and resistance to pests. Disadvantages include use of plastics that are less environmentally friendly including plastic “dust” during construction that must be contained. Comparatively, properly capped wood trim coated with high quality primer and exterior enamel can last 50 years or more but may require repainting every 15 years (when properly prepared before repainting). Wood trim is more expensive to install and maintain. For purposes of this study with budget and cost benefit considered, estimated costs are based on PVC composite trim to match existing trim locations and dimensions.

A. Siding Replacement Options

1. Cedar Shingles. To maintain the existing building style, high quality eastern white cedar shingles are recommended. While the existing shingles are fire-treated, our analysis indicates fire-retardant treated wood is not required by code and therefore is not reflected in the base estimated

construction cost. Cedar shingles tend to carry a premium cost for the quality needed for a commercial school application but are a high quality renewable material that is part of the Cape Cod vernacular. When properly drained, flashed and maintained, cedar shingles can be expected to last 35 to 40 years in coastal areas.

2. Polymer Shingles. To maintain a similar aesthetic at lower cost, polymer wood -look shingle panels such as CedarImpressions by CertainTeed (or approved equal) can mimic natural wood with increased durability. Polymer shingles can be indistinguishable from cedar shingles at a distance, and attractive when viewed closely. High quality polymer products with robust thickness are often engineered for a 50-year life span. This may be reduced slightly by coastal conditions, but unlike wood shingles they do not support algae growth, pest infiltration, or lichen. Polymer products are factory-finished which may fade toward the end of their lifespan but tend not move, warp, or dislodge at end of life to the extent that wood shingles do.
3. Polymer Clapboards. Wood-free composite clapboards can achieve a traditional wood clapboard look at much lower cost than solid wood, with longer life expectancy and more weather resistance than traditional wood. Examples of polymer clapboard products are Everlast siding and CedarBoard by CertainTeed, which are designed so that each clapboard interlocks with boards above and below it as opposed the overlap structure of traditional wood claps. Horizontal clapboards will change the building aesthetic but will integrate well with the existing trim scheme. The polymer products can also be installed vertically to add visual interest to selective areas.

Removal and replacement of all downspouts is recommended but gutters can mostly remain in place. Since downspouts must be removed to accommodate siding work, it is worth replacing them with new material given their age and condition. Aluminum downspouts should be replaced with 3"x4" color coated rectangular aluminum to match existing. Copper downspouts should be replaced with 4"x6" rectangular copper with a custom patina to match the existing gutters as closely as possible. All new downspouts should connect directly to below-grade drainage adapters (to remain) where available and fitted with rain leader extensions and/or splash blocks at all locations that drain at grade.

Lastly, selective various exterior repairs should be included in the siding project scope as unit pricing with base bid quantities. There are locations that will require gutter removal and replacement in order to complete the siding work, foundation repairs that may be identified, and roofing repairs that will be needed at various edge copings and intersections.

II. Rough Opening Repairs

Since the existing windows are in generally acceptable condition, appear to have several more years of life expectancy, and are costly to replace, developing a flashing repair that allows typical window units to remain in place is recommended. Based on evidence of active leaking, we do recommend that all bay windows and greenhouse windows be removed in their entirety and replaced with new energy efficient insulated windows.

Once the air infiltration barrier is installed and tucked into the rough opening of all other in-place existing windows and doors, the rough opening should be insulated. A high performance, commercial grade self-adhered membrane flashing tape should then be installed seamlessly along all jambs, heads, and sills (at

windows) such as ExoAir 110 by Tremco (or equivalent). At sills, additional flashing should be inserted into the rough opening to the extent possible, panned at each end with edge over new trim casing. Finish the opening with PVC composite trim and perimeter sealant. When the time comes to replace windows and/or doors, the PVC composite trim can simply be unscrewed and removed to expose the rough opening without damaging new siding materials. The replacement siding system should be designed to weep below skirt trim.

III. Roofing Replacement

Since asphalt shingle, PVC, EPDM and standing seam metal roofing assemblies have reached the end of their expected life spans, full replacement is recommended but not as part of the siding project. We understand MRSD has applied for roofing replacement funding through the Massachusetts School Building Authority (MSBA) and that the initial request has been denied because the roofing was installed less than 30 years ago. Based on our observations and with continued routine maintenance, the integrity of each system can be expected to remain for three to five years while funding is secured.

When funding becomes available, we recommend that all sloped roof areas be stripped down to existing decking (wood plank and corrugated steel) and replaced with new shingle roofing. To replace in kind, new asphalt shingle roofing should include a continuous vapor barrier below ventilated panels, and ventilated insulating panels similar to the existing deck assembly. Current energy codes will require a higher roofing system R-Value, so additional insulation will likely be required. We recommend a lifetime architectural asphalt shingle assembly installed over ventilated panels which includes adhered leak barrier membrane at all eaves, rakes, ridges, hips, valleys and penetrations, and continuous deck protection underlayment by the shingle manufacturer. Gutters, soffits and wood fascia should be replaced at this time with new gutters connected to downspouts replaced during the siding project.

Flat roof areas should be stripped down to existing decking and then built back up with continuous vapor barrier, tapered rigid insulation at thickness to meet current energy codes, high density cover board and new fully adhered roofing membrane. PVC, EPDM and TPO (thermoplastic polyolefin) are all viable options for new membrane material, to be determined during design. All gutters, downspouts, edge metals and copings should be replaced at the time of roofing replacement.

Standing seam metal roofing is recommended to be replaced in kind, with continuous vapor barrier, new rigid insulation to meet current energy requirements where required, plywood sheathing, and underlayment in accordance with the metal roof manufacturer's recommendations.

IV. Foundation Repairs

Based on our observations, the existing foundations are in generally good condition and do not require substantial repairs. As discussed, the siding project will include spot repairs on a unit price basis. Improving perimeter drainage with new downspouts, leaders and condensate line extensions will help to reduce deterioration of exposed concrete. Areas with staining and algae growth should be cleaned using appropriate cleaning methods for exterior concrete.

V. Interior Repairs

Interior repairs are not included in the estimated siding replacement project cost in order to control costs and project complexity. Based on MRSDs current available funding, we recommend repair of interior water damage be considered a future phase project.

Damage to existing wall finishes caused by current active leaks can be repaired either as part of the siding and window replacement work, or under a future contract as funding becomes available. Based on our observations, these areas can be repaired by scraping, patching and application of new primer and finish paint. Once the building envelope is secured, a full interior repainting project may be desirable as it can be difficult to match paint colors at repair areas to existing adjacent paint colors, and high quality paint enamel with sealed joints can function as a sort of vapor barrier to help mitigate effects of the gaps found in the existing poly-vapor barrier within exterior walls. Damage to window jamb finishes is relatively minor but is understandably unsightly and potentially unnerving to staff and parents.

VI. Heating and Cooling Equipment

HVAC (heating, ventilation and air-conditioning) scope is not included in this project and is not included in the detailed cost estimate, but we recommend that MRSD begin to develop a future project to evaluate the existing heating, cooling and exhaust equipment as part of a holistic strategy to reduce indoor humidity levels and improve comfort. Again, repair of the building envelope is expected to help improve humidity levels but the ventilation system is likely out of date and may benefit from modernization. It is recommended that this planning be aligned with roofing replacement work in order to avoid disturbing freshly installed roofing assemblies with new ventilation and/or air conditioning rooftop equipment. Please refer to Attachment F for Vertex Companies' observations related to existing HVAC equipment.

VII. Accessibility

The total construction cost of the siding replacement work is not estimated to exceed thirty percent of the equalized building value, but incorporating window replacement into the project will trigger 521 CMR compliance since the estimated cost will exceed the thirty percent threshold. If MRSD wishes to include window replacement, a comprehensive accessibility audit is recommended to compare the entire facility to 521 CMR requirements. This full audit of MAAB compliance should include recommendations for any variances where deficiencies require unreasonable costs to upgrade compared to the accessibility gain.

While upgrading to full compliance with 521 CMR will not be required for the siding replacement project, the cost will trigger 521 CMR's requirement for a fully accessible entrance and public restrooms triggered by renovations exceeding \$150,000. MRMS already has accessible restrooms at a main entrance lobby that appear to be accessible. Additional analysis is required during the design process to determine whether or not any renovations will be required within those restrooms, but such costs are included in the "design contingency" cost allowance listed in the Cost Estimate attachment.

VIII. Conclusion

The MRMS is in need of a comprehensive siding replacement in order to protect the building structure, improve air quality, and preserve one of MRSD's most valuable municipal buildings. Siding replacement

should be considered high priority because deterioration is known to accelerate as trim continuous to rot away, and the building could experience considerable damage in the near future.

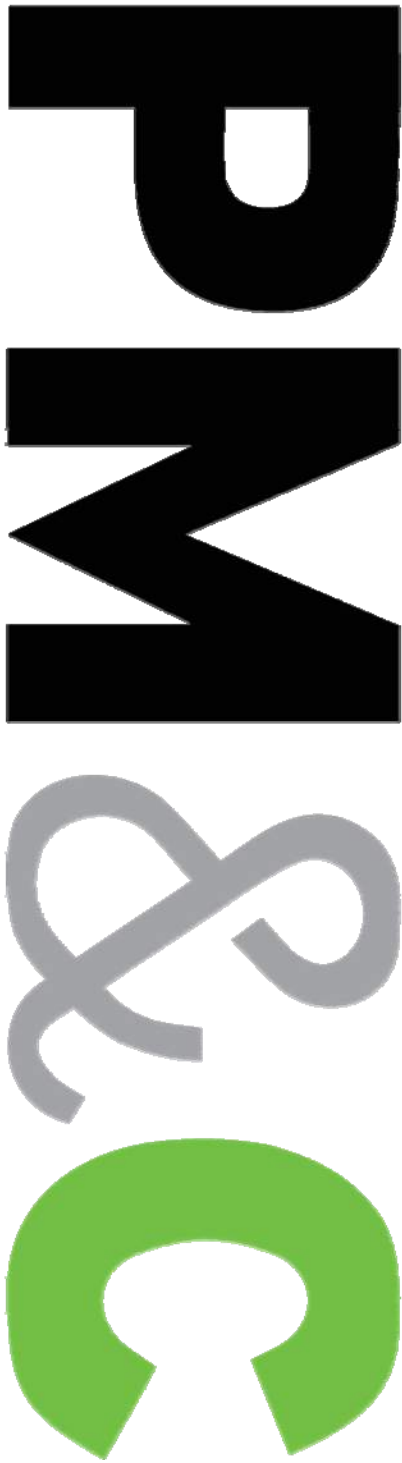
Phasing this project to align with funding installments is not recommended for a number of reasons. Damage and deterioration are severe in various locations throughout the building and deficiencies are consistent. Breaking up the scope into separate bids with two separate contractors may lead to installation inconsistencies, and shingle siding weatherization would differ. Furthermore, MRSD will incur substantial additional project soft costs and general conditions construction costs associated with planning, designing, procuring, administering, and closing two projects rather than one. If phasing is determined to be absolutely necessary, the scope could be separated by elevation to replace northeast facing walls first.

We understand the attached estimated cost for construction exceeds the available secured funding, but we remain your trusted partner in pursuit of additional funding if needed and representation to the MRSD School Committee.

IX. Next Steps

Upon approval of this Feasibility Study and confirmation of general Scope of Work, RDA is prepared to begin Design Development. During this phase, we plan to schedule infrared moisture testing of all exterior walls to better predict the amount of existing wet wall areas, and to provide material mock-ups installed on the Middle School Building to assist MRSD in the selection of siding materials. In the meantime and prior to Spring 2025 bidding, we understand MRSD may establish a Building Committee, select an Owner's Project Manager, and secure additional funding.

Please refer to Appendices A – F for supporting materials and reports



Appendix A

**Feasibility
Estimate**

Monomoy Regional Middle School
Siding Replacement
Chatham, MA

PM&C LLC
20 Downer Ave, Suite 5
Hingham, MA 02043
(T) 781-740-8007
(F) 781-740-1012

Prepared for:

RDA, Inc.

October 9, 2024



Feasibility

BASIS OF ESTIMATE

This cost estimate was produced from Feasibility drawings, specifications and other documentation prepared by RDA, Inc. and their design team dated 10/01/24 . Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, general contractor's profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be under:

Chapter 149 of the Massachusetts General Laws to pre-qualified general contractors, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

If a CM at risk CH149a procurement is used costs will increase from the costs presented in this report.

The estimate is based on **prevailing wage** rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

ITEMS NOT INCLUDED IN THIS ESTIMATE

Items not included in this estimate are:

All professional fees and insurance

Site or existing conditions surveys investigations costs, including to determine subsoil conditions

Items identified in the design as Not In Contract (NIC)

Items identified in the design as by others

Owner supplied and/or installed items (e.g. technology, furniture and equipment, etc.)

ESTIMATE UNITS & ABBREVIATIONS LEGEND

ALW	ALLOWANCE	LS	LUMP SUM
ALT	ALTERNATE	LV(S)	DOOR LEAF/LEAVES
BF	BOARD FOOT	LVL	LAMINATED VENEER LUMBER
DY(S)	DAY	MTH(S)	MONTH
EA	EACH	NIC	NOT IN CONTRACT
FLT(S)	FLIGHT (OF STAIRS)	OPT	OPTION
GFA	GROSS FOOTAGE AREA	QTY	QUANTITY
GSF	GROSS SQUARE FOOTAGE	SF	SQUARE FOOTAGE
HR(S)	HOOR	STOP	ELEVATOR STOP
HSS	HOLLOW STRUCTURAL SECTION	SY	SQUARE YARD
LBS	POUNDS	TN(S)	TONS (STEEL TONNAGE)
LF	LINEAR FOOTAGE	WK(S)	WEEK
LOC	LOCATION	YD(S)	YARD



Monomoy Regional Middle School
Siding Replacement
 Chatham, MA

10/9/2024

Feasibility

MAIN CONSTRUCTION COST SUMMARY

	Construction Start		Estimated Cost
TRADE COSTS			
Siding Replacement	Jul-25		\$2,895,505
HazMat removals at existing building			See Detail
SUBTOTAL TRADE COSTS	Jul-25		\$2,895,505
Design and Estimating Contingency		15.0%	\$434,326
Escalation to Construction Start	Jul-25	3.4%	\$98,447
SUBTOTAL			\$3,428,278
Subcontractor Bonds			In rates
General Conditions	12.0%		\$411,393
General Requirements	6.0%		\$205,697
Winter Conditions			excl
Insurances - GLI/Builders Risk	1.50%		\$51,424
Bond	1.00%		\$34,283
Building Permit	1.00%		\$34,283
Overhead & Profit	8.0%		\$333,229
Phasing Premium	10.0%		\$342,828
TOTAL ESTIMATED CONSTRUCTION COST			\$ 4,841,415

Alternates (Markedup) :

ALT1	Prepare, prime and repaint existing exterior metal doors and frames to remain.	ADD	\$ 30,895
ALT2	Replace alu. Windows - hurricane resistant w/ new incl. insulation board at all exterior cladding	ADD	\$ 3,820,042
ALT3A	Everlast composite interlocking clapboards (or equal) in lieu of cedar shingles.	ADD	\$ 186,542
ALT3B	CertainTeed Cedar Impressions.	DEDUCT	\$ (248,723)
ALT3C	CertainTeed CERTAplank Boards.	DEDUCT	\$ (373,085)
ALT3D	Beach House Shake by Derby Building Products.	DEDUCT	\$ (124,362)
ALT4	Fire rated cedar shingle siding premium	ADD	\$ 186,542



Monomoy Regional Middle School
Siding Replacement
Chatham, MA

10/9/2024

Feasibility

CONSTRUCTION COST SUMMARY IN CSI FORMAT

Building Detail

DIVISION

Subtotal

Total

DIV. 2 EXISTING CONDITIONS

\$10,000

024100 Demolition

028000 Facility Remediation

\$10,000

DIV. 3 CONCRETE

\$15,000

033000 Concrete

\$15,000

DIV. 6 WOODS & PLASTICS

\$378,348

061000 Rough Carpentry

\$378,348

062000 Finish Carpentry

DIV. 7 THERMAL & MOISTURE PROTECTION

\$2,464,157

072000 Thermal Protection

074000 Roofing & Siding Panels

\$2,334,191

078400 Penetration Firestopping

079200 Joint Sealants

\$129,966

DIV. 8 DOORS & WINDOWS

080001 Metal Windows

DIV. 9 FINISHES

090007 Painting

DIV. 23 HVAC

\$12,000

230001 HVAC

\$12,000

DIV. 26 ELECTRICAL

\$16,000

260001 Electrical

\$16,000

SUBTOTAL DIRECT (TRADE) COST

Building

\$2,895,505



Feasibility

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
------	-------------	-----	------	-----------	------	---------------	------------

Building Detail

GROSS FLOOR AREA CALCULATION

Work Area

TOTAL GROSS FLOOR AREA (GFA)

- sf

02 EXISTING CONDITIONS

024100 Demolition

w/ trades below

SUBTOTAL:

\$ -

028000 Facility Remediation

Hazardous abatement budget, allowance

SUBTOTAL:

1

alw

10,000.00

10,000

\$ 10,000

TOTAL, DIVISION 2 - EXISTING CONDITIONS

\$10,000

03 CONCRETE

033000 Concrete

Base Unit Prices

Foundation repairs: Foundation wall patching repairs, scattered throughout the exterior perimeter at various locations, in accordance with industry-standard exterior concrete crack and spall repair best practices. Does not include excavation. Patch areas are generally 5 SF each. - **Repairs in selective locations.**

SUBTOTAL:

150

sf

100.00

15,000

\$ 15,000

TOTAL, DIVISION 03 CONCRETE

\$15,000

06 WOOD & PLASTICS

061000 Rough Carpentry

Base Unit Prices

Sheathing replacement: Remove and dispose of existing plywood sheathing discovered during demolition to be rotted or otherwise unsuitable as substrate for new siding. Replace with 5/8" thick, 5-ply exterior grade Douglas Fir plywood sheathing. Include batt wall cavity insulation replacement in unit cost with new 6" thick fiberglass batts. Base bid quantity is distributed at various scattered areas - **Replacement in selective locations.**

Nailer replacement: Replace any rotted wood nailers exposed during demolition with new 2x P.T. wood nailer. For pricing, assume all nailers to be 2x8. Base bid quantity is distributed at various locations throughout the building perimeter.

14,894

sf

20.00

297,880

300

lf

20.00

6,000

Misc.

Additional misc. rough carpentry & blocking as req'd, allowance

37,234

sf

2.00

74,468

SUBTOTAL:

\$ 378,348

062000 Finish Carpentry

w/ Div 7

SUBTOTAL:

-

\$ -

TOTAL, DIVISION 06 WOOD & PLASTICS

\$378,348

07 THERMAL & MOISTURE PROTECTION

074000 Roofing & Siding Panels

KN1: Remove and replace ALL existing wood shingle siding on all elevations, typical.

1 Remove and dispose of fire-treated wood shingles and air-barrier similar to Tyvek HouseWrap down to exterior plywood sheathing. Includes associated trim removal

37,234

sf

3.00

111,702

1 Install commercial grade draining air-infiltration barrier such as HydroGap Drainable Housewrap (or equal) over existing plywood sheathing, and 5" exposure Eastern White cedar shingle siding.

37,234

sf

39.00

1,452,126



CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
------	-------------	-----	------	-----------	------	---------------	------------

Building Detail

50	1 Unit price plywood sheathing replacement: Replace severely deteriorated sheathing exposed during demolition with 5/8" thick exterior grade Douglas Fir plywood sheathing (no CDX or OSB). Include 6" thick batt insulation replacement as part of sheathing unit price scope. See Unit Prices section of this document for base bid quantities.					See Unit Prices	
51	1 Staging & lifts as req'd to perform exterior cladding work	43,711	sf	4.00	174,844		
52							
53	<u>KN2: Remove and dispose of all existing exterior painted wood trim (and building wrap behind it). Replace with PVC composite trim (and building wrap typical of siding.</u>						
54	2A Frieze board to be replaced with 5/4x12 PVC composite trim, typical all elevations.	880	lf	20.00	17,600		
55	2B Corner board to be replaced with 5/4x10 PVC composite trim, typical all elevations. At exterior door entry alcoves, include corner boards at perpendicular walls	1,211	lf	15.00	18,165		
56	2C Horizontal trim to be replaced with 5/4x6 PVC board. Include continuous color-coated aluminum drip cap flashing along top edge with self-adhered membrane flashing termination behind shingles, typical all applicable elevations.	3,344	lf	30.00	100,320		
57	2D Horizontal trim to be replaced with 5/4x10 PVC board. Include continuous color-coated aluminum drip cap flashing along top edge with self-adhered membrane flashing termination. Typical all applicable elevations.	938	lf	35.00	32,830		
58	2E Unit ventilator louver trim to be replaced with 1x4 PVC composite trim. Typical all locations.	144	lf	7.00	1,008		
59	2F Existing wood fascia to remain until roofing and gutters are replaced. Scrape, prepare, prime and repaint exposed portion below gutter. Typical all elevations.	577	lf	10.00	5,770		
60	2G Fascia to be replaced with 5/4x10 PVC composite trim. See roofing keynotes for edge metal scope. Typical at all similar parapet walls.	776	lf	15.00	11,640		
61	2H Rake board to be replaced with 5/4x6 PVC composite trim. Carefully remove existing trim from behind roofing drip edge to remain. Include continuous PVC crown-molding profile detail trim to match existing along rakes. Do not bend or damage drip edge. Carry 200 LF of drip edge replacement in the base bid as a unit price. Drip edge replacement shall be performed by a professional roofer following best asphalt shingle roofing practices to maintain integrity of existing roofing to remain. Coordinate with Keynote 3.	573	lf	15.00	8,595		
62	2H* Carry 200 LF of drip edge replacement in the base bid as a unit price. Drip edge replacement shall be performed by a professional roofer following best asphalt shingle roofing practices to maintain integrity of existing roofing to remain. Coordinate with Keynote 3.	200	lf	40.00	8,000		
63	2I (2) 5/4x8 vertical trim boards to be replaced with 5/4" thick PVC composite panel without joints, cut to fit. Also typical on return walls as well to meet perpendicular clerestory windows. Typical on (3) sides of entry clerestory.	142	lf	15.00	2,130		
64	2J (2) horizontal trim boards to be replaced with continuous 5/4x10 PVC composite trim over Window HH casing and 5/4x12 PVC composite trim each side of window. Continuous aluminum drip cap flashing below 5/4x10 boards, running seamlessly over 5/4x12 boards and window casing.	34	lf	55.00	1,870		
65	2K Base trim board to be replaced with 5/4x8 PVC composite trim with continuous drip cap flashing and integrated into flashing detail (to be designed) between metal standing seam vestibule roof base flashing, base trim and window sill.	23	lf	35.00	805		
66	2L Exterior door wood casing trim to be replaced with 5/4x8 PVC composite trim. Fill all voids exposed during trim removal between hollow metal door frame and exterior wall framing with commercial grade, low-VOC/low-odor, low-expansion spray foam sealant manufactured for window and door perimeter sealing. Terminate new air/vapor barrier around door frame per manufacturer recommendations and regional best practices. Include aluminum drip catch flashing at all head trim	456	lf	30.00	13,680		
67	2M Replace wood frieze board with 5/4x6 PVC composite trim, typical.	1,080	lf	10.00	10,800		
68	2N Replace existing 13"+/- wood base trim depth with 5/4 PVC composite panel.	40	lf	20.00	800		
69	X Trim surrounding windows not tagged	4,470	lf	20.00	89,400		
70							



Feasibility

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
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Building Detail

71	<u>KN3: Remove and dispose of all existing gable end wall wood trim, painted plywood paneling, and air-barrier to expose 5/8" thick plywood sheathing. Plywood sheathing and 2x8 wood rake nailer shall remain. Refer to Details E & F/Sheet A3.6 of 1996 Drawings. Replace with the following system:</u>						
72	3 If found to be rotted or severely water damaged, replace existing 5/8" plywood sheathing on a unit price basis with new 5/8" exterior exposure plywood sheathing. CDX/OSB not permitted. See Keynote 1 for plywood requirements and unit price replacement quantities.	300	sf	20.00	6,000		
73	3 If found to be rotted, replace existing 2x8 wood rake nailer on a unit price basis. Replace with new P.T. 2x8 wood rake nailer.	300	sf	8.00	2,400		
74	3 Continuous commercial grade drainable air-water barrier typical of siding system (HydroGap, or equal) to cover entire gable down to window head termination. Tape to seal all edges. Wrap around 2x8 rake nailer	300	sf	5.00	1,500		
75	3 1/2" marine grade/permanent exposure, Douglas Fir plywood with (1) paintable finish grade face. Prime and finish paint with mildew/algae-inhibitive enamel on exterior (finish grade) face and (4) edges, and back-prime interior face.	300	sf	10.00	3,000		
76	3 For study pricing purposes, replace existing wood trim components with paintable PVC composite trim to match existing components shown in Details E & F/Sheet A3.6 of the 1996 Drawings. Finish paint with mildew/algae-inhibitive exterior enamel.	300	sf	20.00	6,000		
77	3 Seal all exterior joints between trim components with commercial grade, mildew/stain-resistant general purpose exterior finish sealant.	300	sf	4.00	1,200		
78	3 Refer to Details E & F/Sheet A3.6 of 1996 Drawings.						
79	3 Refer to Roofing Keynotes for gutter scope.						
80							
81	<u>KN4: At all windows on all elevations (and louvers, similar):</u>						
82							
83	Window A	764	sf				
84	Window B	332	sf				
85	Window BB	46	sf				
86	Window C	603	sf				
87	Window CC	25	sf				
88	Window D	436	sf				
89	Window DD	73	sf				
90	Window E	62	sf				
91	Window EE	23	sf				
92	Window F	309	sf				
93	Window FF	23	sf				
94	Window G	108	sf				
95	Window GG	84	sf				
96	Window H	100	sf				
97	Window HH	120	sf				
98	Window J	32	sf				
99	Window JJ	29	sf				
100	Window K	48	sf				
101	Window KK	30	sf				
102	Window L	58	sf				
103	Window LL	124	sf				
104	Window M	752	sf				
105	Window MM	79	sf				
106	Window N	300	sf				
107	Window NN	81	sf				
108	Window O	203	sf				
109	Window P	170	sf				
110	Window PP	10	sf				
111	Window R	207	sf				
112	Window T	48	sf				
113	Window U	42	sf				
114	Window XX	32	sf				
115	Louver 5A	8	sf				
116	Louver 5B	47	sf				
117	Glass Block 13	1,069	sf				
118							
119	4 Remove and dispose of wood casing to expose metal and wood-framed rough opening.	4,566	lf	3.00	13,698		
120	4 Remove and dispose of any existing batt insulation tucked into void between window frame and rough opening; and replace with window and door spray-foam sealant.	4,566	lf	4.00	18,264		



CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
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Building Detail

121	4 Apply Exo-Air (or equal) type flashing tape around window perimeter lapped onto air-barrier membrane. For pricing, include cost for new sill flashing installed with window in place (detail and approach to be designed).	4,566	lf	10.00	45,660		
122	4 Install new 5/4x6 PVC composite jamb, head and sill casing. Head casing dimensions may vary at select window locations. Apply continuous sealant along perimeter joint between window frame and trim. Sealant cost only PVC w/ trim work in Keynote 2	4,566	lf	10.00	45,660		
123	4A 4A: Remove and dispose of existing bay window in its entirety down to rough opening. Replace with multi-unit insulated aluminum window (no bay) to match general existing window style. Assume (3)-wide of fixed-over-hopper sash. Includes new metal sill flashing and limited interior/exterior wall infill and patching. New window will fit within existing rough opening.	1	ea	6,500.00	6,500		
124	<u>KN5: Remove and dispose of existing round aluminum gable end vent louver. Replace with color-coated aluminum round vent to match existing net free airflow. Color to be white. Tape and seal perimeter per typical window repair scope (Keynote 4)</u>						
125							
126	5A 2'-6" +/- diameter vent replacement	1	ea	250.00	250		
127	5B 3'-6" +/- diameter vent replacement.	5	ea	300.00	1,500		
128	<u>KN6: Existing cupola components above siding termination to remain. Components include, but are not limited to wood base, wood railing, wood cupola structure and finish trim, and metal roofing. Prepare, prime and repaint all exposed wood surfaces and seal between all joints. Typical all (4) sides.</u>						
129		1	ls	15,000.00	15,000		
130	<u>KN7: Generally, all gutters shall remain in place. Do not damage during the course of work. Inspect and repair any loose or leaking seams. For pricing, include 200 LF of gutter removal, salvage and reinstallation for various scattered locations where gutters must be removed for siding work.</u>						
131							
132	7A At aluminum gutters (installed 1996), apply water-stop clear sealant to repair seams. For pricing, carry (2) workers for (24) hours each at mechanic wage rate. Lift will be required for higher elevations.	384	lf	10.00	3,840		
133	7B Remove, salvage and store existing aluminum downspouts. Protect drainage inlet at grade from dust and construction debris. Reinstall over new siding with new color-coated aluminum brackets. Reconnect to corrugated plastic drainage inlets. Do not scuff, dent or puncture downspouts. Replace any damaged, bent or punctured downspouts with new 3"x4" flat rectangular color-coated aluminum to match existing on a unit price basis.	477	lf	15.00	7,155		
134	7B In the base bid, carry replacement of (5) downspouts (1 per unit price). Contractor is responsible for replacement in kind of any downspout damaged during construction. Allow 20'H	5	ea	1,000.00	5,000		
135	7C At copper gutters (original 1963 installation), repair seams with lead-free solder. For pricing, carry (2) workers at (32) hours each at prevailing wage rate. All copper gutters are ladder-accessible and can be repaired from roof edge.	299	lf	40.00	11,960		
136	7D Remove, salvage and protect copper downspouts and brackets. Protect drainage inlet at grade from dust and construction debris. Reinstall over new siding with in locations to match existing and reconnect to corrugated plastic drainage inlets. Do not damage or puncture. Replace any damaged, bent or punctured downspouts with new 4"x6" flat rectangular bronze copper to match existing dimension and patina on a unit price basis. In the base bid, carry replacement of (5) downspouts (1 per unit price). Contractor is responsible for replacement in kind of any downspout damaged during construction.	207	lf	25.00	5,175		
137	<u>KN8: All existing roofing shall remain except as noted</u>						
138							



Feasibility

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
Building Detail							
139	8A Remove and dispose of existing color-coated aluminum flat roofing edge metal/parapet wall coping in order to accommodate siding and trim replacement work. Replace in kind over new siding, with continuous hemmed drip edge and continuous cleat. Include minor parapet wall flashing repairs contingency in case of damage uncovered during demolition. At flat roof edges, include EPDM roofing membrane edge metal flashing strip, sealed and bonded to existing EPDM roofing.	377	lf	40.00		15,080	
140	8B Existing membrane roofing termination into copper gutters shall remain, typical	522	lf			ETR	
141	8C Existing standing seam metal roofing to remain, typical.	170	lf			ETR	
142	8D Tagged but not described assume ETR	834	lf			ETR	
143							
144	9 <u>KN9: Remove existing non-structural wood column. Existing structural steel post within shall remain. Clean any rust from steel post base. Replace column with fiberglass replica to match existing; manufactured in two halves for field installation around steel post. Field-finish and seal joining seam to conceal. Prime and finish paint and include 3" diameter column vent on inside column face.</u>	4	ea	2,500.00		10,000	
145							
146	10 <u>KN10: Remove and dispose of existing metal guardrail at kitchen loading dock. Replace with new galvanized and powder coated steel guardrail, color black.</u>	40	lf	400.00		16,000	
147							
148	13 <u>KN13: Existing glass block gymnasium window to remain. Remove existing wood trim (and sealant) and replace with 5/4x6 PVC composite trim similar to aluminum windows. Seal and spray-foam insulate between glass block and rough opening when exposed by trim removal. Seal between glass block and new trim. Perimeter work only. PVC trim w/ Kevnote 2</u>	558	lf	8.00		4,464	
149							
150	14 <u>KN14: Existing EPDM membrane roofing on cheek wall to remain. Replace vertical wood trim between EPDM and wood shingles with 5/4x6 PVC composite trim. Include EPDM-compatible flashing tape behind trim termination.</u>	120	sf	50.00		6,000	
151							
152	<u>Base Unit Prices</u>						
153	Roofing edge metal replacement: Replace any damaged or unsuitable aluminum edge metal to accommodate various siding installation details with new edge metal to match existing. Include removal of membrane roofing flashing strip and new flashing strip over new edge metal.	200	lf	60.00		12,000	
154	Gutter Replacement: Remove and dispose of selective gutters in 10-foot minimum sections in order to accommodate siding replacement work and replace with new gutters to match existing material, profile, and dimensions.	50	lf	80.00		4,000	
155	Soffit replacement: Remove and dispose of rotted wood at existing soffits and replace with new wood to match existing, to be primed and painted. Replace in minimum two-foot sections. (4 sf per location)	4	loc	1,200.00		4,800	
156							
157	<u>Alternates</u>						
158	1 Prepare, prime and repaint existing exterior metal doors and frames to remain.						
	Door 3070 EXT	7	ea	500.00		Alternate	
	Door 6070 EXT	15	ea	1,000.00		Alternate	
161	2 Remove and dispose of all existing aluminum windows in their entirety and replace with new insulated aluminum windows to match existing styles and dimensions. Includes new sill flashing detail at each opening. - Hurricane resistant	5,353	sf	300.00		Alternate	
162	2 Include with this alternate: 1-inch thick rigid exterior insulation board to entire façade on all elevations with 5/8-inch thick exterior plywood sheathing over the new insulation. Includes edge metal replacement at all flat roof edges without gutters. New siding would then be installed over new 5/8" plywood per base bid.	37,234	sf	25.00		Alternate	
163	2 Includes edge metal replacement at all flat roof edges without gutters	2,429	lf	20.00		Alternate	
164	2 Remove/modify all louvers & other system appurtenances for increased wall thickness	6	loc	1,500.00		Alternate	
165	3 Provide pricing for siding options other than cedar shingles:						
166	3 Cedar Shingles w/ Hydrogap	37,234	sf	39.00		Base	



Monomoy Regional Middle School
Siding Replacement
Chatham, MA

09-Oct-24

GFA

Feasibility

CODE	DESCRIPTION	QTY	UNIT	UNIT COST	COST	SUBTOTAL COST	TOTAL COST
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Building Detail

167	3A Everlast composite interlocking clapboards (or equal) in lieu of cedar shingles.	37,234	sf	42.00	Alternate		
168	3B CertainTeed Cedar Impressions.	37,234	sf	35.00	Alternate		
169	3C CertainTeed CERTAplank Boards.	37,234	sf	33.00	Alternate		
170	3D Beach House Shake by Derby Building Products.	37,234	sf	37.00	Alternate		
171	4 Fire treated cedar shingles premium	37,234	sf	3.00	Alternate		
172							
173	074000 SUBTOTAL:					\$ 2,334,191	
174							
175	079200 Joint Sealants						
176	Joint sealants as req'd @ openings	4,566	lf	4.00	18,264		
177	Joint sealants as req'd @ exterior cladding	37,234	sf	3.00	111,702		
178	079200 SUBTOTAL:					\$ 129,966	
179							
180	TOTAL, DIVISION 07 THERMAL & MOISTURE PROTECTION						\$2,464,157
181							
182	08 DOORS & WINDOWS						
183							
184	080001 Metal Windows						
185	Alternate only				-		
186	080001 SUBTOTAL:					\$ -	
187							
188	TOTAL, DIVISION 08 DOORS & WINDOWS						
189							
190	09 FINISHES						
191							
192	090007 Painting						
193	Painting & refinish work w/ div 7				-		
194	090007 SUBTOTAL:					\$ -	
195							
196	TOTAL, DIVISION 09 FINISHES						
197							
198	23 HVAC						
199							
200	230001 HVAC						
201	12 KN12: Disconnect existing mini-split condenser and refrigerant lines, and store to make space for siding replacement work. Reinstall at grade on new bearing racks and reconnect refrigerant lines with cover over new siding. Ensure condenser is placed at least 12" from face of exterior wall.	10	ea	1,200.00	12,000		
202	230001 SUBTOTAL					\$ 12,000	
203							
204	TOTAL, DIVISION 23 HVAC						\$12,000
205							
206	26 ELECTRICAL						
207							
208	260001 Electrical						
209	Gear & Distribution						
210	No items in this section						
211							
212	Lighting & Power						
213	11 KN11: Remove and dispose of existing exterior fluorescent light fixture and replace with new commercial grade LED fixture on properly flashed PVC composite mounting block and head flashing incorporated into siding system.	20	ea	500.00	10,000		
214	11 Selective removal & reinstallation of extg building mounted conduit for lighting	20	loc	300.00	6,000		
215							
216	Communication & Security Systems						
217	No items in this section						
218							
219	Other Electrical Systems						
220	No items in this section						
221	260001 SUBTOTAL					\$ 16,000	
222							
223	TOTAL, DIVISION 26 ELECTRICAL						\$16,000
224							

Total Direct Trade Costs \$ 2,895,505



Appendix B: Photo Index

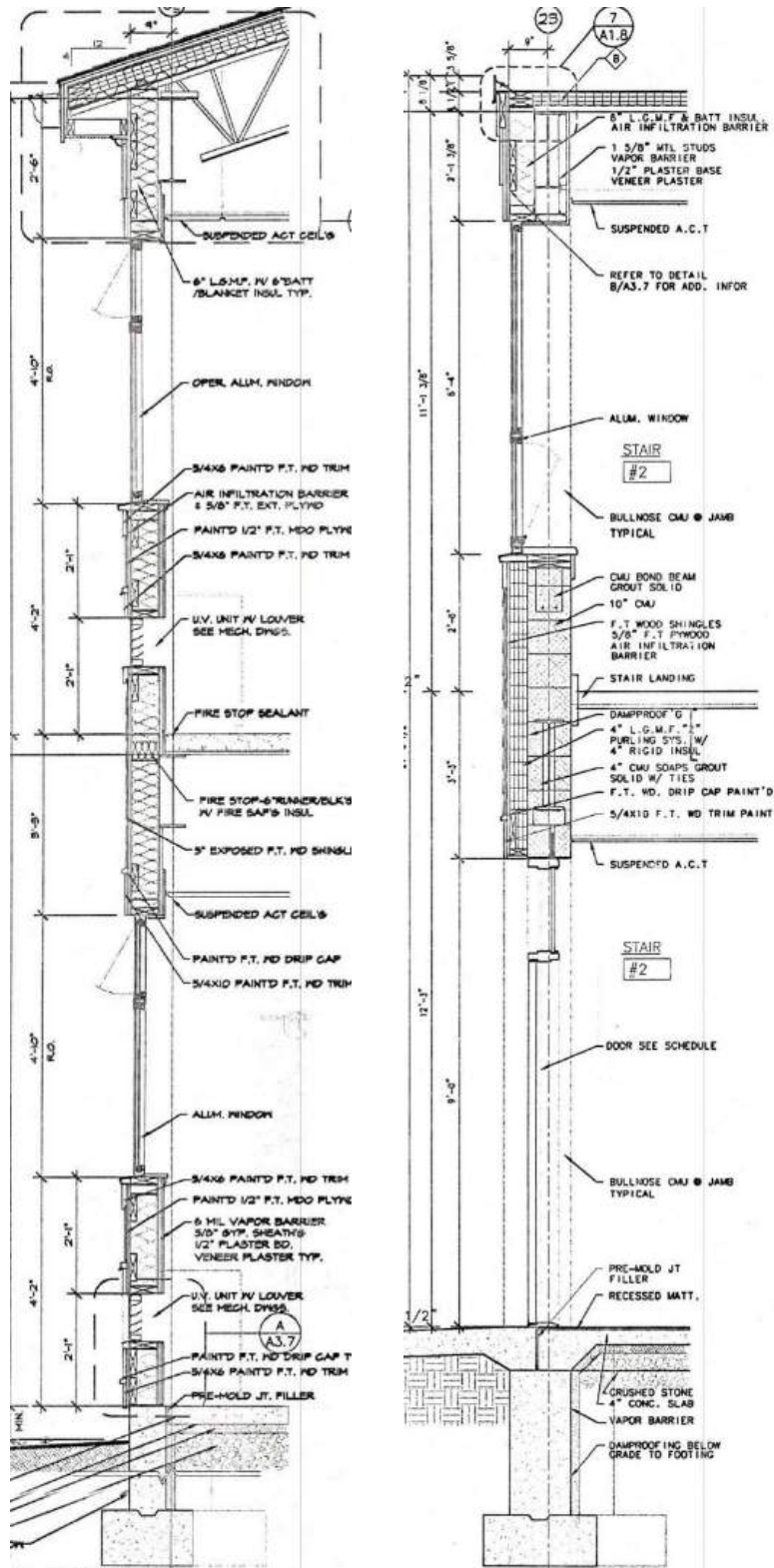
Please refer to the following index of photos taken by RDA at the time of our field investigation conducted in July, 2024 for evidence of conditions described in the report.

Existing Conditions Photos		
<u>Foundations</u>		
1.		View of original 1963 chamfered foundation wall edge. This photo also shows lichen growth and trim rot which is consistent throughout all elevations.
2.		View of foundation wall in otherwise good condition becoming stained and damaged by condensate pipe run-off. Discharged water is pooling at grade against the foundation and nearby moss in the grass indicates consistent high moisture levels in the soil. Note the loose, nearly falling wood shingle below white trim.

3.	 A photograph showing the exterior of a building with grey shingle siding and white window frames. A dark brown downspout runs vertically from the roofline to the ground. At the base of the downspout, there is significant dark staining and what appears to be algae growth on the concrete foundation wall.	View of additional condensate pipe location where continuous exposure to water is causing staining and algae growth on the foundation wall which is in otherwise good condition. This exposure to water can lead to serious deterioration and cracking if not repaired.
4.	 A close-up photograph looking into a triangular void or 'footing pocket' between concrete foundation slabs. The area is filled with dark, loose soil, organic debris, and some small pieces of wood or twigs, indicating rodent nesting.	View of “footing pocket” slab void discovered in Room E114 when the District removed cabinetry and flooring. Dirt and organic debris are the result of rodent nesting, but there were no signs of current pest activity likely because the District repaired the exterior wall at this location prior to our investigation.
5.	 A photograph of a building's exterior wall with grey shingle siding and white window frames. A yellow arrow points to a dark, horizontal line of liquid-applied waterproofing membrane along the base of the foundation wall, just above the grass.	View of liquid-applied foundation wall waterproofing membrane visible on the E-Wing gable end wall.

Exterior Walls

6.



View of two (2) exterior wall sections from the 1996 renovation construction drawings, representing typical metal stud and concrete masonry unit (CMU) general exterior wall construction types.

7.		View of missing, broken and cracked cedar shingles.
8.		Example of typical shingle and trim damaged observed. Round window casing joint is split and is likely allowing water infiltration, evidenced by heaving shingles directly below and rotting of casing. Large rot voids in wood trim are visible on window casing below rectangular ribbon windows.
9.		View of typical deterioration and decay of shingles and trim. Shingles are uneven, stained and harboring lichen (right-hand side of photo). Wood drip cap on skirt board is visibly missing in many sections.

10.		View of more typical wood shingle staining and deterioration. Shingles are missing on the lower right-hand building corner. The hole beneath the triple-wide window was a partial test cut that revealed severely rotted plywood sheathing.
11.		Close-up view of shingles and wood trim with considerable algae and lichen growth.
12.		View of existing cheek wall above flat roofing that shows consistent wear and tear, including water stains between shingle courses.

13.		Photo of missing cheek wall shingles. Fortunately, the EPDM roofing membrane base flashing appears to extend at least 12-inches behind single siding which will help prevent leaking.
14.		Photo showing Typar brand air-infiltration barrier that was exposed during the investigation.
15.		View of varying air-infiltration barrier products. These building corners are close to each other (near the main entrance) but one appears to be Typar brand (gray) and the other appears to be Tyvek brand (white).

16.		Photo showing a building wrap tape product that was installed improperly in 1996, possible to cover a tear in the building wrap. It is unclear whether or not the added tape is allowing the building wrap to breathe.
17.		View of a test cut revealing no building wrap installed over the mull between two windows so the wood trim was installed directly onto the plywood sheathing. This is not in line with accepted building practices.
18.		View of plywood sheathing damaged by active water infiltration, evidenced by general dark hue in the wood and dark staining where plywood is beginning to rot.

19.		Close-up photo of hole seen in Photo 10 which shows (a) worn shingle with rusting nail, (b) Tyvek or similar air-infiltration barrier rather than Typar seen in other locations, (c) plywood sheathing that is rotted through and no longer sound, (d) stained batt insulation, and (e) absence of interior vapor barrier which would be visible against the backside of the GWB finish. Here, the GWB is exposed (tan color in photo) directly to the insulation.
20.		View of existing fiberglass batt insulation that has been damaged by water and rodents to the point of requiring replacement.
21.		View of same opening as Photo 20, with insulation removed, showing (a) close view of rotted plywood sheathing, (b) oxidation [rusting] of metal stud framing bottom channel caused by inadequate base flashing, and (c) continuous gap between the bottom of the wall and bottom edge of poly-vapor barrier.

22.	 A close-up photograph showing a vertical tear in a white vapor barrier material. The tear is located near the top of a metal frame. A small, rectangular label with illegible text is visible on the barrier to the right of the tear. The metal frame is blue-painted steel.	View of a tear in the vapor barrier that appears to be original to the 1996 installation. This indicates questionable workmanship and/or lack of understanding of vapor barrier function.
23.	 A photograph showing a gap between the bottom edge of a white vapor barrier and the exterior wall. The wall is made of concrete and shows signs of weathering and discoloration. The vapor barrier is held in place by a metal frame. A small, rectangular label with illegible text is visible on the barrier.	Additional view of gap between bottom of exterior wall and bottom edge of vapor barrier.
24.	 A close-up photograph of a metal frame showing significant oxidation and rust. A large pile of pink, fibrous material, likely insulation, is visible on the left side of the frame. The ground in the foreground is covered in a layer of brown, granular material, possibly soil or debris.	Close-up view of framing oxidation and rodent droppings exposed during the investigation.

25.		View of an E-Wing soffit test cut that shows non-vented wood soffit and termination of air-infiltration barrier which is not taped. There is no continuous vapor barrier to meet the roofing and is instead open to the attic interior.
26.		Close-up view of E-Wing soffit test cut showing premature oxidation of steel roof decking underside and structural steel components.
27.		Example views of water damage to interior window jambs and heads that were observed at many window locations.

28.		View of window where existing interior wood stool was removed to revealed, showing stains on baseboard radiators caused by dripping water from the stool underside, likely caused by water infiltration through the rough opening.
29.		View close-up views of effect that excess moisture within exterior walls has had on GWB finishes. Here, mildew growth on both sides of the wall board is evidence of this moisture build-up.
30.		View of visible mildew growth on the underside of a wood window stool.

31.		View of typical wood trim components and style.
32.		Additional view of trim components and style, on 1996 addition elevation.
33.		View of trim components on 1963 building elevations, where exterior walls were rebuilt in 1996.

34.		View of existing window trim that is rotted through to the point of exposing the air-infiltration barrier behind it.
35.		View of existing corner trim boards harboring extensive lichen growth and showing rot at the base trim.
36.		View of severely rotted corner trim where MRSD staff have applied foam sealant as a temporary repair to prevent direct water infiltration. Still, the air-infiltration barrier is exposed.

37.		View of upper level trim which is also rotting through to the point of exposing the air-infiltration barrier, further demonstrating how wide spread trim deterioration is throughout the building from foundation to gable end walls.
38.		Additional view of severely rotted trim which has lost considerable mass.
39.		View of heaved shingles directly below window casing trim which indicates frequent leaking originating at the window rough opening and running down behind the shingles.

40.		Top view of rotted corner base trim where wood has lost its integrity.
41.		View of a wood soffit location that appears to have been water damaged. Soffits are in generally acceptable conditions, but selective spot repairs should be included in the siding work.
42.		View of an additional wood soffit location that appears to have been water damaged resulting in a large opening. Note that, based on our findings, the soffit is open to the building interior and is therefore susceptible to pest infiltration through the opening.

43.		View of the top of a horizontal trim board with <u>no</u> drip cap flashing protection. The wood is stained, worn, split and may be absorbing standing water.
44.		View of one location where metal drip cap flashing was observed which provides more adequate protection. Ideally, there would be continuous hemmed drip edge to direct draining water away from the trim face.
45.		View of wood cap trim installed in 1996 which is severely deteriorated, seen here with extensive lichen growth.

46.		View of one of many areas where the wood drip cap has rotted away, leaving a gap for water infiltration.
47.		View of tear in the air-infiltration barrier that was exposed during the investigation, behind rotted wood trim cap. The plywood sheathing exposed by the tear was damp to the touch.
48.		View of (2) of the (4) decorative columns located at the two front main entrances.

49.		View of an open hole caused by wood rot in one of the column capitals.
<u>Windows</u>		
50.		Sample view of typical windows types.
51.		Sample view of typical window types.

52.		View of two (2) bay windows and one (1) greenhouse window assembly.
53.		View of cracking and "alligatoring" of existing window sealant.
54.		View of typical air-infiltration barrier termination at window opening. No flashing, backer rod or sealant was observed.

55.		View of batt insulation that was found at one window opening corner which was loose and inconsistent.
56.		View of window sill framing showing dark (likely deteriorating) wood sub-sill and rusting steel stud framing.
57.		View of recently replaced bay window base plywood (by MRSD) that is already staining, damaged and growing algae due to the extent of leaking around the bay window units above.

58.		View of rotted second floor bay window trim.
59.		View of severely rotted interior wood window stool. Wood fibers flake apart to the touch due to rot caused by frequent water infiltration.
<u>Roofing</u>		
60.		Broad view of different roofing types located throughout the building.

61.		View of existing architectural asphalt shingles and eave overhang. The shingles are beginning to deteriorate as evidenced by loss of surface granules, seen in this photo as dark stippling on the field of most shingles.
62.		Additional view of architectural asphalt shingle roofing and rake overhang.
63.		Additional view of asphalt shingle roofing (EPDM roofing is also shown) with evidence surface granule loss which appears as darkened areas in the photo.

64.		View of gable ridge vent that was observed. Not all ridges are fitted with vents.
65.		View of typical vented gable roof soffit. Not all soffits are vented.
66.		View of typical PVC roofing which is a white color as opposed to EPDM which is black.

67.		Some cheek wall areas are clad with PVC or EPDM membrane (left photo). We observed selective breaks in seams (right photo) which should be repaired during regular roofing maintenance work.
68.		View of typical EPDM roofing membrane and transition down to PVC membrane roofing.
69.		Sample photos of test cuts performed during the investigation to confirm flat roofing assemblies. Left-hand photos show base membrane flashing adhered directly to plywood sheathing which is in line with 1996 building practices. Right-hand photo shows polyisocyanurate rigid insulation over Tectum decking.

70.		Additional roofing test cut photos showing shingle siding air-infiltration barrier lapping over PVC membrane base flashing. This is the proper overlap direction, but a more robust flashing termination is required by current building standards.
71.		View of a test cut location that revealed “backwards” flashing where the air-infiltration barrier is tucked behind the standing seam metal roofing base flashing. This condition directs water behind the flashing and potentially into the standing seam metal roofing system.
72.		Photo showing evidence of leaking from existing downspout seams that appear to be have been sealed, and now the sealant has stained from airborne dirt and particles.

73.		View of typical copper gutter and downspout. Copper gutters have reached the end of their useful life span.
74.		View of hole observed at one (1) copper gutter location.
75.		View of location where a downspout does not reach the corrugated plastic below-grade drainage connector.

76.		Additional view of a downspout that does not reach the below-grade drainage connector. Staining on the face of the concrete foundation wall indicates frequent splashing during rain events.
77.		Photo showing an aluminum downspout fitted with a splash block, but the splash block is not aligned and may actually block drainage. Run-off should be directed at least three feet away from the foundation wall, especially where grade is close to the siding as seen in this image.
78.		Photo showing a copper downspout fitted with a small splash block that is slightly tilted backward and likely does little to direct water away from the foundation wall. However, no staining on the concrete indicates acceptable drainage.

79.



View of several typical courtyard downspouts which drain onto splash blocks where run-off has created trenches in the sandy courtyard soil.

Exterior Doors

80.



View of a typical exterior painted metal door.

81.



View of a double exterior painted metal door.

82.		View of an exterior door with some over-painting which evidences recent repainting which will help preserve the lifespan of the frames and panels.
<u>HVAC Equipment</u>		
83.		View of a typical unit ventilator (U.V.) located in many classrooms throughout the Middle School.
84.		View of the inner piping within a typical unit ventilator.

85.		View of a typical mini-split unit system consisting of an exterior condenser (rooftop condenser seen to the left) and a wall-hung interior cassette with heating and cooling functions.
86.		View of mildew growth above an interior mini-split cassette that appears to have been caused by excess humidity that caused condensation on the surface of piping above the ceiling, which then dripped down to soak the ceiling tile. MRSD reported that this condition was repaired following our investigation.
87.		View of one mini-split condenser that is located close to the exterior wall, behind which wood shingles and trim have completely rotted away to expose the air-infiltration barrier.

End of Photo Index



Appendix C: Schematic Scope of Work Outline

Project: Siding Replacement
Location: Monomoy Regional Middle School
Owner: Monomoy Regional School District
Date: 10/10/2024

GENERAL

Scope of work generally includes full replacement of existing cedar shingle siding system with complete, new shingle siding system, including replacement of exterior wood trim. Scope includes miscellaneous related repairs to restore the exterior, improve air barrier performance, and increase roofing ventilation.

Existing roofing, gutters, doors, and windows shall remain in the place, but all are affected by the siding replacement work. Roofing and gutters are expected to be replaced within the next several years. Windows and doors are in acceptable condition.

Scope includes careful removal, make-safe, and reinstallation of surface-mounted conduits, wiring, and fixtures.

Refer to enclosed elevation drawing sheets for corresponding scope of work Keynote locations.

KEYNOTES

1. **Keynote 1:** Remove and replace ALL existing wood shingle siding on all elevations, typical.
 - Remove and dispose of fire-treated wood shingles and air- barrier similar to Tyvek HouseWrap down to exterior plywood sheathing.
 - Install commercial grade draining air-infiltration barrier such as HydroGap Drainable Housewrap (or equal) over existing plywood sheathing.
 - Install 5" exposure Eastern White cedar shingle siding, with fire-retardant treatment as an alternate.
 - Unit price plywood sheathing replacement: Replace severely deteriorated sheathing exposed during demolition with 5/8" thick exterior grade Douglas Fir plywood sheathing (no CDX or OSB). Include 6" thick batt insulation replacement as part of sheathing unit price scope. See Unit Prices section of this document for base bid quantities.
2. **Keynote 2:** Remove and dispose of all existing exterior painted wood trim (and building wrap behind it). Replace with PVC composite trim (and building wrap typical of siding replacement).
 - A. **2A:** Frieze board to be replaced with **5/4x12** PVC composite trim, typical all elevations.
 - B. **2B:** Corner board to be replaced with **5/4x10** PVC composite trim, typical all elevations. At exterior door entry alcoves, include corner boards at perpendicular walls.

- C. **2C:** Horizontal trim to be replaced with **5/4x6** PVC board. Include continuous color-coated aluminum drip cap flashing along top edge with self-adhered membrane flashing termination behind shingles, typical all applicable elevations.
 - D. **2D:** Horizontal trim to be replaced with **5/4x10** PVC board. Include continuous color-coated aluminum drip cap flashing along top edge with self-adhered membrane flashing termination. Typical all applicable elevations.
 - E. **2E:** Unit ventilator louver trim to be replaced with **1x4** PVC composite trim. Typical all locations.
 - F. **2F:** Existing wood fascia to remain until roofing and gutters are replaced. Scrape, prepare, prime and repaint exposed portion below gutter. Typical all elevations.
 - G. **2G:** Fascia to be replaced with **5/4x10** PVC composite trim. See roofing keynotes for edge metal scope. Typical at all similar parapet walls.
 - H. **2H:** Rake board to be replaced with **5/4x6** PVC composite trim. Carefully remove existing trim from behind roofing drip edge to remain. Include continuous PVC crown-molding profile detail trim to match existing along rakes. Do not bend or damage drip edge. Carry 200 LF of drip edge replacement in the base bid as a unit price. Drip edge replacement shall be performed by a professional roofer following best asphalt shingle roofing practices to maintain integrity of existing roofing to remain. Coordinate with Keynote 3.
 - I. **2I:** (2) 5/4x8 vertical trim boards to be replaced with 5/4" thick PVC composite panel without joints, cut to fit. Also typical on return walls as well to meet perpendicular clerestory windows. Typical on (3) sides of entry clerestory.
 - J. **2J:** (2) horizontal trim boards to be replaced with continuous **5/4x10** PVC composite trim over Window HH casing and **5/4x12** PVC composite trim each side of window. Continuous aluminum drip cap flashing below 5/4x10 boards, running seamlessly over 5/4x12 boards and window casing.
 - K. **2K:** Base trim board to be replaced with 5/4x8 PVC composite trim with continuous drip cap flashing and integrated into flashing detail (to be designed) between metal standing seam vestibule roof base flashing, base trim and window sill.
 - L. **2L:** Exterior door wood casing trim to be replaced with **5/4x8** PVC composite trim. Fill all voids exposed during trim removal between hollow metal door frame and exterior wall framing with commercial grade, low-VOC/low-odor, low-expansion spray foam sealant manufactured for window and door perimeter sealing. Terminate new air/vapor barrier around door frame per manufacturer recommendations and regional best practices. Include aluminum drip catch flashing at all head trim.
 - M. **2M:** Replace wood frieze board with **5/4x6** PVC composite trim, typical.
 - N. **2N:** Replace existing 13" +/- wood base trim depth with **5/4** PVC composite panel.
3. **Keynote 3:** Remove and dispose of all existing gable end wall wood trim, painted plywood paneling, and air-barrier to expose 5/8" thick plywood sheathing. Plywood sheathing and 2x8 wood rake nailer shall remain. Refer to Details E & F/Sheet A3.6 of 1996 Drawings. Replace with the following system:

- If found to be rotted or severely water damaged, replace existing 5/8" plywood sheathing on a unit price basis with new 5/8" exterior exposure plywood sheathing. CDX/OSB not permitted. See Keynote 1 for plywood requirements and unit price replacement quantities.
- If found to be rotted, replace existing 2x8 wood rake nailer on a unit price basis. Replace with new P.T. 2x8 wood rake nailer.
- Continuous commercial grade drainable air-water barrier typical of siding system (HydroGap, or equal) to cover entire gable down to window head termination. Tape to seal all edges. Wrap around 2x8 rake nailer.
- 1/2" marine grade/permanent exposure, Douglas Fir plywood with (1) paintable finish grade face. Prime and finish paint with mildew/algae-inhibitive enamel on exterior (finish grade) face and (4) edges, and back-prime interior face.
- For study pricing purposes, replace existing wood trim components with paintable PVC composite trim to match existing components shown in Details E & F/Sheet A3.6 of the 1996 Drawings. Finish paint with mildew/algae-inhibitive exterior enamel.
- Seal all exterior joints between trim components with commercial grade, mildew/stain-resistant general purpose exterior finish sealant.
- Refer to Details E & F/Sheet A3.6 of 1996 Drawings.
- Refer to Roofing Keynotes for gutter scope.

4. **Keynote 4:** At all windows on all elevations (and louvers, similar):

- Remove and dispose of wood casing to expose metal and wood-framed rough opening.
 - Remove and dispose of any existing batt insulation tucked into void between window frame and rough opening; and replace with window and door spray-foam sealant.
 - Apply Exo-Air (or equal) type flashing tape around window perimeter lapped onto air-barrier membrane. For pricing, include cost for new sill flashing installed with window in place (detail and approach to be designed).
 - Install new 5/4x6 PVC composite jamb, head and sill casing. Head casing dimensions may vary at select window locations. Apply continuous sealant along perimeter joint between window frame and trim.
- A. **4A:** Remove and dispose of existing bay window in its entirety down to rough opening. Replace with multi-unit insulated aluminum window (no bay) to match general existing window style. Assume (3)-wide of fixed-over-hopper sash. Includes new metal sill flashing and limited interior/exterior wall infill and patching. New window will fit within existing rough opening.

5. **Keynote 5:** Remove and dispose of existing round aluminum gable end vent louver. Replace with color-coated aluminum round vent to match existing net free airflow. Color to be white. Tape and seal perimeter per typical window repair scope (Keynote 4).

A. **5A:** 2'-6" +/- diameter vent replacement.

B. **5B:** 3'-6" +/- diameter vent replacement.

6. **Keynote 6:** Existing cupola components above siding termination to remain. Components include, but are not limited to wood base, wood railing, wood cupola structure and finish trim, and metal roofing. Prepare, prime and repaint all exposed wood surfaces and seal between all joints. Typical all (4) sides.
7. **Keynote 7:** Generally, all gutters shall remain in place. Do not damage during the course of work. Inspect and repair any loose or leaking seams. For pricing, include 200 LF of gutter removal, salvage and reinstallation for various scattered locations where gutters must be removed for siding work.
 - A. **7A:** At aluminum gutters (installed 1996), apply water-stop clear sealant to repair seams. For pricing, carry (2) workers for (24) hours each at mechanic wage rate. Lift will be required for higher elevations.
 - B. **7B:** Remove, salvage and store existing aluminum downspouts. Protect drainage inlet at grade from dust and construction debris. Reinstall over new siding with new color-coated aluminum brackets. Reconnect to corrugated plastic drainage inlets. Do not scuff, dent or puncture downspouts. Replace any damaged, bent or punctured downspouts with new 3"x4" flat rectangular color-coated aluminum to match existing on a unit price basis. In the base bid, carry replacement of (5) downspouts (1 per unit price). Contractor is responsible for replacement in kind of any downspout damaged during construction.
 - C. **7C:** At copper gutters (original 1963 installation), repair seams with lead-free solder. For pricing, carry (2) workers at (32) hours each at prevailing wage rate. All copper gutters are ladder-accessible and can be repaired from roof edge.
 - D. **7D:** Remove, salvage and protect copper downspouts and brackets. Protect drainage inlet at grade from dust and construction debris. Reinstall over new siding with in locations to match existing and reconnect to corrugated plastic drainage inlets. Do not damage or puncture. Replace any damaged, bent or punctured downspouts with new 4"x6" flat rectangular bronze copper to match existing dimension and patina on a unit price basis. In the base bid, carry replacement of (5) downspouts (1 per unit price). Contractor is responsible for replacement in kind of any downspout damaged during construction.
8. **Keynote 8:** All existing roofing shall remain except as noted otherwise below.
 - A. **8A:** Remove and dispose of existing color-coated aluminum flat roofing edge metal/parapet wall coping in order to accommodate siding and trim replacement work. Replace in kind over new siding, with continuous hemmed drip edge and continuous cleat. Include minor parapet wall flashing repairs contingency in case of damage uncovered during demolition. At flat roof edges, include EPDM roofing membrane edge metal flashing strip, sealed and bonded to existing EPDM roofing.
 - B. **8B:** Existing membrane roofing termination into copper gutters shall remain, typical.
 - C. **8C:** Existing standing seam metal roofing to remain, typical.
9. **Keynote 9:** Remove existing non-structural wood column. Existing structural steel post within shall remain. Clean any rust from steel post base. Replace column with fiberglass replica to match existing; manufactured in two halves for field installation around steel post. Field-finish and seal joining seam to conceal. Prime and finish paint and include 3" diameter column vent on inside column face.
10. **Keynote 10:** Remove and dispose of existing metal guardrail at kitchen loading dock. Replace with new galvanized and powder coated steel guardrail, color black.

- 11. Keynote 11:** Remove and dispose of existing exterior fluorescent light fixture and replace with new commercial grade LED fixture on properly flashed PVC composite mounting block and head flashing incorporated into siding system.
- 12. Keynote 12:** Disconnect existing mini-split condenser and refrigerant lines, and store to make space for siding replacement work. Reinstall at grade on new bearing racks and reconnect refrigerant lines with cover over new siding. Ensure condenser is placed at least 12" from face of exterior wall.
- 13. Keynote 13:** Existing glass block gymnasium window to remain. Remove existing wood trim (and sealant) and replace with 5/4x6 PVC composite trim similar to aluminum windows. Seal and spray-foam insulate between glass block and rough opening when exposed by trim removal. Seal between glass block and new trim.
- 14. Keynote 14:** Existing EPDM membrane roofing on cheek wall to remain. Replace vertical wood trim between EPDM and wood shingles with 5/4x6 PVC composite trim. Include EPDM-compatible flashing tape behind trim termination.

UNIT PRICES

- 1. Sheathing replacement:** Remove and dispose of existing plywood sheathing discovered during demolition to be rotted or otherwise unsuitable as substrate for new siding. Replace with 5/8" thick, 5-ply exterior grade Douglas Fir plywood sheathing. Include batt wall cavity insulation replacement in unit cost with new 6" thick fiberglass batts. Base bid quantity is distributed at various scattered areas
Base bid quantity: 40% of total sheathing area.
- 2. Nailer replacement:** Replace any rotted wood nailers exposed during demolition with new 2x P.T. wood nailer. For pricing, assume all nailers to be 2x8. Base bid quantity is distributed at various locations throughout the building perimeter.
Base bid quantity: 300 LF
- 3. Foundation repairs:** Foundation wall patching repairs, scattered throughout the exterior perimeter at various locations, in accordance with industry-standard exterior concrete crack and spall repair best practices. Does not include excavation. Patch areas are generally 5 SF each.
Base bid quantity: 150 SF
- 4. Roofing edge metal replacement:** Replace any damaged or unsuitable aluminum edge metal to accommodate various siding installation details with new edge metal to match existing. Include removal of membrane roofing flashing strip and new flashing strip over new edge metal.
Base bid quantity: 200 LF
- 5. Gutter Replacement:** Remove and dispose of selective gutters in 10-foot minimum sections in order to accommodate siding replacement work and replace with new gutters to match existing material, profile, and dimensions.
Base bid quantity: 50 LF of aluminum gutters. Replace with 7" K-style white to match existing. 50 LF of copper gutters. Replace with 8" box gutters to match existing profile, in custom color to match patina.

6. **Soffit replacement:** Remove and dispose of rotted wood at existing soffits and replace with new wood to match existing, to be primed and painted. Replace in minimum two-foot sections.

Base bid quantity: Include 4 locations, 4 SF per location. Include coordination with existing venting.

ALTERNATES

1. Prepare, prime and repaint existing exterior metal doors and frames to remain.
2. Remove and dispose of all existing aluminum windows in their entirety and replace with new insulated aluminum windows to match existing styles and dimensions. Includes new sill flashing detail at each opening.

Include with this alternate: 1-inch thick rigid exterior insulation board to entire façade on all elevations with 5/8-inch thick exterior plywood sheathing over the new insulation. Includes edge metal replacement at all flat roof edges without gutters. New siding would then be installed over new 5/8" plywood per base bid.

3. Provide pricing for siding options other than cedar shingles:
 - Everlast composite interlocking clapboards (or equal) in lieu of cedar shingles.
 - CertainTeed Cedar Impressions.
 - CertainTeed CERTAplank Boards.
 - Beach House Shake by Derby Building Products.

ABATEMENT

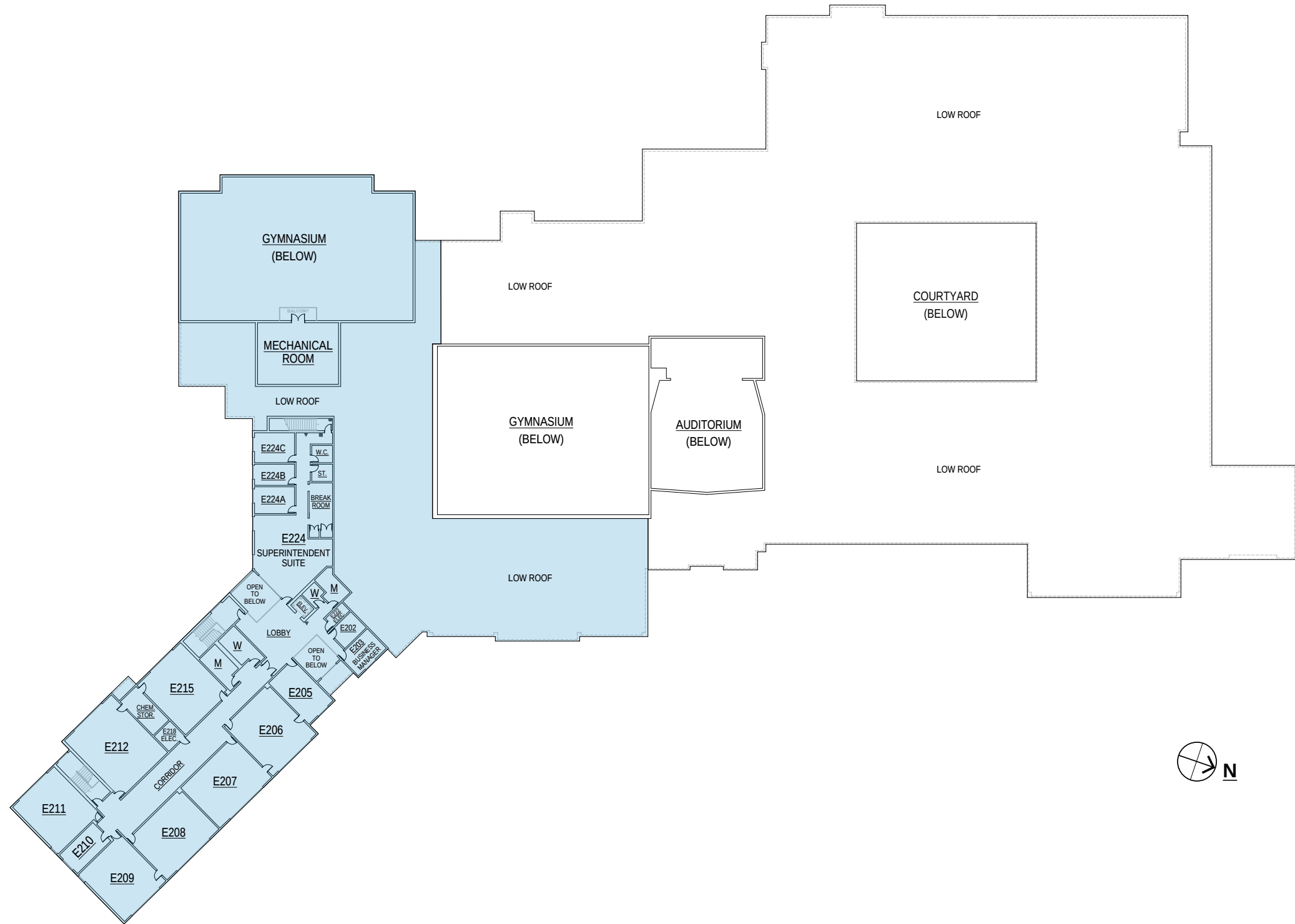
1. Testing was performed and no asbestos containing materials (ACM) were identified. For pricing, include an abatement contingency amount of at least \$10,000 in case of discovery of hazardous materials during design.

End of Scope of Work Summary



1 FIRST FLOOR PLAN DIAGRAM
SCALE: NOT TO SCALE

Revisions:		
No.	Date	Description
Project No.:		
Drawing Scale:		
Submission:		
FEASIBILITY STUDY OWNER REVIEW DRAFT		
Date:		
OCTOBER 1, 2024		



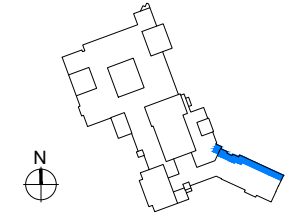
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OCTOBER 1, 2024		

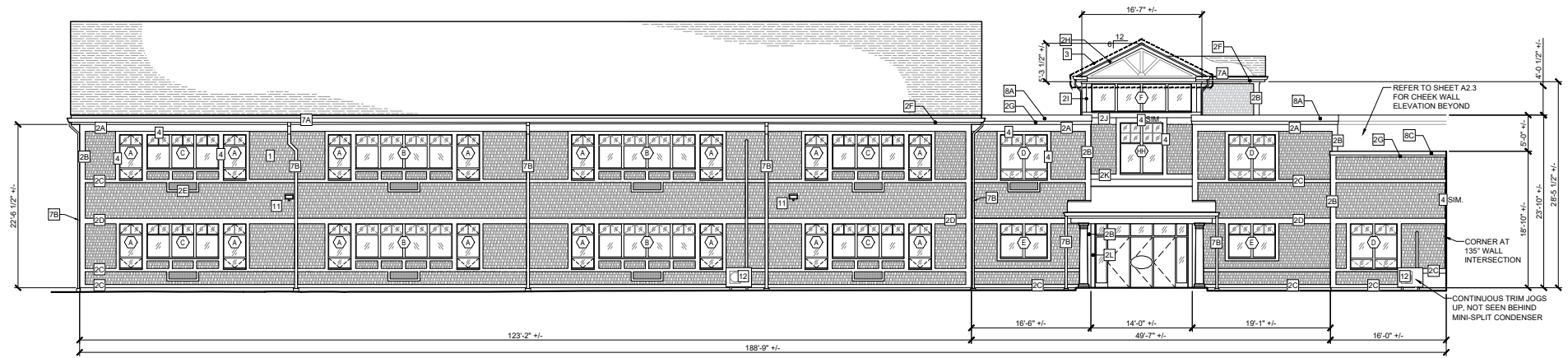
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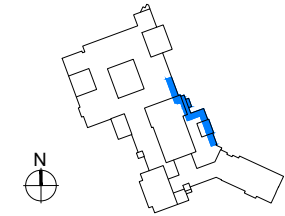
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OCTOBER 1, 2024



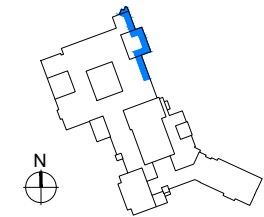
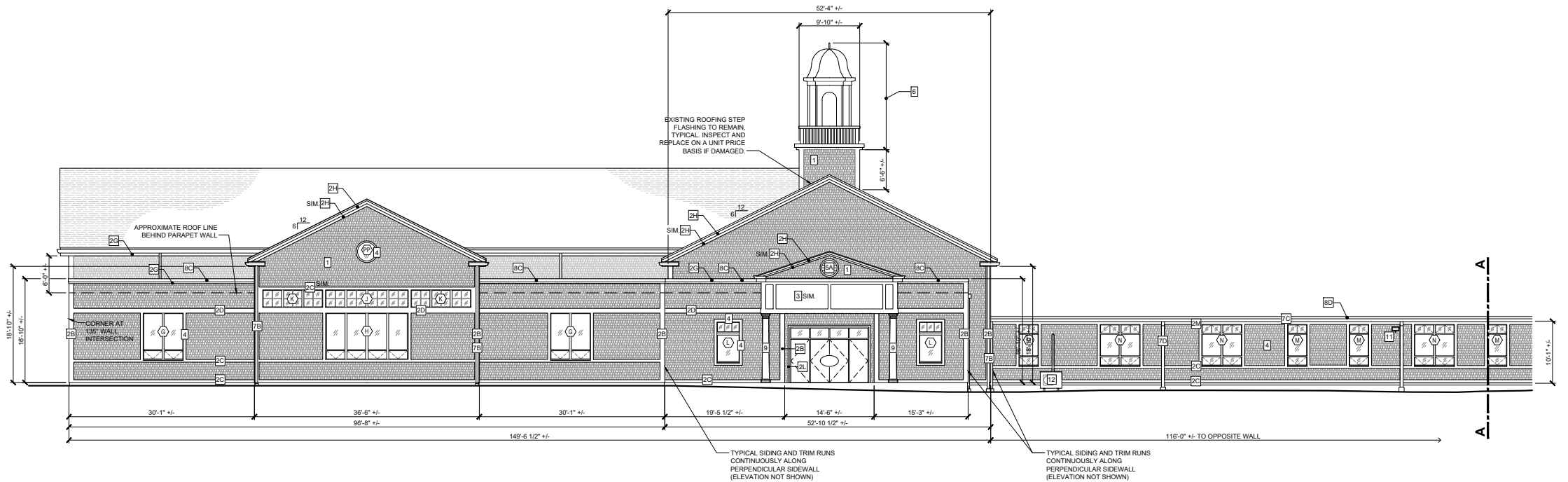
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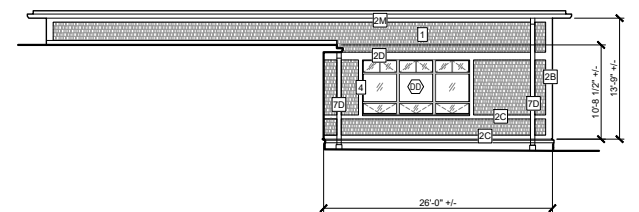
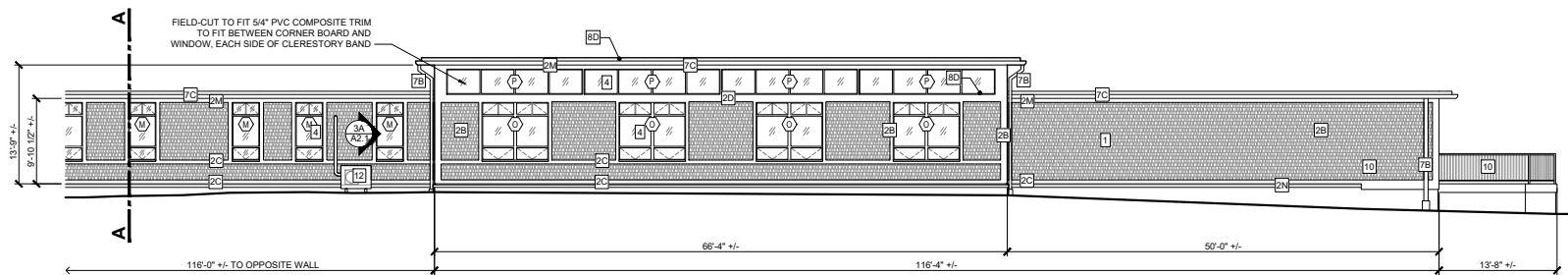
NOTE:
NO WORK IS ASSOCIATED WITH EXISTING
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SELECTIVE PATCHING REPAIRS ON A UNIT PRICE
BASIS. REFER TO UNIT PRICE SCHEDULE.



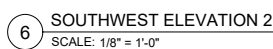
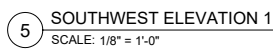
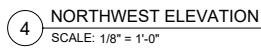
2 NORTHEAST ELEVATION 2
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3 NORTHEAST ELEVATION 3
SCALE: 1/8" = 1'-0"



3A PARTIAL SOUTHEAST ELEVATION 1
SCALE: 1/8" = 1'-0"



MONMOUTH REGIONAL MIDDLE SCHOOL
SIDING REPLACEMENT
 425 CROWELL ROAD, CHATHAM, MA 02633

EXTERIOR ELEVATIONS

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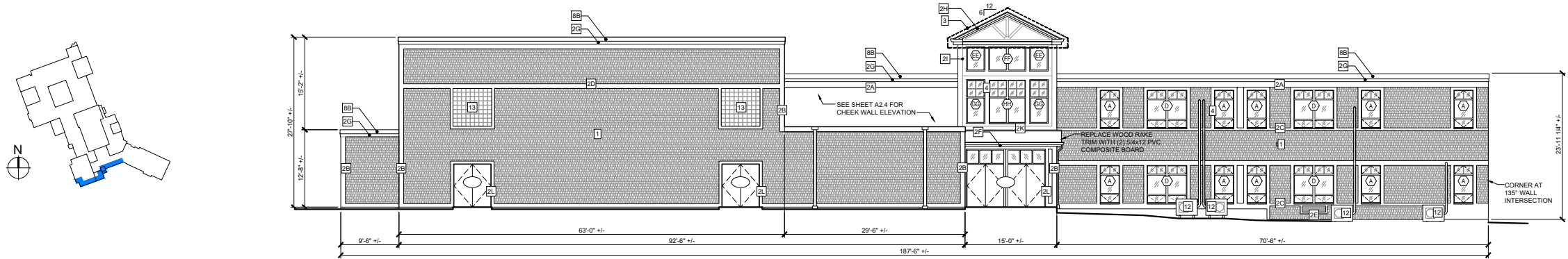
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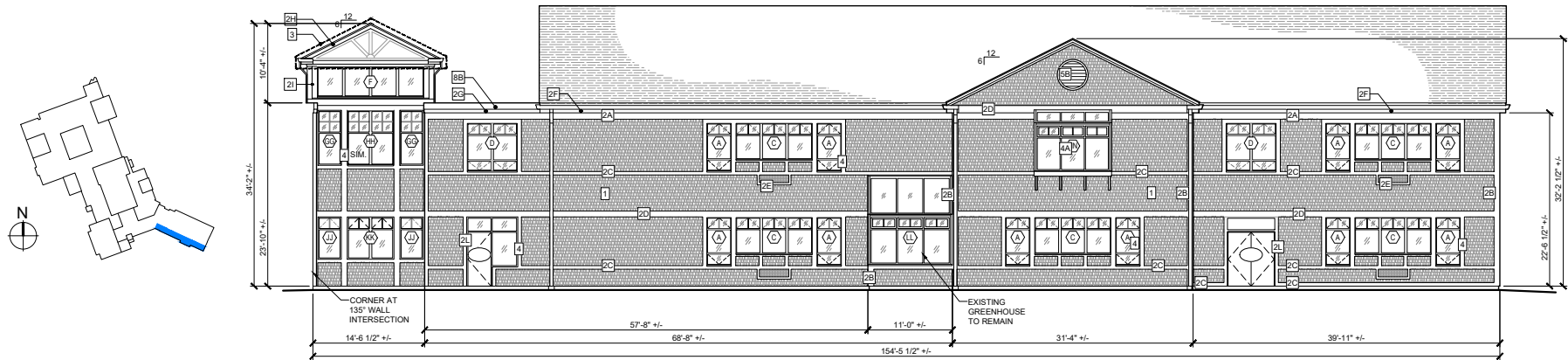
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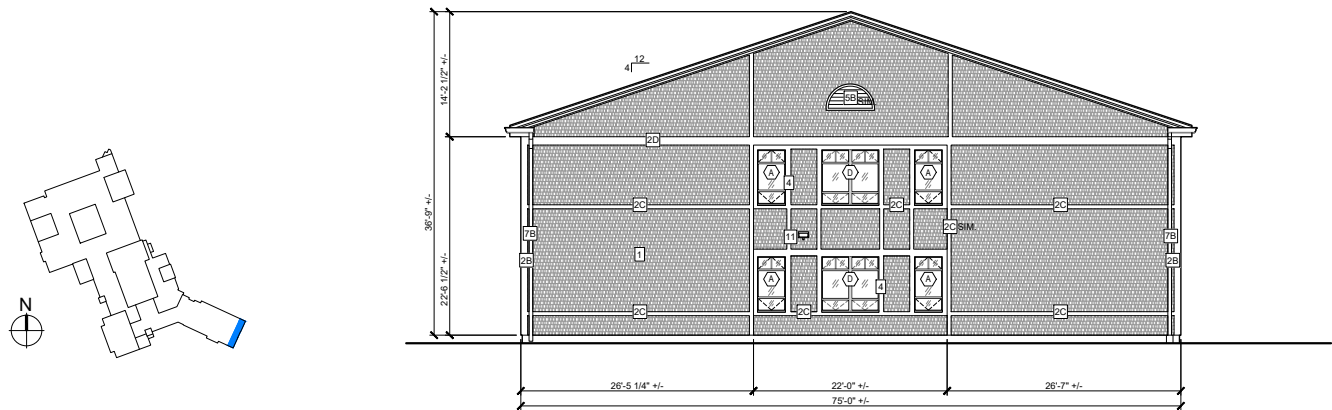
OCTOBER 10, 2024



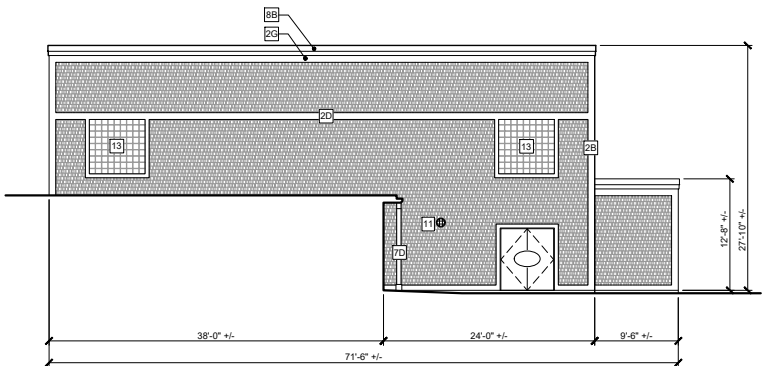
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8 SOUTHWEST ELEVATION 3
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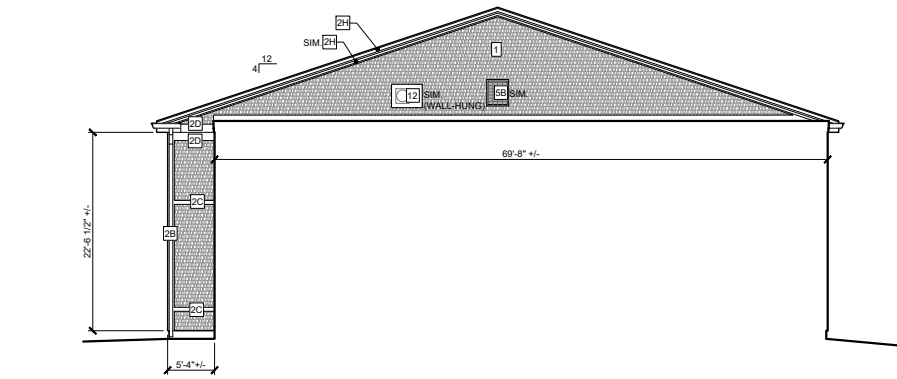
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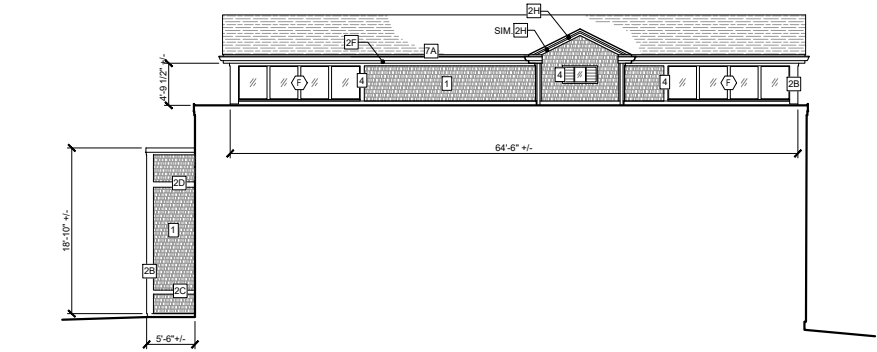
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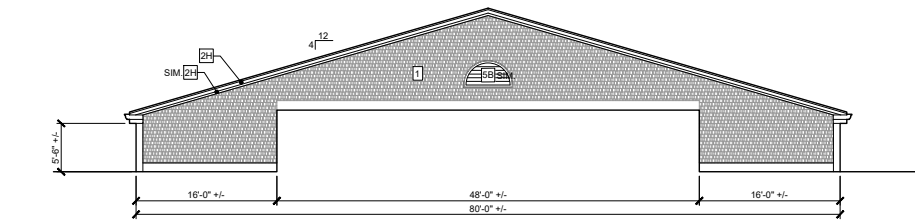
NOTE:
REFER TO ROOF PLAN FOR
CHEEK WALL ELEVATION TAGS.



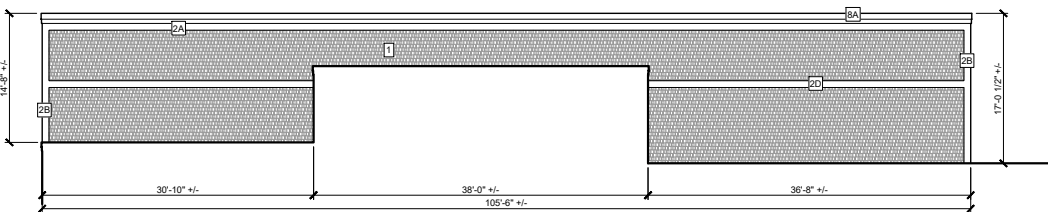
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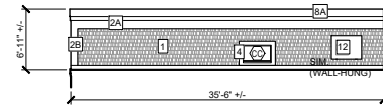
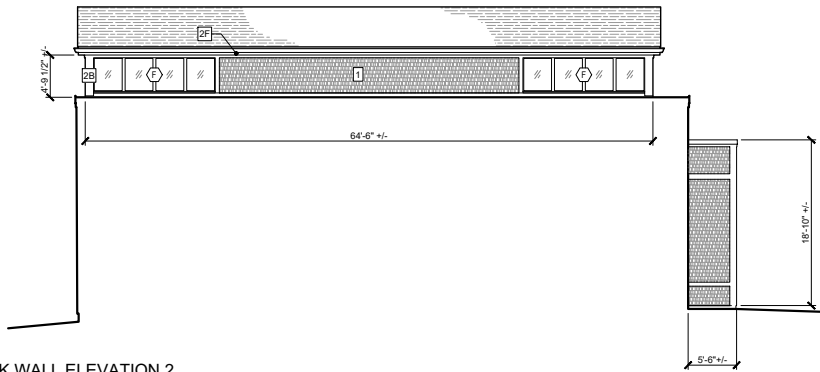


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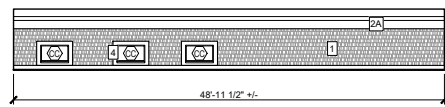


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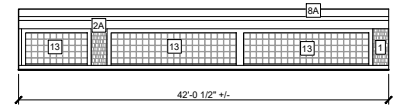
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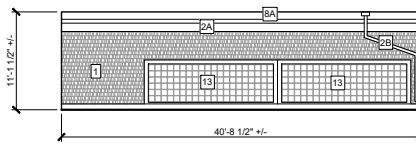
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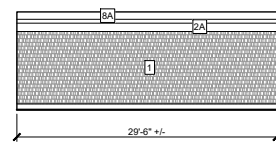
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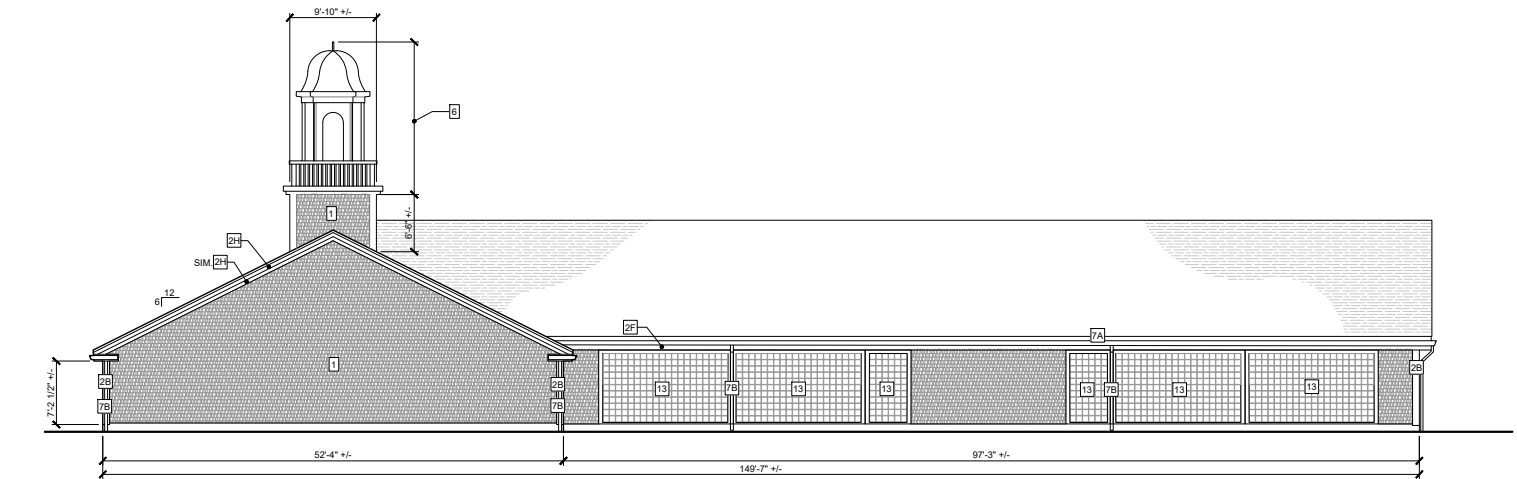
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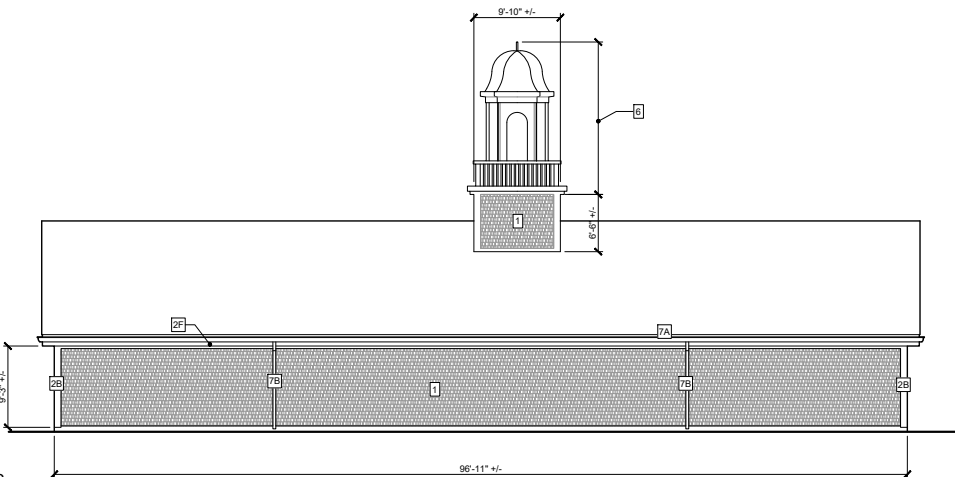
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SCALE: 1/8" = 1'-0"



19 CHEEK WALL ELEVATION 9
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21 CHEEK WALL ELEVATION 11
SCALE: 1/8" = 1'-0"



22 CHEEK WALL ELEVATION 12
SCALE: 1/8" = 1'-0"

Revisions:

No.	Date	Description

Project No.:

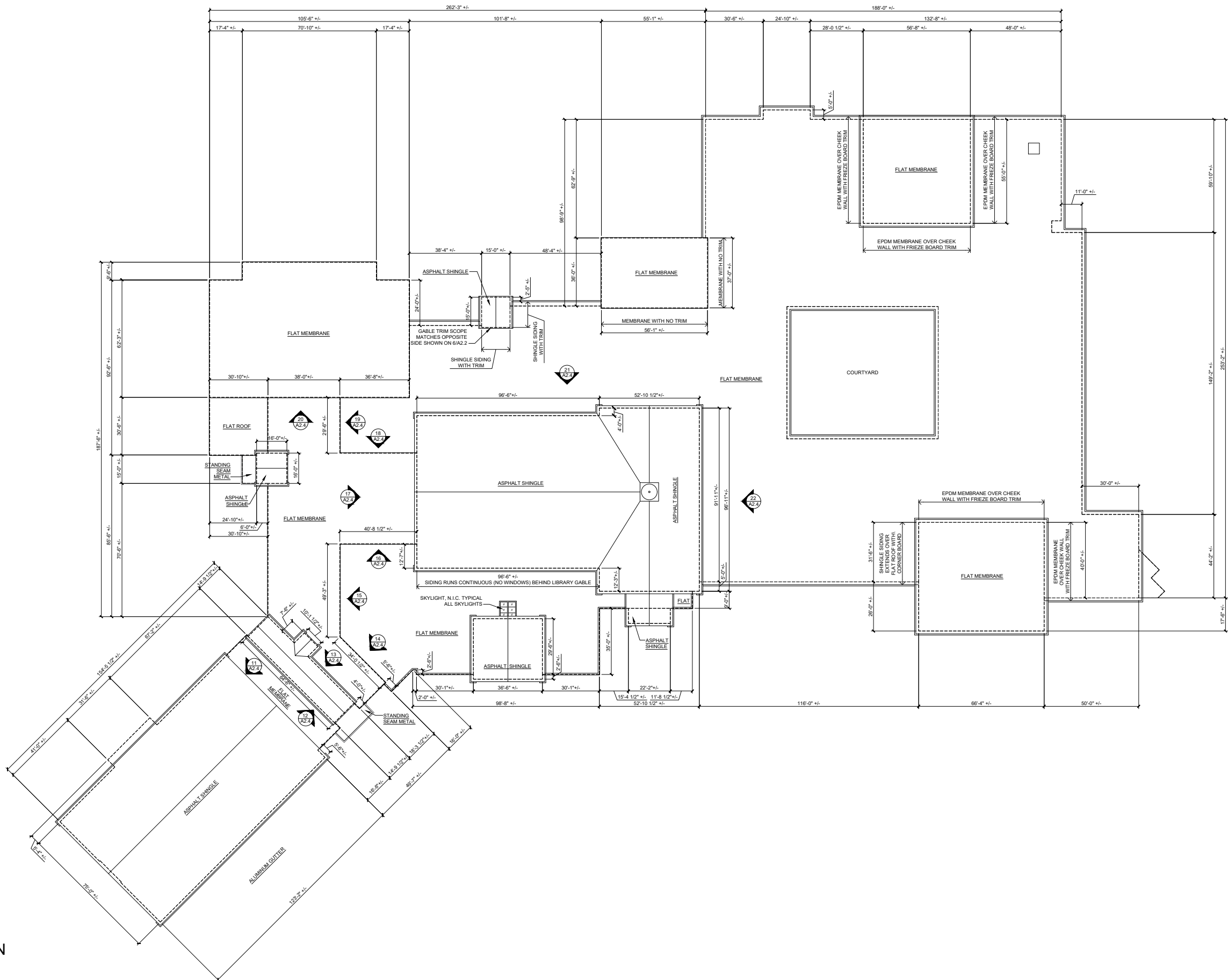
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Submission:
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OWNER REVIEW DRAFT

Date:
OCTOBER 1, 2024



1 ROOF PLAN
SCALE: 1" = 20'-0"



August 12, 2024

Mr. Steven Watchorn
Raymond Design Associates, Inc.
60 Ledgewood Place
Rockland, MA 02370

Re: **Limited Inspection and Sampling**
Monomoy Regional Middle School-Windows and Siding
425 Crowell Road
Chatham, Massachusetts 02633
VERTEX Project No. 98447

Dear Mr. Watchorn:

The Vertex Companies, LLC (VERTEX) is pleased to provide you with this letter report summarizing the visual inspection and bulk sampling results from the Limited Asbestos-Containing Materials (ACMs) Inspection at the Monomoy Regional Middle School located at 425 Crowell Road in Chatham, MA (the Site).

The purpose of the inspection was to determine if asbestos-containing materials and/or lead painted surfaces are present within the areas proposed to be impacted and would require proper abatement/removal prior to any renovation activities.

Asbestos Containing Materials Inspection

The inspection and bulk sample collection was conducted by Massachusetts licensed Asbestos Inspector, Jason Mohre (AI000262) on July 29th and 30th, 2024. A total of twenty-two (22) representative bulk samples of suspect materials were collected from the areas inspected. Suspect materials generally identified within the survey area included: exterior siding paper, interior and exterior window caulking as well as exterior vent caulking.

The bulk samples were collected and analyzed in order to determine the identity of suspect materials and their composition. Bulk samples were collected in the following sampling scheme which is derived from the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR 763): For friable surfacing materials, 3, 5, 7, or 9 random samples were taken to determine asbestos content depending on the amount of material in the homogeneous area. For friable and non-friable miscellaneous materials, 2 or more samples were collected and analyzed to determine asbestos content.

Monomoy Middle School

Limited Inspection-Windows and Siding

Page 2

The collected bulk samples were submitted under a chain-of-custody to EMSL of Cinnaminson, NJ. The bulk samples were analyzed via Polarized Light Microscopy (PLM) in accordance with U.S. Environmental Protection Agency (EPA) Method 600/R-93/116 recommended protocol-using PLM. EMSL of Cinnaminson is accredited through the National Voluntary Laboratory Accreditation Program (#101048-0) and is a Massachusetts certified analytical laboratory (AA000056).

VERTEX had previously collected bulk samples of suspect materials proposed to be impacted within the interior of the school in February 2023. These suspect materials included gypsum board, joint compound and various patterned drop ceiling tiles.

Please refer to attached Table IA (July 2024) and 1B (February 2023) which summarizes the sample locations and analytical results. Please refer to **ATTACHMENT A** which includes a schematic which generally depicts the bulk sample locations. Please refer to **ATTACHMENT B** which includes the Laboratory Reports.

Table IA-Summary of Sample Results			
SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE LOCATION	ASBESTOS CONTENT
July 2024			
B-729-01A	Tan Adhesive on Wood Windowsill	Interior, A106	None Detected
B-729-01B	Tan Adhesive on Wood Windowsill	Interior, A106	None Detected
B-729-02A	Off-White Window Caulking	Exterior, A106	None Detected
B-729-02B	Off-White Window Caulking	Exterior, E111	None Detected
B-729-02C	Off-White Window Caulking	Exterior, E119	None Detected
B-729-02D	Off-White Window Caulking	Exterior, B128	None Detected
B-729-02E	Off-White Window Caulking	Exterior, B102	None Detected
B-729-03A	Off-White Vent Caulking	Exterior, E111	None Detected
B-729-03B	Off-White Vent Caulking	Exterior, E119	None Detected
B-729-03C	Off-White Vent Caulking	Exterior, B102	None Detected
B-729-04A	Gray Siding Paper	Exterior, Side A	None Detected
B-729-04B	Gray Siding Paper	Exterior, Side A	None Detected
B-729-05A	White Siding Paper	Exterior, Side C	None Detected
B-729-05B	White Siding Paper	Exterior, Side C	None Detected
B-729-06A	Glass Block Window Caulking	Exterior, Side A	None Detected
B-729-06B	Glass Block Window Caulking	Exterior, Side C	None Detected
B-729-07A	Glass Block Window Grout	Exterior, Side A	None Detected
B-729-07B	Glass Block Window Grout	Exterior, Side C	None Detected
B-729-08A	Gray Vent Caulking	Exterior, Gym Side D	None Detected
B-729-08B	Gray Vent Caulking	Exterior, Gym Side D	None Detected
B-729-09A	White Window Caulking	Interior, E209	None Detected
B-729-09B	White Window Caulking	Interior, A106	None Detected

Monomoy Middle School

Limited Inspection-Windows and Siding

Page 3

Table IB-Summary of Sample Results			
SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE LOCATION	ASBESTOS CONTENT
February 2023			
B-222-9A	Drywall	E119	None Detected
B-222-9B	Drywall	E212	None Detected
B-222-10A	Joint Compound	Gym 2 Hall	None Detected
B-222-10B	Joint Compound	E110	None Detected
B-222-10C	Joint Compound	E112	None Detected
B-222-10D	Joint Compound	E119	None Detected
B-222-10E	Joint Compound	E211	None Detected
B-222-10F	Joint Compound	2nd Fl., E Hallway	None Detected
B-222-10G	Joint Compound	2nd Fl., Admin Office Area	None Detected
B-222-33A	Drywall	1st Fl., A112	None Detected
B-222-33B	Drywall	1st Fl., B135	None Detected
B-222-34A	Joint Compound	1st Fl., A155	None Detected
B-222-34B	Joint Compound	1st Fl., B105	None Detected
B-222-34C	Joint Compound	1st Fl., B128	None Detected
B-222-34D	Joint Compound	1st Fl., B135	None Detected
B-222-34E	Joint Compound	1st Fl., C103	None Detected
B-222-34F	Joint Compound	1st Fl., Library D111	None Detected
B-222-34G	Joint Compound	1st Fl., Cafeteria A120	None Detected
B-222-40A	2x4 Ceiling Tile - Block Pattern	1st Fl., B106 Cafe Hall	None Detected
B-222-40B	2x4 Ceiling Tile - Block Pattern	1st Fl., B131 Custodian Hall	None Detected
B-222-41A	2x2 Ceiling Tile - Speckled/Dot	1st Fl., B131 Custodian Hall	None Detected
B-222-41B	2x2 Ceiling Tile - Speckled/Dot	1st Fl., B131 Custodian Hall	None Detected
B-222-42A	2x4 Ceiling Tile - Replacements	1st Fl., Cafeteria A120	None Detected
B-222-42B	2x4 Ceiling Tile - Replacements	1st Fl., Cafeteria A120	None Detected
B-222-43A	2x4 Ceiling Tile - New Speckled/Dot	1st Fl., D126	None Detected
B-222-43B	2x4 Ceiling Tile - New Speckled/Dot	1st Fl., D126	None Detected
B-222-44A	2x4 Ceiling Tile - Speckled/Dot	1st Fl., B105	None Detected
B-222-44B	2x4 Ceiling Tile - Speckled/Dot	1st Fl., B125	None Detected
B-222-45A	2x4 Ceiling Tile - Flat	1st Fl., Kitchen	None Detected
B-222-45B	2x4 Ceiling Tile - Flat	1st Fl., Kitchen	None Detected
B-222-46A	2x4 Ceiling Tile - Flat	1st Fl., Boys Locker Room	None Detected
B-222-46B	2x4 Ceiling Tile - Flat	1st Fl., Girls Locker Room	None Detected
B-222-47A	Tectum Board Ceiling Material	1st Fl., B134	None Detected
B-222-47B	Tectum Board Ceiling Material	1st Fl., B125	None Detected

Monomoy Middle School Limited Inspection-Windows and Siding

Page 4

Conclusions

Based on the sampling and analysis of the suspect building materials, the presence of asbestos was not detected within the representative bulk samples collected and analyzed.

Based on the sampling and analysis of the suspect painted surfaces proposed to be impacted, the presence of lead was not detected above the laboratory detection limit within the representative samples collected and analyzed.

Limitations

Professional opinions presented in this summary letter are based on information made available to VERTEX either by review of data provided by others or data gained by VERTEX personnel.

VERTEX affirms that data gathered and presented by VERTEX in this summary letter was collected in an appropriate manner in accordance with generally accepted methods and practices. VERTEX cannot be responsible for decisions made by our client solely on the basis of economic factors.

Conditions described in this summary letter were observed at the time of the inspection, unless otherwise stated. VERTEX observed only the conditions and locations described in the summary letter at the time indicated. VERTEX analyzed only the substances, conditions, and locations described in the report at the time indicated.

This survey was limited and should not be utilized for planning for renovation and/or demolition activities outside the proposed work areas inspected.

Please do not hesitate to contact us at your convenience, should you have any questions or comments regarding this summary letter or our recommendations.

Sincerely,

The Vertex Companies, LLC



Ian Lyster
Project Manager



Jason Mohre
Project Lead

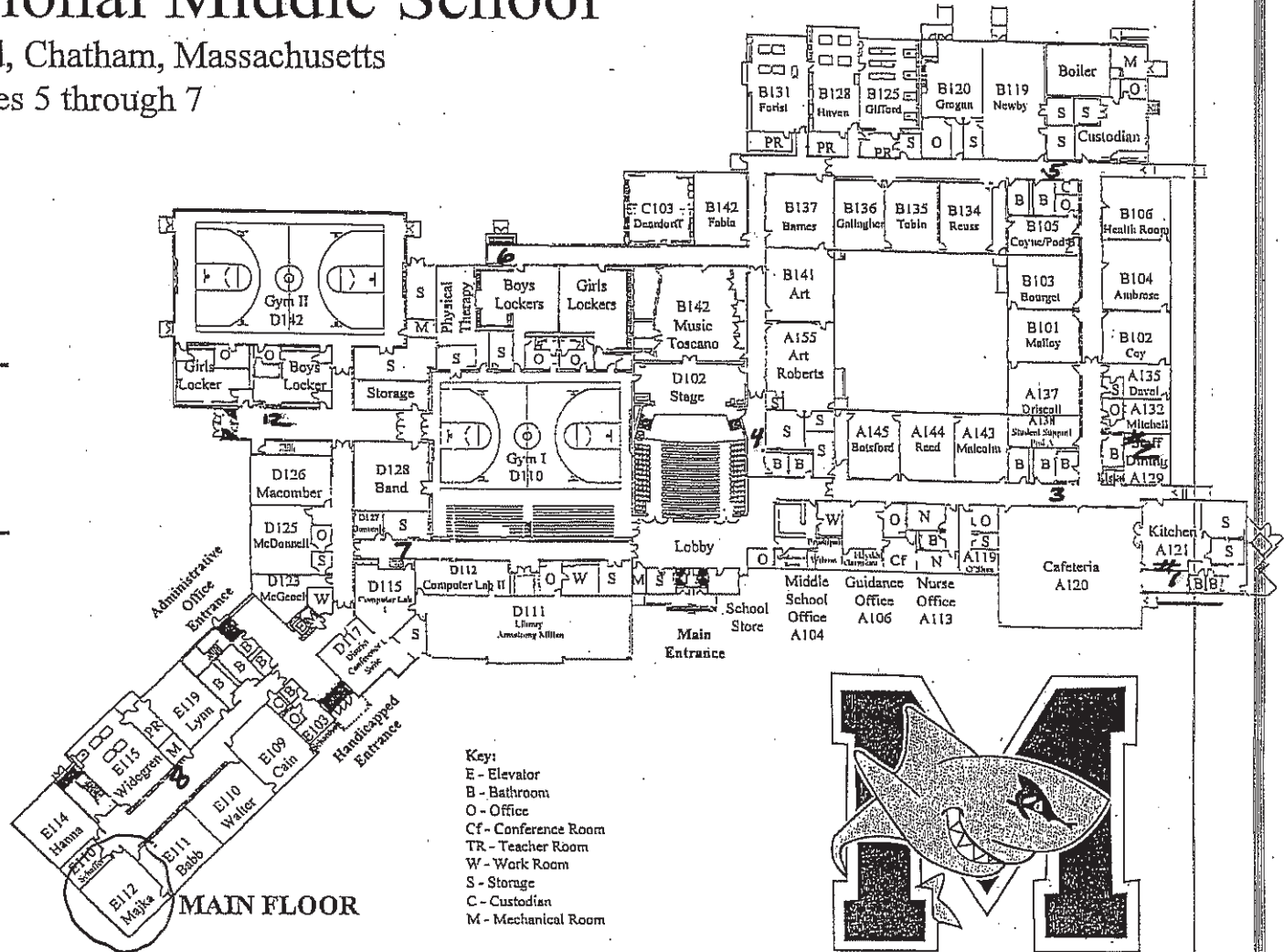
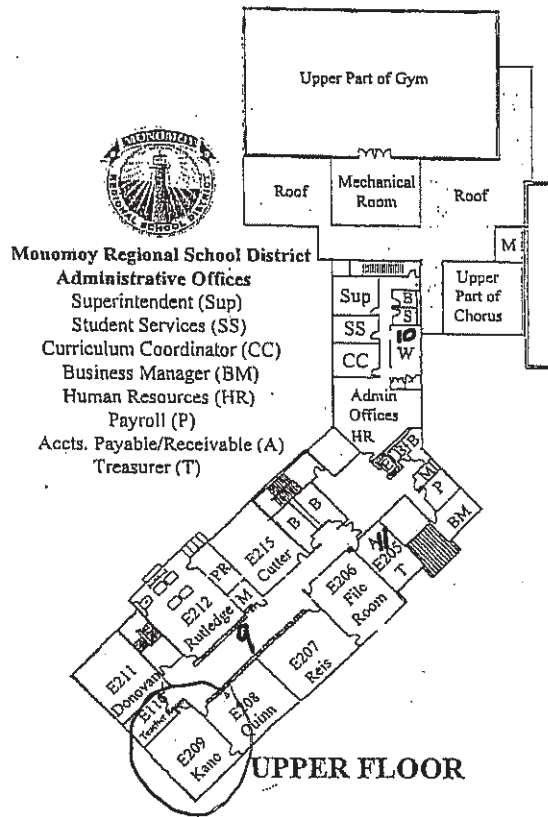
ATTACHMENT A

SCHEMATIC

Monomoy Regional Middle School

425 Crowell Road, Chatham, Massachusetts

Grades 5 through 7



ATTACHMENT B

BULK SAMPLE ANALYSIS RESULTS BY PLM



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com/cinnaslab@EMSL.com>

EMSL Order: 042415971

Customer ID: VERT51

Customer PO: 98447

Project ID:

Attention: J Mohre

The Vertex Companies, LLC

398 Libbey Parkway

Weymouth, MA 02189

Phone: (781) 952-6000

Fax: (781) 335-3543

Received Date: 07/31/2024 9:40 AM

Analysis Date: 08/01/2024 - 08/02/2024

Collected Date: 07/29/2024

Project: 98447 / Monomoy Middle School

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-729-01A 042415971-0001	Interior A106 - Tan Adhesive on Wood Windowsill	Tan Fibrous Homogeneous	6% Cellulose HA: 01	94% Non-fibrous (Other)	None Detected
B-729-01B 042415971-0002	Interior A106 - Tan Adhesive on Wood Windowsill	Tan Non-Fibrous Homogeneous	HA: 01	100% Non-fibrous (Other)	None Detected
B-729-02A 042415971-0003	Exterior A106 - Off-White Window Caulking	Gray/White/Black Non-Fibrous Homogeneous	3% Cellulose HA: 02	97% Non-fibrous (Other)	None Detected
B-729-02B 042415971-0004	Exterior E111 - Off-White Window Caulking	Gray/White Fibrous Homogeneous	4% Cellulose HA: 02	96% Non-fibrous (Other)	None Detected
B-729-02C 042415971-0005	Exterior E119 - Off-White Window Caulking	Gray/White Fibrous Homogeneous	2% Cellulose HA: 02	98% Non-fibrous (Other)	None Detected
B-729-02D 042415971-0006	Exterior B128 - Off-White Window Caulking	Gray/White/Black Fibrous Homogeneous	2% Cellulose HA: 02	98% Non-fibrous (Other)	None Detected
B-729-02E 042415971-0007	Exterior B102 - Off-White Window Caulking	Gray/White Fibrous Homogeneous	3% Cellulose HA: 02	97% Non-fibrous (Other)	None Detected
B-729-03A 042415971-0008	Exterior E111 - Off-White Vent Caulking	Gray/White Fibrous Homogeneous	5% Cellulose HA: 03	95% Non-fibrous (Other)	None Detected
B-729-03B 042415971-0009	Exterior E119 - Off-White Vent Caulking	Gray/White Fibrous Homogeneous	6% Cellulose HA: 03	94% Non-fibrous (Other)	None Detected
B-729-03C 042415971-0010	Exterior B102 - Off-White Vent Caulking	White Fibrous Homogeneous	3% Cellulose HA: 03	97% Non-fibrous (Other)	None Detected
B-729-04A 042415971-0011 Sample bag is labeled "B-729-04B"	Exterior side A - Gray Siding Paper	Gray Fibrous Homogeneous	70% Synthetic HA: 04	30% Non-fibrous (Other)	None Detected
B-729-04B 042415971-0012	Exterior side A - Gray Siding Paper	Gray Fibrous Homogeneous	60% Synthetic HA: 04	40% Non-fibrous (Other)	None Detected

Initial report from: 08/02/2024 14:37:31



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com / cinnasblab@EMSL.com>

EMSL Order: 042415971

Customer ID: VERT51

Customer PO: 98447

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-729-05A 042415971-0013	Exterior side C - Gym - White Siding Paper	White Fibrous Homogeneous	85% Cellulose HA: 05	15% Non-fibrous (Other)	None Detected
B-729-05B 042415971-0014	Exterior side C - C103 - White Siding Paper	Tan/White Fibrous Homogeneous	90% Cellulose HA: 05	10% Non-fibrous (Other)	None Detected
B-729-06A 042415971-0015	Exterior side A - Gym - White Glassblock Window Caulking	Gray/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-729-06B 042415971-0016	Exterior side C - Gym - White Glassblock Window Caulking	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-729-07A 042415971-0017	Exterior side A - Gym - Off-White Glassblock Window Grout	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-729-07B 042415971-0018	Exterior side C - Gym - Off-White Glassblock Window Grout	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-729-08A 042415971-0019	Exterior side D - Gym - Gray Vent Caulking	Gray Non-Fibrous Homogeneous	4% Cellulose HA: 08	96% Non-fibrous (Other)	None Detected
B-729-08B 042415971-0020	Exterior side D - Gym - Gray Vent Caulking	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-729-09A 042415971-0021	Interior E209 - White Window Caulking	White Non-Fibrous Homogeneous	6% Cellulose 3% Synthetic HA: 09	91% Non-fibrous (Other)	None Detected
B-729-09B 042415971-0022	Interior A106 - White Window Caulking	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Adam Einwechter (13)

Andrea Dougherty (9)

Samantha Rundstrom, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA LAP, LLC-IHLAP Lab 100194, PA ID# 68-00367, LA #04127

Initial report from: 08/02/2024 14:37:31

EMSL

EMSL ANALYTICAL, INC.
LABORATORY PRODUCTS TRAINING

Asbestos Bulk Building Materials - Chain of Custody

EMSL Order Number / Lab Use Only

Cinnaminson NJ 08077

EMSL Analytical, Inc.

200 Route 130 North

Cinnaminson, NJ 08077

PHONE: 1-800-220-3675

EMAIL: c@emsl.com

Customer Information	Customer ID:		Billing ID:	
	Company Name:	The Vertex Companies, LLC	Company Name:	The Vertex Companies, LLC
	Contact Name:	J Mohre/V Agostino	Billing Contact:	J Mohre
	Street Address:	398 Libbey Parkway	Street Address:	398 Libbey Parkway
	City, State, Zip:	Weymouth MA 02181	City, State, Zip:	Weymouth MA
	Country:	US	Country:	US
Phone:	781-952-6000	Phone:	781-952-6000	
Email(s) for Report:	jmohre@vertexeng.com	Email(s) for Invoice:		

Project Information

Project Name/No:	Monomoy Middle School/98447	Purchase Order:	98447
EMSL LIMS Project ID:	(If applicable, EMSL will provide)	US State where samples collected:	MA
State of Connecticut (CT) must select project location:		☐ Commercial (Taxable)	☐ Residential (Non-Taxable)
Sampled By Name:	J. Mohre	Sampled By Signature:	[Signature]
Date Sampled:	7/29-7/30	No. of Samples in Shipment:	22

Turn-Around-Time (TAT)

☐ 3 Hour
 ☐ 6 Hour
 ☐ 24 Hour
 ☐ 32 Hour
 ☐ 48 Hour
 ☒ 72 Hour
 ☐ 96 Hour
 ☐ 1 Week
 ☐ 2 Week

Please call ahead for large projects and/or turnaround times 6 Hours or Less. *32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

Test Selection

PLM - Bulk (reporting limit)

- ☒ PLM EPA 600/R-93/116 (<1%)
☐ PLM EPA NOB (<1%)
☐ POINT COUNT
☐ 400 (<0.25%) ☐ 1,000 (<0.1%)
☐ POINT COUNT w/ GRAVIMETRIC
☐ 400 (<0.25%) ☐ 1,000 (<0.1%)
☐ NIOSH 9002 (<1%)
☐ NYS 198.1 (Friable - NY)
☐ NYS 198.6 NOB (Non-Friable - NY)
☐ NYS 198.8 (Vermiculite SM-V)

TEM - Bulk

- ☐ TEM EPA NOB
☐ NYS NOB 198.4 (Non-Friable - NY)
☐ TEM EPA 600/R-93/116 w/ Milling Prep (0.1%)

Other Tests (please specify)

- ☒ Positive Stop - Clearly Identified Homogeneous Areas (HA)

Sample Number	HA Number	Sample Location	Material Description
B-729-01A	01	Interior A106	Ten Adhesive on wood window sill
B-729-01B	↓	↓	↓
B-729-02A	02	Exterior A106	off-white window caulking
B-729-02B	↓	E111	↓
B-729-02C	↓	E119	↓
B-729-02D	↓	B128	↓
B-729-02E	↓	B102	↓
B-729-03A	03	E111	off-white vent caulking
B-729-03B	↓	E119	↓
B-729-03C	↓	B102	↓

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Method of Shipment:	Sample Condition Upon Receipt:
Relinquished by: [Signature]	Received by: [Signature] EPT
Date/Time: 7/30/21	Date/Time: 7/31/21
Relinquished by: [Signature]	Received by: [Signature]
Date/Time:	Date/Time:

Controlled Document - Asbestos Bulk R7 9/14/2021

☐ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.



EMSL ANALYTICAL, INC.
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Asbestos Bulk Building Materials - Chain of Custody

Emsl Order Number / Lab Use Only

EMSL Analytical, Inc.
200 Route 130 North

Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
EMAIL: c@emsl.com

Amurik 71

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

[illegible]

RECEIVED
FMSL
CINNAMINSON, NJ
2024 JUL 32 A 12:06

Controlled Document - Asbestos Bulk R7 09/14/2021

☐ **AGREE TO ELECTRONIC SIGNATURE** (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / cinnasblab@EMSL.com

EMSL Order: 042304619

Customer ID: VERT51

Customer PO:

Project ID:

Attention: Sean Drain

The Vertex Companies, Inc.

398 Libbey Parkway

Weymouth, MA 02189

Phone: (781) 952-6000

Fax: (781) 335-3543

Received Date: 02/23/2023 9:30 AM

Analysis Date: 02/25/2023 - 02/26/2023

Collected Date: 02/22/2023

Project: Monomoy Middle School - 425 Cromwell Road, Chatham, MA / 85933 / Monomoy Regional School District

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-222-1A 042304619-0001	MMS - Floor 1 - E111 - 12" Off-white Beige Spec Floor Tile	White Non-Fibrous Homogeneous		40% Ca Carbonate 60% Non-fibrous (Other)	None Detected
B-222-1B 042304619-0002	MMS - Floor 2 - E215 - 12" Off-white Beige Spec Floor Tile	White Non-Fibrous Homogeneous		60% Ca Carbonate 40% Non-fibrous (Other)	None Detected
B-222-2A 042304619-0003	MMS - Floor 1 - E110 - 12" off-white Tan Spec Floor Tile	White Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-2B 042304619-0004	MMS - Floor 1 - E114 - 12" off-white Tan Spec Floor Tile	White Non-Fibrous Homogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
B-222-3A 042304619-0005	MMS - Floor 1 - E110 - Yellow Floor Tile Mastic	Yellow Non-Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (Other)	None Detected
B-222-3B 042304619-0006	MMS - Floor 2 - E215 - Yellow Floor Tile Mastic	Yellow Non-Fibrous Homogeneous	3% Cellulose	50% Ca Carbonate 47% Non-fibrous (Other)	None Detected
B-222-4A 042304619-0007	MMS - Floor 1 - E Hallway - 12" Mint Floor Tile	Green Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-4B 042304619-0008	MMS - Floor 2 - E110 - 12" Mint Floor Tile	Blue Non-Fibrous Homogeneous		60% Ca Carbonate 40% Non-fibrous (Other)	None Detected
B-222-5A 042304619-0009	MMS - Floor 1 - D126 - 12" White Blue Spec Floor Tile	White Non-Fibrous Homogeneous		40% Ca Carbonate 60% Non-fibrous (Other)	None Detected
B-222-5B 042304619-0010	MMS - Floor 1 - D126 - 12" White Blue Spec Floor Tile	White Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-6A 042304619-0011	MMS - Floor 1 - D128 Band - Blue/Black Rubber Flooring Material	Black/Blue Non-Fibrous Homogeneous		20% Ca Carbonate 80% Non-fibrous (Other)	None Detected
B-222-6B 042304619-0012	MMS - Floor 1 - D128 Band - Blue/Black Rubber Flooring Material	Black/Blue Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-7A 042304619-0013	MMS - Floor 2 - Admin Lobby - Green Carpet Adhesive	Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-222-7B 042304619-0014	MMS - Floor 2 - Admin Lobby - Green Carpet Adhesive	Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-222-8A 042304619-0015	MMS - Floor 1 - Library / Gymnasium - Yellow Carpet Adhesive	Tan/Yellow Non-Fibrous Homogeneous		15% Ca Carbonate 85% Non-fibrous (Other)	None Detected

Initial report from: 02/27/2023 10:52:58



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / cinnasblab@EMSL.com

EMSL Order: 042304619

Customer ID: VERT51

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos % Type
			% Fibrous	% Non-Fibrous	
B-222-8B 042304619-0016	MMS - Floor 2 - Admin Office Area - Yellow Carpet Adhesive	Yellow/Green Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (Other)	None Detected
B-222-9A 042304619-0017	MMS - Floor 1 - E119 - Drywall	Brown/Gray Non-Fibrous Homogeneous	12% Cellulose	65% Gypsum 23% Non-fibrous (Other)	None Detected
B-222-9B 042304619-0018	MMS - Floor 2 - E212 - Drywall	Gray Non-Fibrous Homogeneous	4% Cellulose 2% Glass	65% Gypsum 29% Non-fibrous (Other)	None Detected
B-222-10A 042304619-0019	MMS - Floor 1 - Gym 2 Hall - Joint Compound	White Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-10B 042304619-0020	MMS - Floor 1 - E110 - Joint Compound	White Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-10C 042304619-0021	MMS - Floor 1 - E112 - Joint Compound	White Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-10D 042304619-0022	MMS - Floor 1 - E119 - Joint Compound	White Non-Fibrous Homogeneous		55% Ca Carbonate 45% Non-fibrous (Other)	None Detected
B-222-10E 042304619-0023	MMS - Floor 2 - E211 - Joint Compound	White Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
B-222-10F 042304619-0024	MMS - Floor 2 - E Hallway - Joint Compound	White Non-Fibrous Homogeneous		60% Ca Carbonate 40% Non-fibrous (Other)	None Detected
B-222-10G 042304619-0025	MMS - Floor 2 - Admin Office Area - Joint Compound	White Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
B-222-11A 042304619-0026 Inseparable.	MMS - Floor 1 - A137 - Black Residual Mastic	Black/Yellow Non-Fibrous Homogeneous		20% Ca Carbonate 80% Non-fibrous (Other)	None Detected
B-222-11B 042304619-0027 Inseparable.	MMS - Floor 1 - Main Office Area - Black Residual Mastic	Black/Yellow Non-Fibrous Homogeneous		20% Ca Carbonate 80% Non-fibrous (Other)	None Detected
B-222-11C 042304619-0028	MMS - Floor 1 - B142 - Black Residual Mastic	Black/Yellow Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (Other)	None Detected
B-222-11D 042304619-0029	MMS - Floor 1 - B135 - Black Residual Mastic	Black Non-Fibrous Homogeneous	2% Cellulose	20% Ca Carbonate 78% Non-fibrous (Other)	None Detected
B-222-11E 042304619-0030	MMS - Floor 1 - B137 - Black Residual Mastic	Black Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (Other)	None Detected
B-222-12A 042304619-0031	MMS - Floor 1 - B106 - 9" Off-white Floor Tile	Tan Non-Fibrous Homogeneous		30% Ca Carbonate 68% Non-fibrous (Other)	2% Chrysotile
B-222-12B 042304619-0032	MMS - Floor 1 - A132 - 9" Off-white Floor Tile				Positive Stop (Not Analyzed)
B-222-12C 042304619-0033	MMS - Floor 1 - Auditorium - 9" Off-white Floor Tile				Positive Stop (Not Analyzed)

Initial report from: 02/27/2023 10:52:58



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / cinnasblab@EMSL.com

EMSL Order: 042304619

Customer ID: VERT51

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-222-13A 042304619-0034	MMS - Floor 1 - B106 - Black Floor Tile Mastic	Black Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (Other)	None Detected
B-222-13B 042304619-0035	MMS - Floor 1 - A132 - Black Floor Tile Mastic	Black Non-Fibrous Homogeneous	2% Cellulose	10% Ca Carbonate 88% Non-fibrous (Other)	None Detected
B-222-13C 042304619-0036	MMS - Floor 1 - Auditorium - Black Floor Tile Mastic	Black Non-Fibrous Homogeneous	2% Cellulose	8% Ca Carbonate 90% Non-fibrous (Other)	None Detected
B-222-14A 042304619-0037	MMS - Floor 1 - Guidance Office Area - 9" Gray Floor Tile	Gray Non-Fibrous Homogeneous		25% Ca Carbonate 73% Non-fibrous (Other)	2% Chrysotile
B-222-14B 042304619-0038	MMS - Floor 1 - Guidance Office Area - 9" Gray Floor Tile				Positive Stop (Not Analyzed)
B-222-15A 042304619-0039	MMS - Floor 1 - Guidance Office Area - Black Floor Tile Mastic	Black/Yellow Non-Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (Other)	None Detected
B-222-15B 042304619-0040	MMS - Floor 1 - Guidance Office Area - Black Floor Tile Mastic	Black Non-Fibrous Homogeneous	2% Cellulose	6% Ca Carbonate 92% Non-fibrous (Other)	None Detected
B-222-16A 042304619-0041	MMS - Floor 1 - A119 Hall - 9" Teal Floor Tile	Green Non-Fibrous Homogeneous		20% Ca Carbonate 78% Non-fibrous (Other)	2% Chrysotile
B-222-16B 042304619-0042	MMS - Floor 1 - A119 Hall - 9" Teal Floor Tile				Positive Stop (Not Analyzed)
B-222-17A 042304619-0043	MMS - Floor 1 - A119 Hall - Black Floor Tile Mastic	Black/Yellow Non-Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (Other)	None Detected
B-222-17B 042304619-0044	MMS - Floor 1 - A119 Hall - Black Floor Tile Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-222-18A 042304619-0045	MMS - Floor 1 - B131 Custodian Hall - 12" Off-white Multi-color Spec Floor Tile	Beige Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-18B 042304619-0046	MMS - Floor 1 - B120 - 12" Off-white Multi-color Spec Floor Tile	Beige Non-Fibrous Homogeneous		55% Ca Carbonate 45% Non-fibrous (Other)	None Detected
B-222-19A 042304619-0047	MMS - Floor 1 - B131 Custodian Hall - Yellow Floor Tile Mastic	Yellow Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (Other)	None Detected
B-222-19B 042304619-0048	MMS - Floor 1 - B120 - Yellow Floor Tile Mastic	Yellow Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (Other)	None Detected
B-222-20A 042304619-0049	MMS - Floor 1 - B120 - 12" Off-white Gray Spec Floor Tile	White Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-20B 042304619-0050	MMS - Floor 1 - B142 - 12" Off-white Gray Spec Floor Tile	White Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected

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200 Route 130 North Cinnaminson, NJ 08077

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EMSL Order: 042304619

Customer ID: VERT51

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-222-21A 042304619-0051	MMS - Floor 1 - B120 - Yellow Floor Tile Mastic	Yellow Non-Fibrous Homogeneous	2% Cellulose	2% Quartz 96% Non-fibrous (Other)	None Detected
B-222-21B 042304619-0052	MMS - Floor 1 - B142 - Yellow Floor Tile Mastic	Yellow Non-Fibrous Homogeneous	2% Cellulose	15% Ca Carbonate 83% Non-fibrous (Other)	None Detected
B-222-22A 042304619-0053	MMS - Floor 1 - Cafeteria A120 - 12" Blue Floor Tile	Blue Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
B-222-22B 042304619-0054	MMS - Floor 1 - Cafeteria A120 - 12" Blue Floor Tile	Blue Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-23A 042304619-0055	MMS - Floor 1 - Cafeteria A120 - 12" Purple Floor Tile	Purple Non-Fibrous Homogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
B-222-23B 042304619-0056	MMS - Floor 1 - Cafeteria A120 - 12" Purple Floor Tile	Gray/Tan Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-24A 042304619-0057	MMS - Floor 1 - Cafeteria A120 - 12" Green Floor Tile	Blue/Green Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-24B 042304619-0058	MMS - Floor 1 - Cafeteria A120 - 12" Green Floor Tile	Blue Non-Fibrous Homogeneous		45% Ca Carbonate 55% Non-fibrous (Other)	None Detected
B-222-25A 042304619-0059	MMS - Floor 1 - A130 Closet - 12" Light Brown Floor Tile	Blue Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
B-222-25B 042304619-0060	MMS - Floor 1 - A130 Closet - 12" Light Brown Floor Tile	Blue/Yellow Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-26A 042304619-0061	MMS - Floor 1 - B106 Café Hall - Yellow Carpet Adhesive	Yellow/Green Non-Fibrous Homogeneous		15% Quartz 85% Non-fibrous (Other)	None Detected
B-222-26B 042304619-0062	MMS - Floor 1 - Auditorium - Yellow Carpet Adhesive	Yellow Non-Fibrous Homogeneous		40% Ca Carbonate 60% Non-fibrous (Other)	None Detected
B-222-27A 042304619-0063	MMS - Floor 1 - Kitchen - Brown Floor Epoxy	Brown Non-Fibrous Homogeneous		15% Quartz 40% Ca Carbonate 45% Non-fibrous (Other)	None Detected
B-222-27B 042304619-0064	MMS - Floor 1 - Kitchen - Brown Floor Epoxy	Gray/Tan Non-Fibrous Heterogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
B-222-28A 042304619-0065	MMS - Floor 1 - B103 - Dark Gray Cove Base	Gray Non-Fibrous Homogeneous		60% Ca Carbonate 40% Non-fibrous (Other)	None Detected
B-222-28B 042304619-0066	MMS - Floor 1 - B103 - Dark Gray Cove Base	Gray Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (Other)	None Detected
B-222-29A 042304619-0067	MMS - Floor 1 - Audit Light Storage - Gray Cove Base	Gray Non-Fibrous Homogeneous		60% Ca Carbonate 40% Non-fibrous (Other)	None Detected
B-222-29B 042304619-0068	MMS - Floor 1 - B125 - Gray Cove Base	Gray Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (Other)	None Detected
B-222-30A 042304619-0069	MMS - Floor 1 - Main Office Area - Blue Cove Base	Blue Non-Fibrous Homogeneous		40% Ca Carbonate 60% Non-fibrous (Other)	None Detected

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EMSL Order: 042304619

Customer ID: VERT51

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-222-30B 042304619-0070	MMS - Floor 1 - B106 Café Hall - Blue Cove Base	Blue Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (Other)	None Detected
B-222-31A 042304619-0071	MMS - Floor 1 - C103 - Black Cove Base	Black Non-Fibrous Homogeneous		50% Ca Carbonate 50% Non-fibrous (Other)	None Detected
B-222-31B 042304619-0072	MMS - Floor 1 - C103 - Black Cove Base	Black Non-Fibrous Homogeneous		35% Ca Carbonate 65% Non-fibrous (Other)	None Detected
B-222-32A 042304619-0073	MMS - Floor 1 - Audit Light Storage - Yellow Cove Base Adhesive	Yellow Non-Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (Other)	None Detected
B-222-32B 042304619-0074	MMS - Floor 1 - Main Office Area - Yellow Cove Base Adhesive	Yellow Non-Fibrous Homogeneous		30% Ca Carbonate 70% Non-fibrous (Other)	None Detected
B-222-32C 042304619-0075	MMS - Floor 1 - B103 - Yellow Cove Base Adhesive	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
B-222-33A 042304619-0076	MMS - Floor 1 - A112 - Drywall	Gray Non-Fibrous Homogeneous	3% Cellulose	65% Gypsum 32% Non-fibrous (Other)	None Detected
B-222-33B 042304619-0077	MMS - Floor 1 - B135 - Drywall	Brown/Gray Non-Fibrous Homogeneous	8% Cellulose	10% Ca Carbonate 70% Gypsum 12% Non-fibrous (Other)	None Detected
B-222-34A 042304619-0078	MMS - Floor 1 - A155 - Joint Compound	White Non-Fibrous Homogeneous		60% Ca Carbonate 40% Non-fibrous (Other)	None Detected
B-222-34B 042304619-0079	MMS - Floor 1 - B105 - Joint Compound	White Non-Fibrous Homogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
B-222-34C 042304619-0080	MMS - Floor 1 - B128 - Joint Compound	White Non-Fibrous Homogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
B-222-34D 042304619-0081	MMS - Floor 1 - B135 - Joint Compound	White Non-Fibrous Homogeneous	3% Cellulose	65% Ca Carbonate 32% Non-fibrous (Other)	None Detected
B-222-34E 042304619-0082	MMS - Floor 1 - C103 - Joint Compound	White Non-Fibrous Homogeneous		10% Ca Carbonate 75% Gypsum 15% Non-fibrous (Other)	None Detected
B-222-34F 042304619-0083	MMS - Floor 1 - Library D111 - Joint Compound	White Non-Fibrous Homogeneous		10% Ca Carbonate 75% Gypsum 15% Non-fibrous (Other)	None Detected
B-222-34G 042304619-0084	MMS - Floor 1 - Cafeteria A120 - Joint Compound	Tan/White Non-Fibrous Heterogeneous		15% Quartz 10% Ca Carbonate 70% Gypsum 5% Non-fibrous (Other)	None Detected
B-222-35A 042304619-0085	MMS - Floor 1 - B131 Custodian Hall - Textured Wall Material	Gray Non-Fibrous Homogeneous		40% Quartz 15% Ca Carbonate 45% Non-fibrous (Other)	None Detected
B-222-35B 042304619-0086	MMS - Floor 1 - B106 Cafeteria Hall - Textured Wall Material	Gray Non-Fibrous Homogeneous		40% Quartz 20% Ca Carbonate 2% Mica 38% Non-fibrous (Other)	None Detected
B-222-35C 042304619-0087	MMS - Floor 1 - Boys Locker Room - Textured Wall Material	Gray/Tan Non-Fibrous Heterogeneous		35% Quartz 30% Ca Carbonate 35% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-222-36A 042304619-0088	MMS - Floor 1 - B120 - White Sink Mastic	Beige Non-Fibrous Homogeneous	30% Cellulose	60% Ca Carbonate 8% Mica 2% Non-fibrous (Other)	None Detected
B-222-36B 042304619-0089	MMS - Floor 2 - E2111 - White Sink Mastic	White Non-Fibrous Homogeneous	15% Cellulose	60% Ca Carbonate 5% Mica 20% Non-fibrous (Other)	None Detected
B-222-37A 042304619-0090	MMS - Floor 1 - A155 - Gray Sink Mastic	Gray Non-Fibrous Homogeneous	15% Cellulose	50% Ca Carbonate 8% Mica 27% Non-fibrous (Other)	None Detected
B-222-37B 042304619-0091	MMS - Floor 1 - A155 - Gray Sink Mastic	Gray Fibrous Homogeneous	10% Cellulose	5% Quartz 40% Ca Carbonate 15% Mica 30% Non-fibrous (Other)	None Detected
B-222-38A 042304619-0092	MMS - Floor 1 - B125 - Gray Duct Mastic	Gray Non-Fibrous Homogeneous	10% Cellulose	75% Ca Carbonate 15% Non-fibrous (Other)	None Detected
B-222-38B 042304619-0093	MMS - Floor 2 - Mech Room Lobby - Gray Duct Mastic	Gray Non-Fibrous Homogeneous	5% Glass	3% Quartz 65% Ca Carbonate 2% Mica 25% Non-fibrous (Other)	None Detected
B-222-39A 042304619-0094	MMS - Floor 1 - A155 - Exterior White Window Caulking	White Non-Fibrous Homogeneous		55% Ca Carbonate 45% Non-fibrous (Other)	None Detected
B-222-39B 042304619-0095	MMS - Floor 1 - B105 - Exterior White Window Caulking	White Non-Fibrous Homogeneous		15% Quartz 45% Ca Carbonate 5% Mica 35% Non-fibrous (Other)	None Detected
B-222-40A 042304619-0096	MMS - Floor 1 - B106 Café Hall - 2x4 Ceiling Tile - Block Pattern	Gray/White Fibrous Homogeneous	45% Cellulose 15% Min. Wool	25% Perlite 15% Non-fibrous (Other)	None Detected
B-222-40B 042304619-0097	MMS - Floor 1 - B131 Custodian Hall - 2x4 Ceiling Tile - Block Pattern	Gray/White Fibrous Heterogeneous	15% Cellulose 10% Min. Wool 30% Glass	5% Quartz 25% Perlite 15% Non-fibrous (Other)	None Detected
B-222-41A 042304619-0098	MMS - Floor 1 - B131 Custodian Hall - 2x2 Ceiling Tile - Speckled/Dot	Gray/White Fibrous Homogeneous	50% Cellulose 15% Min. Wool	20% Perlite 15% Non-fibrous (Other)	None Detected
B-222-41B 042304619-0099	MMS - Floor 1 - B131 Custodian Hall - 2x2 Ceiling Tile - Speckled/Dot	Gray/White Fibrous Heterogeneous	25% Cellulose 10% Min. Wool 30% Glass	5% Quartz 20% Perlite 10% Non-fibrous (Other)	None Detected
B-222-42A 042304619-0100	MMS - Floor 1 - Cafeteria A120 - 2x4 Ceiling Tile - Replacements	Gray/White Fibrous Homogeneous	45% Cellulose 18% Min. Wool	5% Ca Carbonate 20% Perlite 12% Non-fibrous (Other)	None Detected
B-222-42B 042304619-0101	MMS - Floor 1 - Cafeteria A120 - 2x4 Ceiling Tile - Replacements	Brown/Gray/White Fibrous Heterogeneous	30% Cellulose 10% Min. Wool 25% Glass	5% Quartz 20% Perlite 10% Non-fibrous (Other)	None Detected
B-222-43A 042304619-0102	MMS - Floor 1 - D126 - 2x4 Ceiling Tile - New Speckled/Dot	Gray/White Fibrous Homogeneous	45% Cellulose 12% Min. Wool	10% Ca Carbonate 20% Perlite 13% Non-fibrous (Other)	None Detected
B-222-43B 042304619-0103	MMS - Floor 1 - D126 - 2x4 Ceiling Tile - New Speckled/Dot	Gray/White Fibrous Heterogeneous	15% Cellulose 10% Min. Wool 30% Glass	5% Quartz 20% Perlite 20% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-222-44A 042304619-0104	MMS - Floor 1 - B105 - 2x4 Ceiling Tile - Speckled/Dot	White Fibrous Homogeneous	45% Cellulose 15% Min. Wool	8% Ca Carbonate 20% Perlite 12% Non-fibrous (Other)	None Detected
B-222-44B 042304619-0105	MMS - Floor 1 - B125 - 2x4 Ceiling Tile - Speckled/Dot	Gray/White Fibrous Homogeneous	25% Cellulose 10% Min. Wool 20% Glass	5% Quartz 15% Perlite 25% Non-fibrous (Other)	None Detected
B-222-45A 042304619-0106	MMS - Floor 1 - Kitchen - 2x4 Ceiling Tile - Flat	Gray Fibrous Homogeneous	45% Cellulose 25% Min. Wool	15% Perlite 15% Non-fibrous (Other)	None Detected
B-222-45B 042304619-0107	MMS - Floor 1 - Kitchen - 2x4 Ceiling Tile - Flat	Gray/Tan/White Fibrous Heterogeneous	25% Cellulose 10% Min. Wool 30% Glass	5% Quartz 20% Perlite 10% Non-fibrous (Other)	None Detected
B-222-46A 042304619-0108	MMS - Floor 1 - Boys Locker Room - 2x4 Ceiling Tile - Flat	Brown/Gray Fibrous Homogeneous	10% Cellulose 2% Glass	60% Ca Carbonate 12% Gypsum 16% Non-fibrous (Other)	None Detected
B-222-46B 042304619-0109	MMS - Floor 1 - Girls Locker Room - 2x4 Ceiling Tile - Flat	Brown/Gray/White Fibrous Heterogeneous	15% Cellulose 5% Glass	7% Quartz 20% Ca Carbonate 25% Gypsum 3% Mica 25% Non-fibrous (Other)	None Detected
B-222-47A 042304619-0110	MMS - Floor 1 - B134 - Texture Board Ceiling Material	Brown/Gray Fibrous Homogeneous	50% Cellulose	40% Ca Carbonate 10% Non-fibrous (Other)	None Detected
B-222-47B 042304619-0111	MMS - Floor 1 - B125 - Texture Board Ceiling Material	Brown/Gray Fibrous Heterogeneous	60% Cellulose	5% Quartz 25% Ca Carbonate 10% Non-fibrous (Other)	None Detected

Analyst(s)

Johannes Breckheimer (21)

Jessica Macdonald (28)

Kerrie Gibson (11)

Laura Harris (41)

Migena Shehu (6)

Samantha Rundstrom, Laboratory Manager
or Other Approved Signatory

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Samples analyzed by EMSL Analytical, Inc. Long Island City, NY AIHA LAP, LLC-IHLAP Accredited #102581, NVLAP Lab Code 101048-9, NJ NY022, CT PH-0170, MA AA000170

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ATTACHMENT C

PAINT CHIP SAMPLE ANALYSIS

**EMSL Analytical, Inc.**

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012425199
LIMS Reference ID: AC25199
EMSL Customer ID: VERT51

Attention: Jason Mohre
The Vertex Companies, LLC [VERT51]
398 Libbey Parkway
Weymouth, MA 02189
(617) 939-3823
jmohre@vertexeng.com

Project Name: Monomoy MS/98447

Customer PO: 98447
EMSL Sales Rep: Sheryl Steinmetz
Received: 07/31/2024 09:40
Reported: 08/01/2024 17:58

Analytical Results

Analyte	Results	RL	Weight(g)	Prep Date & Tech	Prep Method	Analysis Date & Analyst	Analytical Method	Q	DF
Client Sample ID: PC - 730 - 01/Exterior Wood Trim - White							Date Sampled: 07/30/24		
Matrix: Chips							LIMS Reference ID: AC25199-01		
Lead	<0.008 % wt	0.008 % wt	0.2938	07/30/24 LP	SW-846 3050B	08/01/24 PMX	SW846-7000B		1
Sample Comments:									
Client Sample ID: PC - 730 - 02/Exterior Wood Trim - White							Date Sampled: 07/30/24		
Matrix: Chips							LIMS Reference ID: AC25199-02		
Lead	<0.008 % wt	0.008 % wt	0.2736	07/30/24 LP	SW-846 3050B	08/01/24 PMX	SW846-7000B		1
Sample Comments:									

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EMSL-CIN-01

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Weymouth, MA 02189
(617) 939-3823
jmohre@vertexeng.com

Project Name:

Monomoy MS/98447

Customer PO:

98447

EMSL Sales Rep:

Sheryl Steinmetz

Received:

07/31/2024 09:40

Reported:

08/01/2024 17:58

Certified Analyses included in this Report

Analyte	Certifications
SW846-7000B in Chips	
Lead	AIHA LAP

List of Certifications

Code	Description	Number	Expires
NJDEP	New Jersey Department of Environmental Protection	03036	06/30/2024
AIHA LAP	EMSL Analytical, Inc. Cinnaminson, NJ AIHA-LAP, LLC-ELLAP Accredited	100194	01/01/2025
NYSDOH	New York State Department of Health	10872	04/01/2025
California ELAP	California Water Boards	1877	06/30/2024
A2LA	A2LA Environmental Certificate	2845.01	07/31/2024
PADEP	Pennsylvania Department of Environmental Protection	68-00367	11/30/2024
MADEP	Massachusetts Department of Environmental Protection	M-NJ337	06/30/2024
CTDPH	Connecticut Department of Public Health	PH-0270	06/23/2024

Please see the specific Field of Testing (FOT) on www.emsl.com for a complete listing of parameters for which EMSL is certified.

Notes and Definitions

Item	Definition
(Dig)	For metals analysis, sample was digested.
[2C]	Reported from the second channel in dual column analysis.
DF	Dilution Factor
MDL	Method Detection Limit.
ND	Analyte was NOT DETECTED at or above the detection limit.
Q	Qualifier
RL	Reporting Limit For paint chips, the RL is 0.008% by wt. (equiv. to 80 mg/kg, or ppm) based upon a minimum sample weight of 0.25 grams. For soils, the RL is 40 mg/kg (ppm) based upon a minimum sample weight of 0.5 grams. For dust wipes, the RL is 10 µg/wipe; reporting units of µg/sq. ft. are not validated by the lab based upon data provided by non-lab personnel.
Wet	Sample is not dry weight corrected.
Measurement of uncertainty and any applicable definitions of method modifications are available upon request. Per EPA NLLAP policy, sample results are not blank corrected.	

**EMSL Analytical, Inc.**

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EMSL-CIN-01

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Owen McKenna Laboratory Manager or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. QC sample results are within quality control criteria and met method specifications unless otherwise noted. All results for soil samples are reported on a dry weight basis, unless otherwise noted.

Analysis following EMSL SOP for the Determination of Environmental Lead by FLAA. The laboratory has a reporting limit of 0.008% by wt., based upon a minimum sample weight of 0.25g submitted to the lab, and is not responsible for any result or reporting limit provided in mg/cm² since it is dependent upon an area value provided by non-lab personnel. A "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty and definitions of modifications are available upon request. Results in this report are not blank corrected unless specified.



EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Lead (Pb) Chain of Custody

EMSL Order ID (Lab Use Only):

AC 25199

PHONE: ()

FAX: ()

Company: The Vertex Companies, Inc.		EMSL-Bill to: ☒ Same ☐ Different If Bill to is Different note instructions in Comments**	
Street: 398 Libbey Parkway		Third Party Billing requires written authorization from third party	
City: Weymouth	State/Province: MA	Zip/Postal Code: 02189	Country: US
Report To (Name): Jason Mohre		Telephone #: 781-952-6000	
Email Address: jmohre@vertexeng.com		Fax #: 781-335-3543	Purchase Order: 98447
Project Name/Number: Monomoy MS/98447		Please Provide Results: ☐ Fax ☒ Email jmohre@vertexeng.com	
U.S. State Samples Taken: MA		CT Samples: ☐ Commercial/Taxable ☐ Residential/Tax Exempt	
Turnaround Time (TAT) Options* - Please Check			
☐ 3 Hour	☐ 6 Hour	☐ 24 Hour	☒ 48 Hour
☐ 72 Hour	☐ 96 Hour	☐ 1 Week	☐ 2 Week
*Analysis completed in accordance with EMSL's Terms and Conditions located in the Price Guide			
Matrix	Method	Instrument	Reporting Limit
Chips ☒ % by wt. ☐ mg/cm ² ☐ ppm (mg/kg)	SW846-7000B	Flame Atomic Absorption	0.01%
Air	NIOSH 7082	Flame Atomic Absorption	4 µg/filter
	NIOSH 7105	Graphite Furnace AA	0.03 µg/filter
	NIOSH 7300M/NIOSH 7303	ICP-OES	0.5 µg/filter
Wipe* ☐ ASTM ☐ non ASTM	SW846-7000B	Flame Atomic Absorption	10 µg/wipe
*if no box checked, non-ASTM Wipe assumed	SW846-6010B or C	ICP-OES	1.0 µg/wipe
TCLP	SW846-1311/7000B/SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)
	SW846-1311/SW846-6010B or C	ICP-OES	0.1 mg/L (ppm)
SPLP	SW846-1312/7000B/SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)
	SW846-1312/SW846-6010B or C	ICP-OES	0.1 mg/L (ppm)
TTLIC	22 CCR App. II, 7000B/7420	Flame Atomic Absorption	40 mg/kg (ppm)
	22 CCR App. II, SW846-6010B or C	ICP-OES	2 mg/kg (ppm)
STLC	22 CCR App. II, 7000B/7420	Flame Atomic Absorption	0.4 mg/L (ppm)
	22 CCR App. II, SW846-6010B or C	ICP-OES	0.1 mg/L (ppm)
Soil	SW846-7000B	Flame Atomic Absorption	40 mg/kg (ppm)
	SW846-6010B or C	ICP-OES	2 mg/kg (ppm)
Wastewater Unpreserved ☐	SM3111B/SW846-7000B	Flame Atomic Absorption	0.4 mg/L (ppm)
Preserved with HNO ₃ pH < 2 ☐	EPA 200.9	Graphite Furnace AA	0.003 mg/L (ppm)
	EPA 200.7	ICP-OES	0.020 mg/L (ppm)
Drinking Water Unpreserved ☐	EPA 200.8	ICP-MS	0.001 mg/L (ppm)
Preserved with HNO ₃ pH < 2 ☐	EPA 200.9	Graphite Furnace AA	0.003 mg/L (ppm)
	EPA 200.5	ICP-OES	0.003 mg/L (ppm)
TSP/SPM Filter	40 CFR Part 50	ICP-OES	12 µg/filter
	40 CFR Part 50	Graphite Furnace AA	3.6 µg/filter
Other:			
Name of Sampler: J. Mohre		Signature of Sampler: [Signature]	
Sample #	Location	Volume/Area	Date/Time Sampled
PC-730-01	Exterior Wood Trim	Point Chip	7/30 / 1000
PC-730-02	(White)	+	1030
Client Sample #s	Total # of Samples:		2
Relinquished (Client): [Signature]	Date: 7/30/24	Time:	
Received (Lab): [Signature]	Date: 7-31-24	Time:	940
Comments:			



EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Lead (Pb) Chain of Custody

EMSL Order ID (Lab Use Only):

AC 25199

PHONE: ()

FAX: ()

Company: The Vertex Companies, Inc.		EMSL-Bill to: ☒ Same ☐ Different If Bill to is Different note instructions in Comments**		
Street: 398 Libbey Parkway		Third Party Billing requires written authorization from third party		
City: Weymouth	State/Province: MA	Zip/Postal Code: 02189	Country: US	
Report To (Name): Jason Mohre		Telephone #: 781-952-6000		
Email Address: jmhore@vertexeng.com		Fax #: 781-335-3543	Purchase Order: 98447	
Project Name/Number: Monomoy MS/98447		Please Provide Results: ☐ Fax ☒ Email jmhore@vertexeng.com		
U.S. State Samples Taken: MA		CT Samples: ☐ Commercial/Taxable ☐ Residential/Tax Exempt		
Turnaround Time (TAT) Options* - Please Check				
☐ 3 Hour	☐ 6 Hour	☐ 24 Hour	☒ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week	
*Analysis completed in accordance with EMSL's Terms and Conditions located in the Price Guide				
Matrix	Method	Instrument	Reporting Limit	Check
Chips ☒ % by wt. ☐ mg/cm ² ☐ ppm (mg/kg)	SW846-7000B	Flame Atomic Absorption	0.01%	☒
Air	NIOSH 7082	Flame Atomic Absorption	4 µg/filter	☐
	NIOSH 7105	Graphite Furnace AA	0.03 µg/filter	☐
	NIOSH 7300M/NIOSH 7303	ICP-OES	0.5 µg/filter	☐
Wipe* ☐ ASTM non ASTM ☐ *if no box checked, non-ASTM Wipe assumed	SW846-7000B	Flame Atomic Absorption	10 µg/wipe	☐
	SW846-6010B or C	ICP-OES	1.0 µg/wipe	☐
TCLP	SW846-1311/7000B/SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	SW846-1311/SW846-6010B or C	ICP-OES	0.1 mg/L (ppm)	☐
SPLP	SW846-1312/7000B/SM 3111B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	SW846-1312/SW846-6010B or C	ICP-OES	0.1 mg/L (ppm)	☐
TTLC	22 CCR App. II, 7000B/7420	Flame Atomic Absorption	40 mg/kg (ppm)	☐
	22 CCR App. II, SW846-6010B or C	ICP-OES	2 mg/kg (ppm)	☐
STLC	22 CCR App. II, 7000B/7420	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	22 CCR App. II, SW846-6010B or C	ICP-OES	0.1 mg/L (ppm)	☐
Soil	SW846-7000B	Flame Atomic Absorption	40 mg/kg (ppm)	☐
	SW846-6010B or C	ICP-OES	2 mg/kg (ppm)	☐
Wastewater Unpreserved ☐ Preserved with HNO ₃ pH < 2 ☐	SM3111B/SW846-7000B	Flame Atomic Absorption	0.4 mg/L (ppm)	☐
	EPA 200.9	Graphite Furnace AA	0.003 mg/L (ppm)	☐
	EPA 200.7	ICP-OES	0.020 mg/L (ppm)	☐
Drinking Water Unpreserved ☐ Preserved with HNO ₃ pH < 2 ☐	EPA 200.8	ICP-MS	0.001 mg/L (ppm)	☐
	EPA 200.9	Graphite Furnace AA	0.003 mg/L (ppm)	☐
	EPA 200.5	ICP-OES	0.003 mg/L (ppm)	☐
TSP/SPM Filter	40 CFR Part 50	ICP-OES	12 µg/filter	☐
	40 CFR Part 50	Graphite Furnace AA	3.6 µg/filter	☐
Other:				☐
Name of Sampler: J. Mohre		Signature of Sampler: [Signature]		
Sample #	Location	Volume/Area	Date/Time Sampled	
PC-730-01	Exterior Wood Trim	Point Chip	7/30/1000	
PC-730-02	+ (White)	+	1/1030	
Client Sample #s	PC-730-	Total # of Samples:	2	
Relinquished (Client): [Signature]	Date:	7/30/24	Time:	
Received (Lab): [Signature]	Date:	7-31-24	Time:	
Comments:				

August 12, 2024

Mr. Steven Watchorn
Raymond Design Associates, Inc.
60 Ledgewood Place
Rockland, MA 02370

Re: **Limited Sampling and Analysis**
Monomoy Regional Middle School-Roof
425 Crowell Road
Chatham, Massachusetts 02633
VERTEX Project No. 98447

Dear Mr. Watchorn:

The Vertex Companies, LLC (VERTEX) is pleased to provide you with this letter report summarizing the visual inspection and bulk sampling results from the Limited Sampling and Analysis on the Roof Area at the Monomoy Regional Middle School located at 425 Crowell Road in Chatham, MA (the Site).

General Roof Description

The roof area is generally made up of three different finish materials which include asphalt shingle on the pitched roof areas and Thermoplastic Polyolefin (TPO) Membrane or Ethylene Propylene Diene Monomer (EPDM) membrane on the low pitched/flat roofs. The original structure consisted of multiple layers in the roof field which included: TPO membrane, Insulation Board (ISO) followed by a layered built-up asphalt roofing on a tectum board roof deck. The original structure roof flashing was observed similar to roof field with an additional layer of TPO and built-up asphalt roofing attached to a wood nailer at the roof edge.

Limited Sampling and Analysis

The limited bulk sample collection was conducted by Massachusetts licensed Asbestos Inspector, Jason Mohre (AI000262) on 30th, 2024. A total of ten (10) representative bulk samples of suspect materials were collected from the areas inspected which included the original structure flat roof area and the pitched asphalt roof on the gym area. Bulk samples of the roof field, roof flashing and asphalt shingles were collected.

Monomoy Middle School-Roof Limited Sampling and Analysis

Page 2

The bulk samples were collected and analyzed in order to determine the identity of suspect materials and their composition. Bulk samples were collected in the following sampling scheme which is derived from the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR 763): For friable surfacing materials, 3, 5, 7, or 9 random samples were taken to determine asbestos content depending on the amount of material in the homogeneous area. For friable and non-friable miscellaneous materials, 2 or more samples were collected and analyzed to determine asbestos content.

The collected bulk samples were submitted under a chain-of-custody to EMSL of Cinnaminson, NJ. The bulk samples were analyzed via Polarized Light Microscopy (PLM) in accordance with U.S. Environmental Protection Agency (EPA) Method 600/R-93/116 recommended protocol-using PLM. EMSL of Cinnaminson is accredited through the National Voluntary Laboratory Accreditation Program (#101048-0) and is a Massachusetts certified analytical laboratory (AA000056).

Please refer to attached Table I which summarizes the sample locations and analytical results. Please refer to **ATTACHMENT A** which includes the Laboratory Report.

Table I-Summary of Sample Results

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE LOCATION	ASBESTOS CONTENT
B-730-01A	Roof Field Material	Exterior-Roof Original Structure	None Detected
B-730-01B	Roof Field Material	Exterior-Roof Original Structure	None Detected
B-730-02A	Roof Flashing Material	Exterior-Roof Original Structure	None Detected
B-730-02B	Roof Flashing Material	Exterior-Roof Original Structure	None Detected
B-730-03A	Black Sealant Material	Exterior-Roof Above E206	None Detected
B-730-03B	Black Sealant Material	Exterior-Roof Above E206	None Detected
B-730-04A	Yellow Adhesive under Rubber Membrane on Parapet Wall	Exterior-Roof Above E206	None Detected
B-730-04B	Yellow Adhesive under Rubber Membrane on Parapet Wall	Exterior-Roof Above E206	None Detected
B-730-05A	Asphalt Shingle	Exterior-Roof Gym	None Detected
B-730-05B	Asphalt Shingle	Exterior-Roof Gym	None Detected

Conclusions

Based on the sampling and analysis of the suspect building materials, the presence of asbestos was not detected within the representative bulk samples collected and analyzed.

Limitations

Professional opinions presented in this summary letter are based on information made available to VERTEX either by review of data provided by others or data gained by VERTEX personnel.

Monomoy Middle School-Roof Limited Sampling and Analysis

Page 3

VERTEX affirms that data gathered and presented by VERTEX in this summary letter was collected in an appropriate manner in accordance with generally accepted methods and practices. VERTEX cannot be responsible for decisions made by our client solely on the basis of economic factors.

Conditions described in this summary letter were observed at the time of the inspection, unless otherwise stated. VERTEX observed only the conditions and locations described in the summary letter at the time indicated. VERTEX analyzed only the substances, conditions, and locations described in the report at the time indicated.

This survey was limited and should not be utilized for planning for renovation and/or demolition activities outside the proposed work areas inspected.

Please do not hesitate to contact us at your convenience, should you have any questions or comments regarding this summary letter or our recommendations.

Sincerely,

The Vertex Companies, LLC



Ian Lyster
Project Manager



Jason Mohre
Project Lead

ATTACHMENT A

BULK SAMPLE ANALYSIS RESULTS BY PLM



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com/cinnasblab@EMSL.com>

EMSL Order: 042415952

Customer ID: VERT51

Customer PO: 98447

Project ID:

Attention: Jason Mohre

The Vertex Companies, LLC

398 Libbey Parkway

Weymouth, MA 02189

Phone: (617) 939-3823

Fax: (781) 335-3543

Received Date: 07/31/2024 9:40 AM

Analysis Date: 08/02/2024

Collected Date: 07/30/2024

Project: Monomoy Middle School / 98447

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
B-730-01A 042415952-0001	Exterior Roof (Original Section) - Roof Field Material	Gray/Black Fibrous Heterogeneous	30% Cellulose 10% Glass HA: 01	60% Non-fibrous (Other)	None Detected
B-730-01B 042415952-0002	Exterior Roof (Original Section) - Roof Field Material	Gray/Black Fibrous Homogeneous	30% Cellulose 10% Glass HA: 01	60% Non-fibrous (Other)	None Detected
B-730-02A 042415952-0003	Exterior Roof (Original Section) - Roof Flashing Material	Gray/Black Fibrous Heterogeneous	35% Cellulose HA: 02	65% Non-fibrous (Other)	None Detected
B-730-02B 042415952-0004	Exterior Roof (Original Section) - Roof Flashing Material	Gray/Black Non-Fibrous Homogeneous	20% Cellulose HA: 02	80% Non-fibrous (Other)	None Detected
B-730-03A 042415952-0005	Exterior Above E206 - Black Sealant	Black Non-Fibrous Homogeneous	HA: 03	100% Non-fibrous (Other)	None Detected
B-730-03B 042415952-0006	Exterior Above E206 - Black Sealant	Black Non-Fibrous Homogeneous	HA: 03	100% Non-fibrous (Other)	None Detected
B-730-04A 042415952-0007	Exterior Above E206 - Yellow Lence on Parapet / EPDM	Yellow Non-Fibrous Homogeneous	HA: 04	100% Non-fibrous (Other)	None Detected
B-730-04B 042415952-0008	Exterior Above E206 - Yellow Lence on Parapet / EPDM	Yellow Non-Fibrous Homogeneous	HA: 04	100% Non-fibrous (Other)	None Detected
B-730-05A 042415952-0009	Exterior Roof (Gym) - Asphalt Shingle	Gray/Black Fibrous Homogeneous	15% Glass HA: 05	85% Non-fibrous (Other)	None Detected
B-730-05B 042415952-0010	Exterior Roof (Gym) - Asphalt Shingle	Black Non-Fibrous Homogeneous	10% Glass HA: 05	90% Non-fibrous (Other)	None Detected



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-5974

<http://www.EMSL.com> / cinnasblab@EMSL.com

EMSL Order: 042415952

Customer ID: VERT51

Customer PO: 98447

Project ID:

Analyst(s)

Amy Schulze (5)

Selbbep Salgado (5)

Samantha Rundstrom, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA LAP, LLC-IHLAP Lab 100194, PA ID# 68-00367, LA #04127

Initial report from: 08/02/2024 15:01:37



EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Materials - Chain of Custody

EMSL Order Number / Lab Use Only

EMSL Analytical, Inc.

200 Route 130 North

Cinnaminson, NJ 08077

PHONE: 1-800-220-3675

EMAIL: c@emsl.com

042415952

Customer Information	Customer ID:		Billing ID:	
	Company Name:	The Vertex Companies, LLC	Company Name:	The Vertex Companies, LLC
	Contact Name:	J Mohre/V Agostino	Billing Contact:	J Mohre
	Street Address:	398 Libbey Parkway	Street Address:	398 Libbey Parkway
	City, State, Zip:	Weymouth MA 02184	City, State, Zip:	Weymouth MA
	Country:	US	Country:	US
Phone:	781-952-6000	Phone:	781-952-6000	
Email(s) for Report:	jmohre@vertexeng.com	Email(s) for Invoice:		

Project Information

Project Name/No:	Monomoy Middle School/98447	Purchase Order:	98447
EMSL LIMS Project ID: (If applicable, EMSL will provide)		US State where samples collected:	MA
		State of Connecticut (CT) must select project location:	☐ Commercial (Taxable) ☐ Residential (Non-Taxable)
Sampled By Name:	J. Mohre	Sampled By Signature:	<i>[Signature]</i>
		Date Sampled:	7/30
		No. of Samples in Shipment:	10

Turn-Around-Time (TAT)

☐ 3 Hour
 ☐ 6 Hour
 ☐ 24 Hour
 ☐ 32 Hour
 ☐ 48 Hour
 ☒ 72 Hour
 ☐ 96 Hour
 ☐ 1 Week
 ☐ 2 Week

Please call ahead for large projects and/or turnaround times 6 Hours or Less. *32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

Test Selection

PLM - Bulk (reporting limit)

- ☒ PLM EPA 600/R-93/116 (<1%)
☐ PLM EPA NOB (<1%)
☐ POINT COUNT
☐ 400 (<0.25%) ☐ 1,000 (<0.1%)
☐ POINT COUNT w/ GRAVIMETRIC
☐ 400 (<0.25%) ☐ 1,000 (<0.1%)
☐ NIOSH 9002 (<1%)
☐ NYS 198.1 (Friable - NY)
☐ NYS 198.6 NOB (Non-Friable - NY)
☐ NYS 198.8 (Vermiculite SM-V)

TEM - Bulk

- ☐ TEM EPA NOB
☐ NYS NOB 198.4 (Non-Friable - NY)
☐ TEM EPA 600/R-93/116 w Milling Prep (0.1%)

Other Tests (please specify)

- ☒ Positive Stop - Clearly Identified Homogeneous Areas (HA)

Sample Number	HA Number	Sample Location	Material Description
B-730-01A	01	Exterior Roof (Original section)	Root Field material
B-730-01B	↓		↓
B-730-02A	02		Root Flashing material
B-730-02B	↓		↓
B-730-03A	03	Exterior Roof Above E206	Black Sealant on Parapet
B-730-03B	↓		↓
B-730-04A	04		Yellow Sealant on Parapet/EDDM
B-730-04B	↓		↓
B-730-05A	05	Exterior Roof (Gym)	Asphalt Shingle
B-730-05B	↓		↓

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Method of Shipment:	Sample Condition Upon Receipt:
Relinquished by: <i>[Signature]</i>	Received by: <i>[Signature]</i> EFT
Date/Time: 7/30/24	Date/Time: 7/31/24
Relinquished by:	Received by:
Date/Time:	Date/Time:

Controlled Document - Asbestos Bulk R7 9/14/2021

☐ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.



Appendix F

August 19, 2024

Mr. Steven Watchorn
Raymond Design Associates, Inc.
60 Ledgewood Place
Rockland, MA 02370

Re: **Mold/Moisture-Related Assessment**
Monomoy Regional Middle School
425 Crowell Road
Chatham, Massachusetts 02633
VERTEX Project No. 98447

Dear Mr. Watchorn:

The VERTEX Companies, LLC. (VERTEX) is pleased to present this letter report pertaining to the Mold/Moisture-Related Assessment conducted at the Monomoy Regional Middle School located in Chatham, MA (herein referred to as the "Site").

1.0 LIMITED MOLD/MOISTURE VISUAL MOLD SURVEY

On July 29th and 30th, 2024, VERTEX representative, Jason Mohre, conducted a visual assessment and moisture mapping of the exploratory cuts conducted by others on the exterior of the site building. Please refer to the below for a summary of our observations. Please refer to the attached Photographic Documentation page for a depiction of conditions observed at the time of our inspection:

Exterior

Window Area Under A102 (Photo 1)

- Wood window trim board observed to be water-damaged
- Siding paper observed under wood shingles
- Window units did not appear to be flashed properly with seam tape (Photo 2)
- Visible suspect mold growth observed on the plywood sheathing. Moisture mapping of the plywood sheathing was recorded between 17-18 % under the window area. (Photo 3)
- Aluminum studs behind the plywood sheathing were observed to be oxidized (rusty).
- Non-papered back fiberglass batt insulation was observed within the wall stud cavities. Insulation was observed dry to touch at the time of the assessment.

- Non-continuous vapor barrier observed separating the backside of the interior gypsum board. Moisture mapping of the backside of the interior gypsum board was recorded between 14-16 %. (Photo 4)

Library Northeast Corner (Photo 5)

- Wood trim board at corner observed to be water-damaged
- Siding paper observed under trim board
- Moisture mapping of the plywood sheathing was recorded between 14-15 %

E205 Window Area

- Siding paper observed under wood shingles
- Window unit did not appear to be flashed properly with seam tape (Photo 6 and 7)
- Moisture mapping of the plywood sheathing to the right of the window unit as well as at the header was recorded between 15-16%. (Photo 8)

E211 Soffit (Photo 9)

- Soffit ventilation was not observed
- Oxidation (Rust) observed on underside of the roof decking. (Photo 10)
- Moisture mapping of the plywood sheathing under the soffit was recorded between 10-12%.

B128 Window Area

- Siding paper observed under wood shingles and window trim board
- Window units did not appear to be flashed properly with seam tape (Photo 11 and 12)
- Moisture mapping of the plywood sheathing to the right of the window unit as well as at between the windows was recorded between 15-16%.

C103 Window Area

- Siding paper observed under wood shingles and window trim board
- Significant water damage to the plywood sheathing was observed.
- A vapor barrier not observed.
- Moisture mapping of the plywood sheathing to the under the window unit was recorded between 17-20%. (Photo 13)

Roof Area

- The roof area is generally made up of three different finish materials which include asphalt shingle on the pitched roof areas and Thermoplastic Polyolefin (TPO) Membrane or Ethylene Propylene Diene Monomer (EPDM) membrane on the low pitched/flat roofs.
- The original structure consisted of multiple layers in the roof field which included: TPO membrane, Insulation Board (ISO) followed by a layered built-up asphalt roofing on a tectum board roof deck. (Photo 14) The original structure roof flashing was observed

similar to roof field with and additional layer of TPO and built-up asphalt roofing attached to a wood nailer at the roof edge.

- Multiple dome skylights observed on the original section roof area appeared to have been previously repaired.
- The gutter system and wood soffit area were observed to be damaged on the west side of the gym roof area. The glass block window caulking and grout were observed to be in deteriorated condition. (Photo 15) In addition, the gable vent (mechanical fresh air intake) on the south side of the gym appeared to be water-damaged. (Photo 16)

Interior

E109

- Water damage observed on the wood windowsill.
- Suspect visible mold growth observed on a drop ceiling tile. (Photo 17)
- Ventilation not operating

E110

- Water damage on painted gypsum board adjacent to window area.
- Ventilation not operating

E111

- Water damage observed on the wood windowsill.
- Ventilation not operating

E112

- Water damage on painted gypsum board adjacent to window area.
- Significant water damage observed on south wood windowsill. (Photo 18)
- Ventilation not operating

E114

- Suspect visible mold growth observed on perimeter wall where the cabinets have been removed. In addition, approximate 2 ft² cut-out in concrete slab and soil exposed. (Photo 19)
- Ventilation not operating

E115

- Significant water damage observed on the wood windowsill. (Photo 20)
- Water-stained ceiling tiles
- Ventilation not operating

E119

- Significant water damage observed on the wood windowsill. (Photo 21)
- Water-stained ceiling tiles
- Ventilation not operating

E215

- Three water-stained ceiling tiles. Inspection above the ceiling area did not identify any active plumbing leaks.
- Ventilation not operating

E205

- One water-stained ceiling tile
- Ventilation not operating

E206

- Two water-stained ceiling tiles. Inspection above the ceiling area did not identify any active plumbing leaks.
- Ventilation not operating

E207

- Ventilation not operating

E208

- Water damage on painted gypsum board adjacent to window area.
- Six water-stained ceiling tiles
- Ventilation not operating

E209

- Ventilation not operating

E211

- Water damage on painted gypsum board adjacent to single window area.
- Ventilation not operating

E212

- Significant water damage on painted gypsum board adjacent to bay window area. (Photo 21)
- Ventilation not operating

D125

- Suspect visible mold growth observed on a drop ceiling tile adjacent to ceiling mounted mini split.

D126

- Water damage on painted gypsum board adjacent to window area.

D111

- Three water-stained ceiling tiles

Maintenance Room Adjacent to D111

- Six water-stained ceiling tiles. Inspection above the ceiling area did not identify any active plumbing leaks.

Corridor Adjacent to D114

- Water damaged gypsum board adjacent to skylight.

Library

- Water damaged gypsum board adjacent to upper window area.

Main Office Area

- Suspect visible mold growth observed on drop ceiling tiles adjacent and above wall mounted mini split. (Photo 22) Inspection above the drop ceiling tile did not reveal the presence of an active plumbing leak. It should be noted that the refrigeration set lines are poorly insulated which may have resulted in condensation affecting the drop ceiling tiles.

Main Office Area Copy Room

- Suspect visible mold growth and water staining observed on drop ceiling tiles adjacent and above wall mounted mini split. Inspection above the drop ceiling tile did not reveal the presence of an active plumbing leak. It should be noted that the refrigeration set lines are poorly insulated which may have resulted in condensation affecting the drop ceiling tiles.

A106 Counseling Office

- Water staining observed on the drop ceiling tile above the wall mounted mini split.

A106 Conference Room

- Suspect visible mold growth observed on the underside of the removed wood window sill.

B103

- Water damage on painted gypsum board adjacent to window area.

B102

- No ventilation

B119

- No ventilation

B135

- Water damage on painted gypsum board adjacent to window area.

B120 (Shells)

- Peeling paint observed on painted gypsum board adjacent to window area.

B128

- Water staining/damage observed on the wood windowsill. (Photo 23)

To assess general indoor air quality parameters within the school, VERTEX utilized an EXTECH™ brand pen meter to obtain real-time temperature and relative humidity readings. Such parameters can assist with identification of conditions that may be supportive of human comfort within a building space. Additional readings were obtained from the exterior of the school (ambient) for comparison purposes. In addition, moisture mapping of the painted gypsum board around the window units as well as the wood windowsills where accessible. The readings are outlined in Table 1 below:

Table 1 – Indoor Air Quality Parameters (July 30, 2024)			
Location	Temperature (Fahrenheit)	Relative Humidity (%)	Moisture Mapping Around Window Units (where accessible)
Exterior (Ambient)	74.4	69.1	NA
E103	75.2	73.2	6-12%
E109	77.1	80.9	6-12%
E110	77.2	73.5	6-12%
E111	77.7	79.5	6-12%
E112	78.1	78.2	6-12%
E115	78.6	74.4	6-11%
E119	78.3	69.3	6-12%
E215	80.2	70.3	6-11%
E206	75.6	56.7	6-10%
E207	75.5	52.1	8-10%
E208	78.8	73.3	6-10%
E209	79.3	75.3	6-8%
E211	80.9	76.2	6-8%

Monomoy Regional Middle School

Mold and Moisture Assessment

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Table 1 – Indoor Air Quality Parameters (July 30, 2024)

Location	Temperature (Fahrenheit)	Relative Humidity (%)	Moisture Mapping Around Window Units (where accessible)
E212	83.1	76.2	6-12%
D125	73.6	71.5	NA
D126	73.6	71.5	5-10%
Resource Officer	76.1	69.5	8-14%
A101	76.1	74.6	8-14%
Main Office	72.8	54.1	8-12%
Principal Office (A104)	72.5	50.6	8-10%
Counseling Office (A106)	69.8	56.9	5-10%
A145	77.5	83.2	8-10%
A144	77.9	81.1	8-10%
A143	79.5	75.8	8-9%
A137	76.7	78.4	6-8%
B101	78.6	77.2	6-10%
B104	78.4	74.5	7-9%
B106	76.6	65.3	7-9%
B119	76.3	77.3	NA
B134	78.2	80.7	7-9%
B135	78.9	80.9	7-9%
B136	79.3	78.6	6-11%
B120 (Shells)	79.1	76.5	6-12%
B125	80.6	71.8	8-12%
B128	81.1	75.6	8-12%
B131	81.3	71.6	9-11%
C103	80.4	74.6	6-12%
B141	79.5	77.9	6-10%
A155	79.1	73.2	7-10%

(1) ASHRAE 55 Guidance Value for human comfort – Temperature ranging from 67 to 82 degrees Fahrenheit

(2) ASHRAE 62.1 – Relative Humidity below 65% to preclude mold growth

(3) EPA 402-K-01-001 – Relative Humidity ranging from 30 to 60%

Based on the limited IAQ assessment performed by VERTEX on July 30th, 2024, general IAQ parameters appeared to be within the acceptable human comfort range for temperature as per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 55 Guidance values in most areas within the school. Relative Humidity recorded throughout the school was recorded generally above EPA recommended value (> 60 %) as well as above the ASHRAE recommended value for minimizing mold growth within most Classrooms.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Between July 29th and 30th, 2024, VERTEX performed a visual assessment to document current conditions within the Monomoy Regional Middle School. Based on observations noted during the assessment, VERTEX concludes the following:

- Water intrusion events have been a pre-existing condition due to the observed lack of tape flashing around the window openings. This has resulted in observed water damage to interior finish materials including wooden windowsills and painted gypsum board.
- The observations of the lack of a continuous or non-existent vapor barrier contributes to the additional moisture entering the building which may promote mold growth.
- Ventilation did not appear operable within a majority of the E-Wing Classrooms.
- General IAQ parameters appeared to be within the acceptable human comfort range for temperature as per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 55 Guidance values in most areas within the school. Relative Humidity recorded throughout the school was recorded generally above EPA recommended value (> 60 %) as well as above the ASHRAE recommended value for minimizing mold growth within most Classrooms.

Based on the findings of the building assessment at the Monomoy Regional Middle School VERTEX suggests the following:

- Retain a reputable window and siding contractor to remove and replace damaged wood trim as well as install proper tape flashing around all windows.
- Retain a mechanical contractor to inspect and repair as necessary all non-operable mechanical ventilation.
- Remove and replace all water stained and suspect mold impacted drop ceiling tiles noted. This task should be completed by a qualified, experienced mold remediation company under controlled conditions to prevent fugitive dust emissions during these operations.
- Remove suspect mold growth observed on impacted gypsum board on the perimeter wall of E114 utilizing guidance provided by:
 - [SHIB 03-10-10 A Brief Guide to Mold in the Workplace - English | Occupational Safety and Health Administration \(osha.gov\)](#)

- [Mold Remediation in Schools and Commercial Buildings EPA 402-K-01-001, September 2008](#)
- Maintain indoor relative humidity levels between 30% and 60% within the site building as per the EPA guidelines for precluding mold growth as well as ASHRAE guidance for thermal comfort.

4.0 LIMITATIONS

Professional opinions presented in this report are based on information made available to VERTEX either by review of data provided by others or data obtained by VERTEX personnel.

VERTEX affirms that data gathered and presented by VERTEX in this report was collected in an appropriate manner in accordance with generally accepted methods and practices. VERTEX cannot be responsible for decisions made by our client solely on the basis of economic factors.

Real-time readings, mold conditions and observations are subject to the day and time in which they were observed and/or in which samples were obtained. Conducting a mold inspection and subsequent mold remediation do not guarantee the eradication of all airborne fungal amplifiers (which may/may not be a natural intrusion from outdoor air), surface colonies, or mold producing conditions within any given space.

Conditions described in this report are found at the time of the investigation, unless otherwise stated. Changes in conditions which affect the potential for moisture intrusion can occur over time. Should additional information become available which would affect the status of this report, we reserve the right to amend our opinions and professional judgments.

VERTEX appreciates the opportunity to provide support to Raymond Design Associates, Inc. on this project. Please do not hesitate to contact the undersigned at (781) 952-6000 should you have any questions regarding this report or if we can be of further assistance. Thank you.

Sincerely,

The Vertex Companies, LLC



Jason Mohre
Project Lead



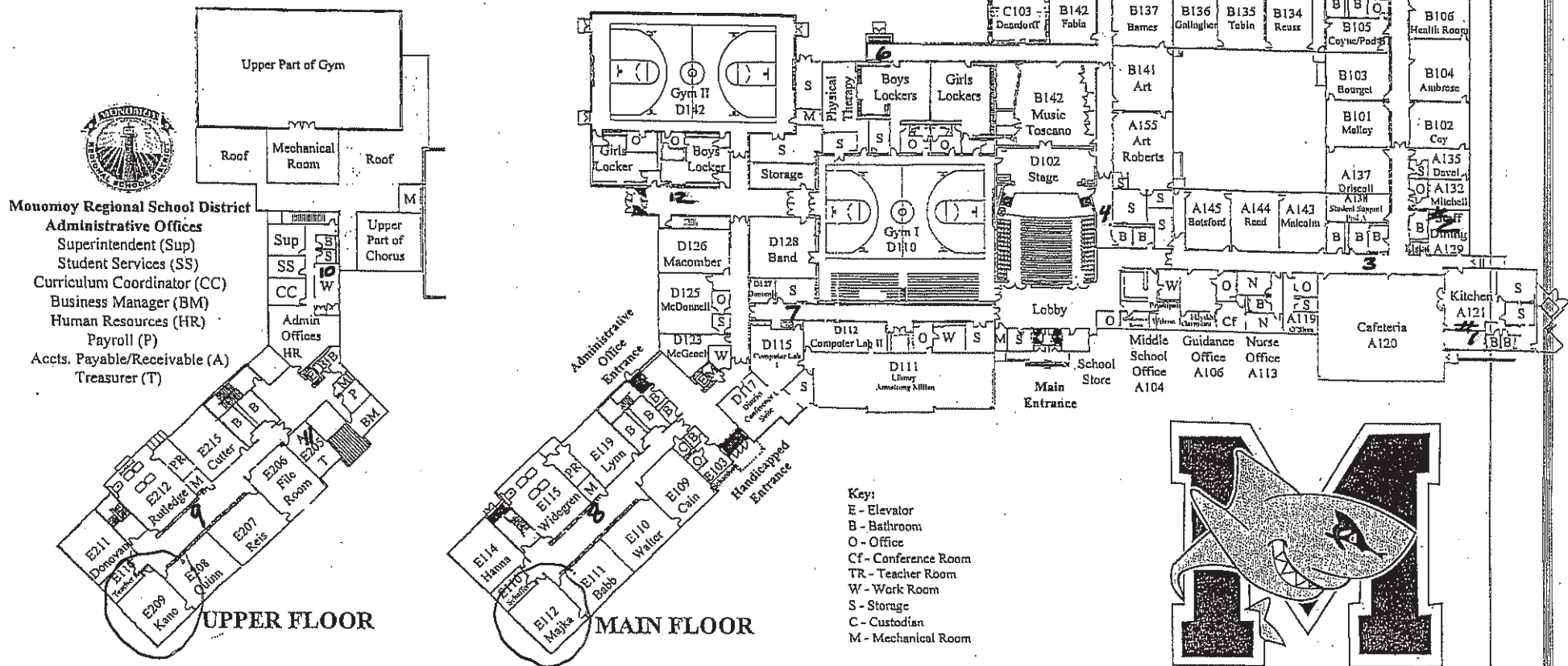
Thomas D. Koch, CIH MS WELL AP
Vice President, Industrial Hygiene and ESH Services

Attachments –
Floor Plan
Photographic Documentation Log

Monomoy Regional Middle School

425 Crowell Road, Chatham, Massachusetts

Grades 5 through 7



ATTACHMENT A:

1

PHOTOGRAPHIC DOCUMENTATION

Photograph: 1

Description:

Photograph depicts general view of exploratory A102 window area.



Photograph: 2

Description:

Photograph depicts general view of A102 window unit missing flashing tape.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 3**Description:**

Photograph depicts general view of suspect mold growth and moisture reading on plywood sheathing under A102 window area.

**Photograph: 4****Description:**

Photograph depicts general view of non-continuous poly vapor barrier and moisture reading on backside of gypsum board under A102 window area.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 5**Description:**

Photograph depicts general view of the removed trimboard at the northeast corner of the library.

**Photograph: 6****Description:**

Photograph depicts general view of E205 window unit missing flashing tape.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 7**Description:**

Photograph depicts general view of E205 window unit missing flashing tape.

**Photograph: 8****Description:**

Photograph depicts general view of moisture reading on the plywood sheathing adjacent to the E205 window area.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 9

Description:

Photograph depicts general view of the soffit and freeze board removed adjacent to E211 window area.



Photograph: 10

Description:

Photograph depicts general view of the roof deck above the window unit at E211.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 11**Description:**

Photograph depicts general view of B128 window unit missing flashing tape.

**Photograph: 12****Description:**

Photograph depicts general view of B128 window unit missing flashing tape.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 13**Description:**

Photograph depicts general view of water damaged plywood sheathing and moisture reading on the plywood sheathing under window area at C103.

**Photograph: 14****Description:**

Photograph depicts general view of roofing field material from original structure.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 15**Description:**

Photograph depicts general view of damaged gutter system on the western portion of the gym roof.

**Photograph: 16****Description:**

Photograph depicts general view of damaged gabale vent (mechanical air intake) on the south gym abale wall.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 17**Description:**

Photograph depicts general view of suspect mold growth on the drop ceiling tile above the window in E109.

**Photograph: 18****Description:**

Photograph depicts general view of water damaged wood window sill and adjacent gypsum board within E112.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 19**Description:**

Photograph depicts general view of suspect mold growth on the perimeter wall and n E114.

**Photograph: 20****Description:**

Photograph depicts general view of water damaged wood window sill and adjacent gypsum board within E115.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 21**Description:**

Photograph depicts general view of water damaged wood window sill and adjacent gypsum board within E119.

**Photograph: 22****Description:**

Photograph depicts general view of water damaged gypsum board and water stained wood within E212.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 23**Description:**

Photograph depicts general view of suspect mold growth on the drop ceiling tiles within the main office area.

**Photograph: 24****Description:**

Photograph depicts general view of water stained wood window sill within B128.

