NEW MILFORD BOARD OF EDUCATION
New Milford Public Schools
25 Sunny Valley Road, Suite A
New Milford, Connecticut 06776

FACILITIES SUB-COMMITTEE
SPECIAL MEETING NOTICE

DATE: December 10, 2024
TIME: 7:30 P.M.
PLACE: Sarah Noble Intermediate School – Library Media Center

AGENDA

New Milford Public Schools Mission Statement

The mission of the New Milford Public Schools, a collaborative partnership of students, educators, family, and community is to prepare each and every student to compete and excel in an ever-changing world, embrace challenges with vigor, respect and appreciate the worth of every human being, and contribute to society by providing effective instruction and dynamic curriculum, offering a wide range of valuable experiences, and inspiring students to pursue their dreams and aspirations.

1. Call to Order

2. Public Comment

An individual may address the Board concerning any item on the agenda for the meeting subject to the following provisions:

A. A three-minute time limit may be allocated to each speaker with a maximum of twenty minutes being set aside per meeting. The Board may, by a majority vote, cancel or adjust these time limits.
B. If a member of the public comments about the performance of an employee or a Board member, whether positive, negative, or neutral, and whether named or not, the Board shall not respond to such comments unless the topic is an explicit item on the agenda and the employee or the Board member has been provided with the requisite notice and due process required by law. Similarly, in accordance with federal law pertaining to student confidentiality, the Board shall not respond to or otherwise discuss any comments that might be made pertaining to students.

3. Items of Information

A. Discussion and possible action concerning security and safety. Executive session anticipated.
B. Northville Elementary School Roof
C. Sarah Noble Intermediate School HVAC RFP
D. HVAC Evaluations
E. Capital Improvement Work

4. Public Comment

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5. Adjourn

Sub-Committee Members:	**Tom O'Brien, Chairperson**
	Brian McCauley
	Eric Hansell
	Leslie Sarich
Alternates:	**Dean Barile**

Northville Elementary School

Roof Report & Roof Replacement Recommendations

22 Hipp Road
New Milford, Connecticut 06776

Draft Report, November 15, 2024
Final Report, November 21, 2024

Prepared by:

Silver Petrucelli & Associates, Inc.
Architects / Engineers / Interior Designers
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Hamden, CT 06518
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TABLE OF CONTENTS

SECTION I - EXECUTIVE SUMMARY

This report was prepared by Silver Petrucelli & Associates, Inc. (S/P+A) of Hamden, Connecticut, an architecture and engineering firm specializing in municipal programming, planning and design, feasibility analyses and building condition investigations.

Objective

Silver Petrucelli & Associates (SPA) was retained in the Fall 2024 by the Town of New Milford, New Milford Connecticut, to perform a comprehensive roof inspection/report reviewing 90,532 s.f. of low sloped roofs, sloped roofs, flashings, gutters & drainage systems. The analysis included the Asphalt Shingles on the Sloped roofs and the ballasted & non-ballasted EPDM low sloped roofs, construction systems, metal gutters, metal downspouts, metal fascia's, soffits, metal rakes, existing ventilation systems and other pertinent roofing components. Our efforts included visual observations from the ground (both outside the facility & inside the facility), visual observations from the roof and review of all existing documents made available to SPA. Original drawings of the original building, dating from 1980 (by Henry T. Moeckel Architects) and the 1990 addition (by Fletcher Thompson) were also made available, which aided in our understanding of the original construction materials & detailing.

Findings

Based on our observations, the 63,989 s.f. of low sloped ballasted EPDM roofs and the 26,543 s.f. sloped asphalt roofs are in poor condition including the perimeter metal gravel stops, Vent boots, gutters, downspouts, roof drains, fascia panels, soffits and perimeter wall flashings. The existing ballasted & non-ballasted EPDM membrane over the 63,989 s.f. is showing signs of membrane failure and should be addressed to minimize further water infiltration. The 26,543 s.f. sloped asphalt shingles are showing sign of failure and should also be addressed immediately. New drains are also recommended at all roof locations along with new gutters & downspouts at sloped roof locations. Since this building was constructed, new Building Codes now require a secondary drainage system if the primary system fails. We feel that careful design of the new metal gravel stops will satisfy this requirement, which has been included in the submitted estimates/costs. The balance of the metal flashing, gutters, downspouts and metal fascia's will need to be altered or replaced as part of the roofing operations. Existing metal panel fascia (below the roof edge) around the perimeter of the facility should also be replaced at part of this project, as many locations are rusted/failing. Various exterior soffits will likely need to be repaired/replaced as part of this project due to water infiltration failure. Canopy painting is also being recommended

Recommendations

SP&A is recommending 4 different options for the district to consider. We recommend that the existing low-slope ballasted and non-ballasted EPDM roofs be stripped completely to the deck and replaced with new insulation, cover board and new EPDM membranes or a 2-ply asphalt modified system. We also recommend that the sloped roof be completely stripped down to the deck and replaced with either asphalt shingles or a metal standing seam roof system. All these solutions would provide a minimum of a 20 or 30 year warranty. The drains on all low-slope roofs will need to be replaced and secondary drains will need to be included. We recommend 4 different options for the district to consider for this facility:

Option 1: EPDM on low sloped roofs. Asphalt shingles on sloped roofs.
Drain replacement, secondary drain installation, new perimeter flashings, new gutters, new metal wall panels
Cost = $4,044,013

Option 2: 2 ply modified on low sloped roofs. Asphalt shingles on sloped roofs
Drain replacement, secondary drain installation, new perimeter flashings, new gutters, new metal wall panels
Cost = $4,329,849

Option 3: EPDM on low sloped roofs. Standing seam on sloped roofs.
Drain replacement, secondary drain installation, new perimeter flashings, new gutters, new metal wall panels
Cost = $4,514,752

Option 4: 2 ply modified on low sloped roofs. Standing seam on sloped roofs
Drain replacement, secondary drain installation, new perimeter flashings, new gutters, new metal wall panels
Cost = $4,796,322

Aerial View of Northville Elementary School, New Milford, CT

SECTION II - PROCESS

The information contained in this report was gathered by S/P+A via field observations, interviews with staff of the school and historical drawings of the Structure, originally designed in 1980 by Henry T. Moeckel, AIA, Architect, P.C., Naugatuck Connecticut. An addition in 1990, designed by Fletcher Thompson, Bridgeport, Connecticut added roofs number 5, 6 & B. The New Milford Public School system opted to not test for any environmental impact, at this time. However, if asbestos containing material is found, the cost of remediation is negligible as no containment or air testing is required. SPA has assumed typical asbestos remediation/abatement in our proposed estimates. All of this information was invaluable and utilized as part of this study. The collected data was organized and appears in sections of this report in the form of written narratives and graphic images. Silver Petrucelli also coordinated a field inspection in late October 2024 for access and observations/ understanding of the existing roof conditions and interior conditions of the facility.

SECTION III - EXISTING CONSTRUCTION

Designs for the New Milford Northville Elementary School were completed in March of 1980 and construction began immediately thereafter. The 1 story structure has a brick exterior with a combination of flat (low sloped) roofs (roofs 1, 2, 3 , 4 & 8) and a very prominent sloped roof (roof A), with the low sloped roofs being covered with ballasted black EPDM roofing membrane while the sloped roof (roof A) is covered in dark brown asphalt shingles. The original 1980 school also has a one story canopy (roof 7), on the North side of the facility, which also has a ballasted black EPDM membrane roof. The large, significant sloped roof running East-West (roof A) is very prominent from Hipp Road. The 1990 addition, which added classrooms and a gymnasium, utilized a white single ply membrane roof over the classroom (roofs 5&6) and dark brown asphalt shingles over the gymnasium (roof B). The final total roof area is 90,532 s.f. consisting of 63,989 s.f. of low slope roof and 26,543 s.f. of sloped roof surfaces. There is also a very prominent standing seam metal wall panel around the perimeter of the school structure, approximately 48" high. This wall panel ends at the roof metal gravel stop.

The Building Structure:

The New Milford Northville Elementary School is a type 2B construction which means that the structure is constructed of non-combustible materials. The Super structure of the facility consists of Concrete footings, foundations & floor slabs, steel columns, load bearing masonry walls, steel beams and or metal deck for the roof structure. The exterior walls of the facility consist of a 4" brick veneer and a load bearing concrete block backup wall. The interior walls consist predominately of concrete block or brick, depending on the location.

Exterior Brick & Concrete Block walls – sloped roof A

Exterior Brick & Concrete Block walls – sloped roof B

1980, Low Slope Roofs (ballasted single ply membrane):

The original 1980 building included low sloped roofs 1, 2, 3, 4 & 8 totaling 56,217 s.f. These roofs are constructed with a ballasted single ply roofing membrane atop a slip sheet. This membrane is placed upon approximately 3" rigid insulation fastened to a 1.5" sloped metal deck. This sloped metal deck sits atop steel framing consisting of sloped W steel sections or sloped steel joists. This 1/8"/ft slope structure provide the code complaint slope for the roof which was complaint at the time of construction. Various wood blocking and flashing was utilized along with a metal gravel stop at all perimeters. There are numerous roof drains, mechanical units, vent stacks & pitch boxes on all roof surfaces.

1980, Sloped Roofs (asphalt shingles):

The original 1980 building included a large, sloped roof (roof A) running East to West totaling 18,022 s.f.. This roof is currently covered with asphalt shingles, however, the original construction showed standing seam metal roofing as the roof covering. Below this covering is 3" rigid insulation atop 1.5" metal deck fastened to steel trusses constructed of W sections of steel and steel angels. Roof A is an asymmetrical gable roof with one side sloped at 3.64/12 where the other side is sloped at 56 degrees. There is (2) 2x4 wood blocking placed up the slope at 4'-0" o.c., likely giving a nailing plate for the standing seam fasteners/clips. Currently, there is a layer of plywood above the rigid insulation which acts as the sheathing for the asphalt shingles. Without destructive testing, building paper or ice/water shield below these shingles could not be confirmed, but standard building practice at the time would likely have included this. There are numerous vent stacks, and metal gravel stops on this roof. There is also a 6"x5" aluminum gutter on both low sides of this roof with numerous aluminum downspouts to grade providing drainage for this roof.

1980, Low Slope Canopy Roof (ballasted single ply membrane):

The original 1980 building included low sloped roofs 7, totaling 3,424 s.f., which is the entry canopy for the school. This roof is constructed with a ballasted single ply roofing membrane atop a slip sheet. This membrane is placed upon approximately 1" rigid insulation fastened to a 2" T&G wood deck. This wood deck sits atop steel framing consisting of tubular steel purlins and tubular steel perimeter bearing on tubular steel columns. There is a metal gravel stop at all perimeters along with perimeter aluminum gutters and downspouts to remove water from this roof. This canopy is constructed from painted steel columns, tubes & beams.

1990, Low Slope Roofs (ballasted single ply membrane):

The 1990 additions included low sloped roofs 5& 6 totaling 4,348 s.f. These roofs are constructed with a fully adhered single ply roofing membrane. This membrane is placed upon approximately 3" rigid insulation fastened to a 1.5" sloped metal deck. This sloped metal deck sits atop steel framing consisting of sloped W steel sections or sloped steel joists. This 1/8"/ft slope structure provide the code complaint slope for the roof which was compliant at the time of construction. Various wood blocking and flashing was utilized along with a metal gravel stop at all perimeters. There are numerous roof drains, mechanical units, vent stacks & pitch boxes on all roof surfaces. A wooden curb constructed to double 2x10 wood blocking capped with metal coping, separates roofs 5 & 4. A through wall overflow scupper is paced adjacent to the one drain on roof 5.

1990, Sloped Roofs (asphalt shingles):

The 1990 addition included a large, sloped roof (roof B) over the gymnasium totaling 8,521 s.f.. This roof is currently covered with asphalt shingles and the original construction also showed asphalt shingles as the roof covering. Below this covering is plywood, 1.5" air space & 3" rigid insulation atop 1.5" metal deck fastened to steel trusses constructed of W sections of steel and steel angels. Roof B is a gable roof with a 4/12 slope. Without destructive testing, building paper or ice/water shield below these shingles could not be confirmed, but standard building practice at the time of construction would likely have included this. There are numerous vent stacks, and metal gravel stops on this roof. There is also a 6"x5" aluminum gutter on both low sides of this roof with numerous aluminum downspouts to grade providing drainage for this roof.

Around the perimeter of the facility, just below the roof, is a metal standing seam fascia. This fascia varies in height but is typically about 48" tall. The standing seam metal panels are supported by wood sheathing, which is supported by wood blocking fastened to the 8" concrete block masonry wall. This detail was likely incorporated to minimize the amount of red brick veneer used for the facility. The roof gravel stop caps off this fascia.

Roo f5, low slope single ply membrane roof

low slope roof 4 (note standing seam metal fascia panel)

Can Canopy of North side of Building

Failed metal standing seam panels & soffit

Failed metal standing seam panels

Typical roof drain – roof 1 (trees overhanging roof above)

SECTION IV - OBSERVATIONS

On Thursday, October 31, 2024, SPA inspected the roofs and roofing components of Northville Elementary school for wear, condition and future longevity.

The Building Structure:

The existing super-structure including the masonry walls, steel columns, steel roof beam, steel roof joists and steel roof trusses all appear to be in sound condition. We did not observe any locations where significant water damage has affected any of the steel superstructure nor any of the 1.5" structural metal roof deck or wood deck at the canopy .However, not all undersides of roof were inspected due to limited viewing opportunities without destructive demolition.

Low Slopped Roofs (with ballasted and non-ballasted EPDM membrane):

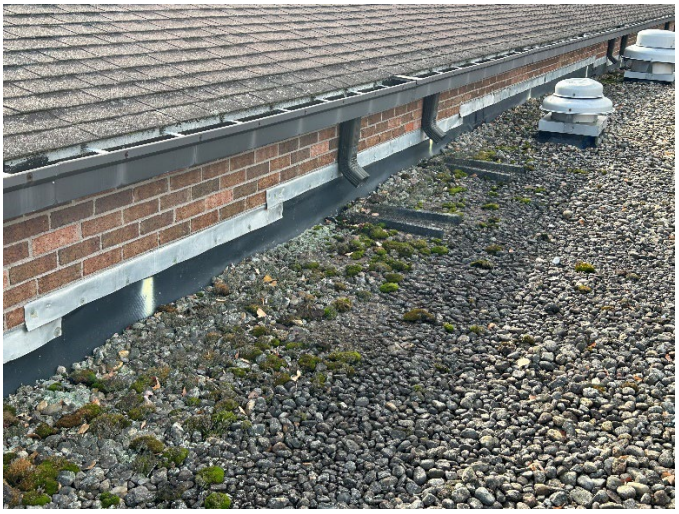
The 63,989 s.f. of Low slope EPDM membrane roofs (ballasted and non-ballasted) at Northville Elementary School (roofs 1, 2, 3, 4, 5, 6 & 7) are generally in poor condition. It is the opinion of SPA that these roofs are the original roofs to the facility making them 30-40 years old, depending on location. Equally, the perimeter metal flashing and EPDM counter flashings are also in poor condition. There was considerate ponding (or signs of ponding in the past) on many of the low sloped roofs on the day of our site visit, indicating that the roofs are not adequately sloping/draining to the existing roof drains. Numerous trees were also noted as overhanging the roof, with many leaves/debris present on the roof surfaces and in the drains. The Mechanical 28 curbs, 4 pitch boxes and 25 vent stacks are also in poor condition. The 40 roof drains, which all appear to be original, are in poor condition and do not have much serviceable life left in them. There are numerous EPDM patches throughout the roof areas indicating leaks that were present in the past. Not only has the EPDM membrane reached the end of its useful life, the EPDM seams, in numerous locations have failed, creating additional pathways for the water to infiltrate the facility.

It appears that the 40 existing roof drains had not been replaced or modified over the last 40 years ago, and therefore, all of the drains are original to the building. Based on visual observation of these drain, they all appear to be in poor condition. There is also no secondary drainage system designed into the current Northville School roof system and therefore, should any roof drain fail, it would flow over the perimeter metal gravel stop.

Lastly, the perimeter metal standing seam fascia is in poor condition and should be replaced as part of any future roofing operations. Various locations of these panels are rusted/rotted and there is no remedy for repairing them, therefore, replacement is the only option. Most of the vented screens at the bottom edge of these panels, is missing and or rotted/failed.

Significant ponding on low slope roofs – roof 7 (canopy)

moss growth is an indication of standing water



moss growth is an indication of standing water

typical condition of low sloped ballasted membrane

Roof transition between roofs 4 & 5

Typical HVAC exhaust fan detail

Slopped Roofs (asphalt shingles on wood deck):

The 26,543 s.f. of sloped asphalt shingles at Northville School (roofs A&B) are generally in very poor condition. It is the opinion of SPA that these roofs are the original roofs to the facility making them 30-40 years old, depending on their location .Many of the shingles are showing signs of overheating resulting in cracking/failing & sliding. This is likely due to the fact that there is no ventilation below these shingles, which is now an IBC code requirement. Equally, the perimeter metal flashing & aluminum gutters/downspouts are in marginal condition and should be replaced along with the roof shingles. The one built in gutter on the north side of roof B should be eliminated and roofed over to avoid future water infiltration opportunities.

General condition of sloped roof & gutters/downspouts

Typical condition of sloped asphalt shingle roofs

Failed Asphalt shingle at sloped roofs

failed, curling & lifting asphalt shingles – sloped roofs

SECTION V – RECOMMENDATIONS & ESTIMATES

Based on the above observance & information, SPA recommends a full roof replacement, down to the existing structural metal roof deck, with new code complaint insulation, membranes, roof drains etc. We recommend that the district do this work as soon as possible due to the conditions listed above. We have analyzed 4 options which are highlighted below:

Option 1: EPDM on low sloped roofs. Asphalt shingles on sloped roofs.

Low Sloped Roofs (with EPDM membrane):

- Remove existing Ballast on all roof except 5 & 6
- Remove existing EPDM membrane
- Remove existing rigid insulation below membrane
- Remove and replace all wood blocking & perimeter gravel stop/metal flashing
- Remove & replace existing 40 roof drains
- Remove & replace existing 28 HVAC exhaust fan wood curbs/flashing
- Remove & replace 4 existing pitch boxes
- Remove & replace 23 existing vent stack flashings
- Remove and replace all aluminum gutters & downspouts
- Remove & replace perimeter standing seam metal fascia
- Clean & inspect existing roof deck
- Install 5” rigid insulation to meet R-30 energy code requirement
- Install 1/8” tapered insulation meeting the current IBC building code
- Install new recovery board
- Install new EPDM roofing membrane (adhesive applied)
- Scrape, prime and paint all steel at canopy
- Repair all damaged exterior soffits
- Entire system to be a minimum warranty of 20 years

Sloped Roofs (with asphalt shingles):

- Remove & replace 2 existing vent stack flashings
- Remove existing asphalt shingles & building paper/ice & water shield
- Remove existing built -in gutter on North Side
- Remove and replace all aluminum gutters & downspouts
- Clean & inspect existing roof deck
- Install new vented nailable deck board
- Install new Ice & water shield over all wood decks
- Install new Asphalt shingles
- Entire system to be a minimum warranty of 30 years

Option 1 – Opinion of Probable Construction

Northville Elementary School Roof Replacement — 14-Nov-24

22 Hipp Road, New Milford CT

Owner: Town of New Milford — JOB NO:24.169

OPINION OF PROBABLE CONSTRUCTION COST — Option 1 - Asphalt Shingle-EPDM Roofing Membrane

90,532 (SQUARE FEET) — CT STATE PROJECT #

SECTION NUMBER	WORK CATEGORIES	QTY.	UNIT	MATERIAL COST UNIT $	MATERIAL COST TOTAL	LABOR COST UNIT $	LABOR COST TOTAL	ALLOWANCE	TOTAL $	CT INELIGIBLE
	OTHER COSTS									
	STATE PERMIT FEE (.26 PER 1,000)	1	LS						$92	$92
				OTHER SUB-TOTAL				$92		TOTAL: $92
	DIVISION TWO									
	DUMPSTERS	20	EA	$1,000.00	$20,000				$20,000	$0
	EXISTING FLAT ROOF	63,989	SF		$0	$1.00	$63,989		$63,989	$0
	ASPHALT SHINGLES	26,543	SF			$1.50			$39,815	$0
	DEMO - WOOD BLOCKING	2,050	LF	$0.00	$0	$7.00	$14,350		$14,350	$0
	DEMO GUTTERS/DOMNSPOUTS	1800	LF	$0.00	$0	$5.00	$9,000		$9,000	$0
	DEMO VENT STACKS	25	EA	$0.00	$0	$25.00	$625		$625	$0
	DEMO ROOF DRAINS	40	EA	$0.00	$0	$50.00	$2,000		$2,000	$0
	DEMO PITCH BOX	4	EA	$0.00	$0	$20.00	$80		$80	$0
	DEMO EXHAUST FAN CURBS	28	EA	$0.00	$0	$200.00	$5,600		$5,600	$0
	DEMO METAL GRAVEL STOP	2050	SF	$0.00	$0	$2.00	$4,100		$4,100	$0
	DEMO METAL STANDING SEAM FASCIA	13400	SF	$0.00	$0	$15.00	$201,000		$201,000	$0
	DEMO ROOF BALLAST	56217	SF	$0.00	$0	$1.25	$70,271		$70,271	$0
				DIVISION TWO SUB-TOTAL				$439,030		TOTAL: $0
	DIVISION FIVE									
	METAL GRAVEL STOP	2,050	LF	$15.00	$30,750	$9.00	$18,450		$49,200	$0
	SAW CUTTING FOR REGLETS & METAL	500	LF	$4.45	$2,225	$4.00	$2,000		$4,225	$0
	METAL FASCIA PANELS	13,400	SF	$15.00	$201,000	$8.50	$113,900		$314,900	$314,900
	5% TOTAL DECK REPLACEMENT ALLOWANCE	1	EA				$10,000		$ 10,000	$ 10,000
				DIVISION FIVE SUB-TOTAL				$378,325		TOTAL: $324,900
	DIVISION SIX									
	PERIMETER WOOD BLOCKING	9,000	BF	$3.00	$27,000	$2.00			$27,000	$0
	MECH. UNIT WOOD BLOCKING	200	BF	$3.50	$700	$2.00	$400		$1,100	$0
	VENTED NAILABLE DECK BOARD	26,543	SF	$4.00	$106,172	$2.00	$53,086		$159,258	$0
				DIVISION SIX SUB-TOTAL				$ 187,358		TOTAL: $0
	DIVISION SEVEN									
	BASE LAYER INSULATION (5" THICK)	63,989	SF	$4.00	$255,956	$3.00	$191,967		$447,923	$0
	TAPERED INSULATION INSULATION (1/8")	63,989	SF	$2.00	$127,978	$1.50	$95,984		$223,962	$0
	COVERBOARD	63,989	SF	$2.00	$127,978	$2.00	$127,978		$255,956	$0
	EPDM ROOFING MEMBRANE	63,989	SF	$3.25	$207,964	$3.00	$191,967		$399,931	$0
	ASPHALT SHINGLES	26,543	SF	$4.00	$106,172	$5.00	$132,715		$238,887	$0
	ICE & WATER	26,543	SF	$2.50	$66,358	$2.50	$66,358		$132,715	$0
	VENT STACK FLASHING	25	EA	$100.00	$2,500	$25.00	$625		$3,125	$0
	PITCH BOX FLASHING	4	EA	$100.00	$400	$25.00	$100		$500	$0
	EXHAUST FAN FLASHING	28	EA	$50.00	$1,400	$20.00	$560		$1,960	$0
	SEALANTS	1	LS						$5,000	$0
	MISC ROOF ACCESSORIES	1	LS						$3,000	$0
	ADHESIVES	1	LS						$6,500	$0
	SCRAPE, PRIME AND PAINT CANOPY	1	LS						$10,000	$10,000
	REPAIR EXTERIOR ENTRY SOFFITS	1	LS						$8,500	$8,500
				DIVISION SEVEN SUB-TOTAL				$1,737,959		TOTAL: $18,500
	DIVISION FIFTEEN									
	ROOF DRAIN & SUMP	40	EA	$400.00	$16,000	$300.00	$12,000		$28,000	$0
	ROOF SCUPPER	6	EA	$200.00	$1,200	$600.00	$3,600		$4,800	$0
	ALUMINUM GUTTERS AND DOWNSPOUTS	1,800	LF	$16.00	$28,800	$6.00	$10,800		$39,600	$0
				DIVISION FIFTEEN SUB-TOTAL				$72,400		TOTAL: $0
							SUBTOTAL =		$2,815,164	TOTAL: $343,492
	CONSTRUCTION COST PER SQUARE FOOT =	$38.87								
							GEN. CONDITIONS	10.00%	$281,516	$27,479
							OVERHEAD & PROFIT	15.00%	$422,275	$41,219
							Subtotal		$3,518,954	
							CONSTRUCTION TOTAL =		$3,518,954	TOTAL: $412,190
							A/E FEES =		$123,163	$12,022
							ENVIRONMENTAL FEE		$50,000	$4,881
							CONTINGENCY =	10%	$351,895	$351,895
							GRAND TOTAL		$4,044,013	TOTAL: $780,989

SILVER/PETRUCELLI + ASSOCIATES
Architects & Engineers

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Hamden, CT 06518
Phone: 203 230 9007 ext. 203
Fax: 203 230 8247
www.silverpetrucelli.com

Option 2: 2 ply modified on low sloped roofs. Asphalt shingles on sloped roofs

Low Sloped Roofs (with 2 ply modified membrane):

- Remove existing Ballast on all roof except 5 & 6
- Remove existing EPDM membrane
- Remove existing rigid insulation below membrane
- Remove and replace all wood blocking & perimeter gravel stop/metal flashing
- Remove & replace existing 40 roof drains
- Remove & replace existing 28 HVAC exhaust fan wood curbs/flashing
- Remove & replace 4 existing pitch boxes
- Remove & replace 23 existing vent stack flashings
- Remove and replace all aluminum gutters & downspouts
- Remove & replace perimeter standing seam metal fascia
- Clean & inspect existing roof deck
- Install 5" rigid insulation to meet R-30 energy code requirement
- Install 1/8" tapered insulation meeting the current IBC building code
- Install new recovery board
- Install new 2 ply modified bitumen roofing membrane (cold asphalt applied)
- Scrape, prime and paint all steel at canopy
- Repair all damaged exterior soffits
- Entire system to be a minimum warranty of 20 years

Sloped Roofs (with asphalt shingles):

- Remove & replace 2 existing vent stack flashings
- Remove existing asphalt shingles & building paper/ice & water shield
- Remove existing built -in gutter on North Side
- Remove and replace all aluminum gutters & downspouts
- Clean & inspect existing roof deck
- Install new vented nailable deck board
- Install new Ice & water shield over all wood decks
- Install new Asphalt shingles
- Entire system to be a minimum warranty of 30 years

Option 2 – Opinion of Probable Construction

Northville Elementary School Roof Replacement — 14-Nov-24

22 Hipp Road, New Milford CT

Owner: Town of New Milford — JOB NO:24.169

OPINION OF PROBABLE CONSTRUCTION COST — Option 2 - Asphalt Shingle-2 ply modified Roofing Membrane

90,532 (SQUARE FEET) — CT STATE PROJECT #

SECTION NUMBER	WORK CATEGORIES	QTY.	UNIT	MATERIAL COST UNIT $	MATERIAL COST TOTAL	LABOR COST UNIT $	LABOR COST TOTAL	ALLOWANCE	TOTAL $	CT INELIGIBLE
	OTHER COSTS									
	STATE PERMIT FEE (.26 PER 1,000)	1	LS						$98	$98
				OTHER SUB-TOTAL				$98		TOTAL: $98
	DIVISION TWO									
	DUMPSTERS	20	EA	$1,000.00	$20,000				$20,000	$0
	EXISTING FLAT ROOF	63,989	SF		$0	$1.00	$63,989		$63,989	$0
	ASPHALT SHINGLES	26,543	SF			$1.50			$39,815	$0
	DEMO - WOOD BLOCKING	2,050	LF	$0.00	$0	$7.00	$14,350		$14,350	$0
	DEMO GUTTERS/DOMNSPOUTS	1800	LF	$0.00	$0	$5.00	$9,000		$9,000	$0
	DEMO VENT STACKS	25	EA	$0.00	$0	$25.00	$625		$625	$0
	DEMO ROOF DRAINS	40	EA	$0.00	$0	$50.00	$2,000		$2,000	$0
	DEMO PITCH BOX	4	EA	$0.00	$0	$20.00	$80		$80	$0
	DEMO EXHAUST FAN CURBS	28	EA	$0.00	$0	$200.00	$5,600		$5,600	$0
	DEMO METAL GRAVEL STOP	2050	SF	$0.00	$0	$2.00	$4,100		$4,100	$0
	DEMO METAL STANDING SEAM FASCIA	13400	SF	$0.00	$0	$15.00	$201,000		$201,000	$0
	DEMO ROOF BALLAST	56217	SF	$0.00	$0	$1.25	$70,271		$70,271	$0
				DIVISION TWO SUB-TOTAL				$439,030		TOTAL: $98
	DIVISION FIVE									
	METAL GRAVEL STOP	2,050	LF	$15.00	$30,750	$9.00	$18,450		$49,200	$0
	SAW CUTTING FOR REGLETS & METAL	500	LF	$4.45	$2,225	$4.00	$2,000		$4,225	$0
	METAL FASCIA PANELS	13,400	SF	$15.00	$201,000	$8.50	$113,900		$314,900	$314,900
	5% TOTAL DECK REPLACEMENT ALLOWANCE	1	EA				$10,000		$ 10,000	$ 10,000
				DIVISION FIVE SUB-TOTAL				$378,325		TOTAL: $324,900
	DIVISION SIX									
	PERIMETER WOOD BLOCKING	9,000	BF	$3.00	$27,000	$2.00			$27,000	$0
	MECH. UNIT WOOD BLOCKING	200	BF	$3.50	$700	$2.00	$400		$1,100	$0
	VENTED NAILABLE DECK BOARD	26,543	SF	$4.00	$106,172	$2.00	$53,086		$159,258	$0
				DIVISION SIX SUB-TOTAL				$ 187,358		TOTAL: $0
	DIVISION SEVEN									
	BASE LAYER INSULATION (5" THICK)	63,989	SF	$4.00	$255,956	$3.00	$191,967		$447,923	$0
	TAPERED INSULATION INSULATION (1/8")	63,989	SF	$2.00	$127,978	$1.50	$95,984		$223,962	$0
	COVERBOARD	63,989	SF	$2.00	$127,978	$2.00	$127,978		$255,956	$0
	2 PLY MODIFIED ROOFING MEMBRANE	63,989	SF	$4.25	$271,953	$5.25	$335,942		$607,896	$0
	ASPHALT SHINGLES	26,543	SF	$4.00	$106,172	$5.00	$132,715		$238,887	$0
	ICE & WATER	26,543	SF	$2.50	$66,358	$2.50	$66,358		$132,715	$0
	VENT STACK FLASHING	25	EA	$100.00	$2,500	$25.00	$625		$3,125	$0
	PITCH BOX FLASHING	4	EA	$100.00	$400	$25.00	$100		$500	$0
	EXHAUST FAN FLASHING	28	EA	$50.00	$1,400	$20.00	$560		$1,960	$0
	SEALANTS	1	LS						$5,000	$0
	MISC ROOF ACCESSORIES	1	LS						$3,000	$0
	SCRAPE, PRIME AND PAINT CANOPY	1	LS						$10,000	$10,000
	REPAIR EXTERIOR ENTRY SOFFITS	1	LS						$8,500	$8,500
				DIVISION SEVEN SUB-TOTAL				$1,939,423		TOTAL: $18,500
	DIVISION FIFTEEN									
	ROOF DRAIN & SUMP	40	EA	$400.00	$16,000	$300.00	$12,000		$28,000	$0
	ROOF SCUPPER	6	EA	$200.00	$1,200	$600.00	$3,600		$4,800	$0
	ALUMINUM GUTTERS AND DOWNSPOUTS	1,800	LF	$16.00	$28,800	$6.00	$10,800		$39,600	$0
				DIVISION FIFTEEN SUB-TOTAL				$72,400		TOTAL: $0
						SUBTOTAL =			$3,016,634	TOTAL: $343,596
	CONSTRUCTION COST PER SQUARE FOOT =	$41.65								
						GEN. CONDITIONS	10.00%		$301,663	$27,488
						OVERHEAD & PROFIT	15.00%		$452,495	$41,232
						Subtotal			$3,770,792	
						CONSTRUCTION TOTAL =			**$3,770,792**	TOTAL: $412,315
						A/E FEES =			$131,978	$12,026
						ENVIRONMENTAL FEE			$50,000	$4,556
						CONTINGENCY =	10%		$377,079	$377,079
						GRAND TOTAL			**$4,329,849**	TOTAL: $805,976

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Option 3: EPDM on low sloped roofs. Standing seam on sloped roofs.

Low Sloped Roofs (with EPDM membrane):

- Remove existing Ballast on all roof except 5 & 6
- Remove existing EPDM membrane
- Remove existing rigid insulation below membrane
- Remove and replace all wood blocking & perimeter gravel stop/metal flashing
- Remove & replace existing 40 roof drains
- Remove & replace existing 28 HVAC exhaust fan wood curbs/flashing
- Remove & replace 4 existing pitch boxes
- Remove & replace 23 existing vent stack flashings
- Remove and replace all aluminum gutters & downspouts
- Remove & replace perimeter standing seam metal fascia
- Clean & inspect existing roof deck
- Install 5" rigid insulation to meet R-30 energy code requirement
- Install 1/8" tapered insulation meeting the current IBC building code
- Install new recovery board
- Install new EPDM roofing membrane (adhesive applied)
- Scrape, prime and paint all steel at canopy
- Repair all damaged exterior soffits
- Entire system to be a minimum warranty of 20 years

Sloped Roofs (with standing seam):

- Remove & replace 2 existing vent stack flashings
- Remove existing asphalt shingles & building paper/ice & water shield
- Remove existing built -in gutter on North Side
- Remove and replace all aluminum gutters & downspouts
- Clean & inspect existing roof deck
- Install new vented nailable deck board
- Install new Ice & water shield over all wood decks
- Install new standing seam metal roof system
- Entire system to be a minimum warranty of 30 years

Option 3 – Opinion of Probable Construction

Northville Elementary School Roof Replacement — 14-Nov-24

22 Hipp Road, New Milford CT

Owner: Town of New Milford — JOB NO:24.169

OPINION OF PROBABLE CONSTRUCTION COST — Option 3- Standing Seam-EPDM Roofing Membrane

90,532 (SQUARE FEET) — CT STATE PROJECT #

SECTION NUMBER	WORK CATEGORIES	QTY.	UNIT	MATERIAL COST UNIT $	MATERIAL COST TOTAL	LABOR COST UNIT $	LABOR COST TOTAL	ALLOWANCE	TOTAL $	CT INELIGIBLE
	OTHER COSTS									
	STATE PERMIT FEE (.26 PER 1,000)	1	LS						$103	$103
				OTHER SUB-TOTAL				$103		TOTAL: $103
	DIVISION TWO									
	DUMPSTERS	20	EA	$1,000.00	$20,000				$20,000	$0
	EXISTING FLAT ROOF	63,989	SF		$0	$1.00	$63,989		$63,989	$0
	ASPHALT SHINGLES	26,543	SF			$1.50			$39,815	$0
	DEMO - WOOD BLOCKING	2,050	LF	$0.00	$0	$7.00	$14,350		$14,350	$0
	DEMO GUTTERS/DOMNSPOUTS	1800	LF	$0.00	$0	$5.00	$9,000		$9,000	$0
	DEMO VENT STACKS	25	EA	$0.00	$0	$25.00	$625		$625	$0
	DEMO ROOF DRAINS	40	EA	$0.00	$0	$50.00	$2,000		$2,000	$0
	DEMO PITCH BOX	4	EA	$0.00	$0	$20.00	$80		$80	$0
	DEMO EXHAUST FAN CURBS	28	EA	$0.00	$0	$200.00	$5,600		$5,600	$0
	DEMO METAL GRAVEL STOP	2050	SF	$0.00	$0	$2.00	$4,100		$4,100	$0
	DEMO METAL STANDING SEAM FASCIA	13400	SF	$0.00	$0	$15.00	$201,000		$201,000	$0
	DEMO ROOF BALLAST	56217	SF	$0.00	$0	$1.25	$70,271		$70,271	$0
				DIVISION TWO SUB-TOTAL				$439,030		TOTAL: $0
	DIVISION FIVE									
	METAL GRAVEL STOP	2,050	LF	$15.00	$30,750	$9.00	$18,450		$49,200	$0
	SAW CUTTING FOR REGLETS & METAL	500	LF	$4.45	$2,225	$4.00	$2,000		$4,225	$0
	METAL FASCIA PANELS	13,400	SF	$15.00	$201,000	$8.50	$113,900		$314,900	$314,900
	5% TOTAL DECK REPLACEMENT ALLOWANCE	1	EA				$10,000		$ 10,000	$ 10,000
				DIVISION FIVE SUB-TOTAL				$378,325		TOTAL: $324,900
	DIVISION SIX									
	PERIMETER WOOD BLOCKING	9,000	BF	$3.00	$27,000	$2.00			$27,000	$0
	MECH. UNIT WOOD BLOCKING	200	BF	$3.50	$700	$2.00	$400		$1,100	$0
	VENTED NAILABLE DECK BOARD	26,543	SF	$4.00	$106,172	$2.00	$53,086		$159,258	$0
				DIVISION SIX SUB-TOTAL				$ 187,358		TOTAL: $0
	DIVISION SEVEN									
	BASE LAYER INSULATION (5" THICK)	63,989	SF	$4.00	$255,956	$3.00	$191,967		$447,923	$0
	TAPERED INSULATION INSULATION (1/8")	63,989	SF	$2.00	$127,978	$1.50	$95,984		$223,962	$0
	COVERBOARD	63,989	SF	$2.00	$127,978	$2.00	$127,978		$255,956	$0
	EPDM ROOFING MEMBRANE	63,989	SF	$3.25	$207,964	$3.00	$191,967		$399,931	$0
	STANDING SEAM ROOF PANELS	26,543	SF	$9.50	$252,159	$12.00	$318,516		$570,675	$0
	ICE & WATER	26,543	SF	$2.50	$66,358	$2.50	$66,358		$132,715	$0
	VENT STACK FLASHING	25	EA	$100.00	$2,500	$25.00	$625		$3,125	$0
	PITCH BOX FLASHING	4	EA	$100.00	$400	$25.00	$100		$500	$0
	EXHAUST FAN FLASHING	28	EA	$50.00	$1,400	$20.00	$560		$1,960	$0
	SEALANTS	1	LS						$5,000	$0
	MISC ROOF ACCESSORIES	1	LS						$3,000	$0
	SCRAP, PRIME AND PAINT CANOPY	1	LS						$10,000	$10,000
	REPAIR EXTERIOR ENTRY SOFFITS	1	LS						$8,500	$8,500
	ADHESIVES	1	LS						$6,500	$0
				DIVISION SEVEN SUB-TOTAL				$2,069,746		TOTAL: $18,500
	DIVISION FIFTEEN									
	ROOF DRAIN & SUMP	40	EA	$400.00	$16,000	$300.00	$12,000		$28,000	$0
	ROOF SCUPPER	6	EA	$200.00	$1,200	$600.00	$3,600		$4,800	$0
	ALUMINUM GUTTERS AND DOWNSPOUTS	1,800	LF	$16.00	$28,800	$6.00	$10,800		$39,600	$0
				DIVISION FIFTEEN SUB-TOTAL				$72,400		TOTAL: $0
						SUBTOTAL =			$3,146,962	TOTAL: $343,503
	CONSTRUCTION COST PER SQUARE FOOT =	$43.45								
						GEN. CONDITIONS	10.00%		$314,696	$27,480
						OVERHEAD & PROFIT	15.00%		$472,044	$41,220
						Subtotal			$3,933,703	
						CONSTRUCTION TOTAL =			$3,933,703	TOTAL: $412,204
						A/E FEES =			$137,680	$12,023
						ENVIRONMENTAL FEE			$50,000	$4,366
						CONTINGENCY =	10%		$393,370	$393,370
						GRAND TOTAL			$4,514,752	TOTAL: $821,963

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Option 4: 2 ply modified on low sloped roofs. Standing seam on sloped roofs

Low Sloped Roofs (with 2 ply modified membrane):

- Remove existing Ballast on all roof except 5 & 6
- Remove existing EPDM membrane
- Remove existing rigid insulation below membrane
- Remove and replace all wood blocking & perimeter gravel stop/metal flashing
- Remove & replace existing 40 roof drains
- Remove & replace existing 28 HVAC exhaust fan wood curbs/flashing
- Remove & replace 4 existing pitch boxes
- Remove & replace 23 existing vent stack flashings
- Remove and replace all aluminum gutters & downspouts
- Remove & replace perimeter standing seam metal fascia
- Clean & inspect existing roof deck
- Install 5" rigid insulation to meet R-30 energy code requirement
- Install 1/8" tapered insulation meeting the current IBC building code
- Install new recovery board
- Install new 2 ply modified bitumen roofing membrane (cold asphalt applied)
- Scrape, prime and paint all steel at canopy
- Repair all damaged exterior soffits
- Entire system to be a minimum warranty of 20 years

Sloped Roofs (with standing seam):

- Remove & replace 2 existing vent stack flashings
- Remove existing asphalt shingles & building paper/ice & water shield
- Remove existing built -in gutter on North Side
- Remove and replace all aluminum gutters & downspouts
- Clean & inspect existing roof deck
- Install new vented nailable deck board
- Install new Ice & water shield over all wood decks
- Install new standing seam metal roof system
- Entire system to be a minimum warranty of 30 years

Option 4 – Opinion of Probable Construction

Northville Elementary School Roof Replacement — 14-Nov-24

22 Hipp Road, New Milford CT

Owner: Town of New Milford — JOB NO:24.169

OPINION OF PROBABLE CONSTRUCTION COST — Option 4 - Standing Seam-2 ply modified Roofing Membrane

90,532 (SQUARE FEET) — CT STATE PROJECT #

SECTION NUMBER	WORK CATEGORIES	QTY.	UNIT	MATERIAL COST UNIT $	MATERIAL COST TOTAL	LABOR COST UNIT $	LABOR COST TOTAL	ALLOWANCE	TOTAL $	CT INELIGIBLE
	OTHER COSTS									
	STATE PERMIT FEE (.26 PER 1,000)	1	LS						$109	$109
				OTHER SUB-TOTAL				$109		TOTAL: $109
	DIVISION TWO									
	DUMPSTERS	20	EA	$1,000.00	$20,000				$20,000	$0
	EXISTING FLAT ROOF	63,989	SF		$0	$1.00	$63,989		$63,989	$0
	ASPHALT SHINGLES	26,543	SF			$1.50			$39,815	$0
	DEMO - WOOD BLOCKING	2,050	LF	$0.00	$0	$7.00	$14,350		$14,350	$0
	DEMO GUTTERS/DOMNSPOUTS	1800	LF	$0.00	$0	$5.00	$9,000		$9,000	$0
	DEMO VENT STACKS	25	EA	$0.00	$0	$25.00	$625		$625	$0
	DEMO ROOF DRAINS	40	EA	$0.00	$0	$50.00	$2,000		$2,000	$0
	DEMO PITCH BOX	4	EA	$0.00	$0	$20.00	$80		$80	$0
	DEMO EXHAUST FAN CURBS	28	EA	$0.00	$0	$200.00	$5,600		$5,600	$0
	DEMO METAL GRAVEL STOP	2050	SF	$0.00	$0	$2.00	$4,100		$4,100	$0
	DEMO METAL STANDING SEAM FASCIA	13400	SF	$0.00	$0	$15.00	$201,000		$201,000	$0
	DEMO ROOF BALLAST	56217	SF	$0.00	$0	$1.25	$70,271		$70,271	$0
				DIVISION TWO SUB-TOTAL				$439,030		TOTAL: $0
	DIVISION FIVE									
	METAL GRAVEL STOP	2,050	LF	$15.00	$30,750	$9.00	$18,450		$49,200	$0
	SAW CUTTING FOR REGLETS & METAL	500	LF	$4.45	$2,225	$4.00	$2,000		$4,225	$0
	METAL FASCIA PANELS	13,400	SF	$15.00	$201,000	$8.50	$113,900		$314,900	$314,900
	5% TOTAL DECK REPLACEMENT ALLOWANCE	1	EA				$10,000		$ 10,000	$ 10,000
				DIVISION FIVE SUB-TOTAL				$378,325		TOTAL: $324,900
	DIVISION SIX									
	PERIMETER WOOD BLOCKING	9,000	BF	$3.00	$27,000	$2.00			$27,000	$0
	MECH. UNIT WOOD BLOCKING	200	BF	$3.50	$700	$2.00	$400		$1,100	$0
	VENTED NAILABLE DECK BOARD	26,543	SF	$4.00	$106,172	$2.00	$53,086		$159,258	$0
				DIVISION SIX SUB-TOTAL				$ 187,358		TOTAL: $0
	DIVISION SEVEN									
	BASE LAYER INSULATION (5" THICK)	63,989	SF	$4.00	$255,956	$3.00	$191,967		$447,923	$0
	TAPERED INSULATION INSULATION (1/8")	63,989	SF	$2.00	$127,978	$1.50	$95,984		$223,962	$0
	COVERBOARD	63,989	SF	$2.00	$127,978	$2.00	$127,978		$255,956	$0
	2 PLY MODIFIED ROOFING MEMBRANE	63,989	SF	$4.25	$271,953	$5.25	$335,942		$607,896	$0
	STANDING SEAM ROOF PANELS	26,543	SF	$9.50	$252,159	$12.00	$318,516		$570,675	$0
	ICE & WATER	26,543	SF	$2.50	$66,358	$2.50	$66,358		$132,715	$0
	VENT STACK FLASHING	25	EA	$100.00	$2,500	$25.00	$625		$3,125	$0
	PITCH BOX FLASHING	4	EA	$100.00	$400	$25.00	$100		$500	$0
	EXHAUST FAN FLASHING	28	EA	$50.00	$1,400	$20.00	$560		$1,960	$0
	SEALANTS	1	LS						$5,000	$0
	MISC ROOF ACCESSORIES	1	LS						$3,000	$0
	SCRAPE, PRIME AND PAINT CANOPY	1	LS						$10,000	$10,000
	REPAIR EXTERIOR ENTRY SOFFITS	1	LS						$8,500	$8,500
				DIVISION SEVEN SUB-TOTAL				$2,268,211		TOTAL: $18,500
	DIVISION FIFTEEN									
	ROOF DRAIN & SUMP	40	EA	$400.00	$16,000	$300.00	$12,000		$28,000	$0
	ROOF SCUPPER	6	EA	$200.00	$1,200	$600.00	$3,600		$4,800	$0
	ALUMINUM GUTTERS AND DOWNSPOUTS	1,800	LF	$16.00	$28,800	$6.00	$10,800		$39,600	$0
				DIVISION FIFTEEN SUB-TOTAL				$72,400		TOTAL: $0
						SUBTOTAL =			$3,345,432	TOTAL: $343,509
	CONSTRUCTION COST PER SQUARE FOOT =	$46.19								
						GEN. CONDITIONS	10.00%		$334,543	$27,481
						OVERHEAD & PROFIT	15.00%		$501,815	$41,221
						Subtotal			$4,181,790	
						CONSTRUCTION TOTAL =			$4,181,790	TOTAL: $412,211
						A/E FEES =			$146,363	$12,023
						ENVIRONMENTAL FEE			$50,000	$4,107
						CONTINGENCY =	10%		$418,179	$418,179
						GRAND TOTAL			$4,796,332	TOTAL: $846,520

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SECTION VI - ESCALATION

Silver Petrucelli & Associates was not told when this project is projected to be constructed. Since our opinion of probable construction costs is based on Construction rates for the year 2024/2025, below is an escalation schedule based on 5% increase per year, which has been the average annual construction increase percentage in Connecticut in recent years. Escalation is due to labor and material increases year after year.

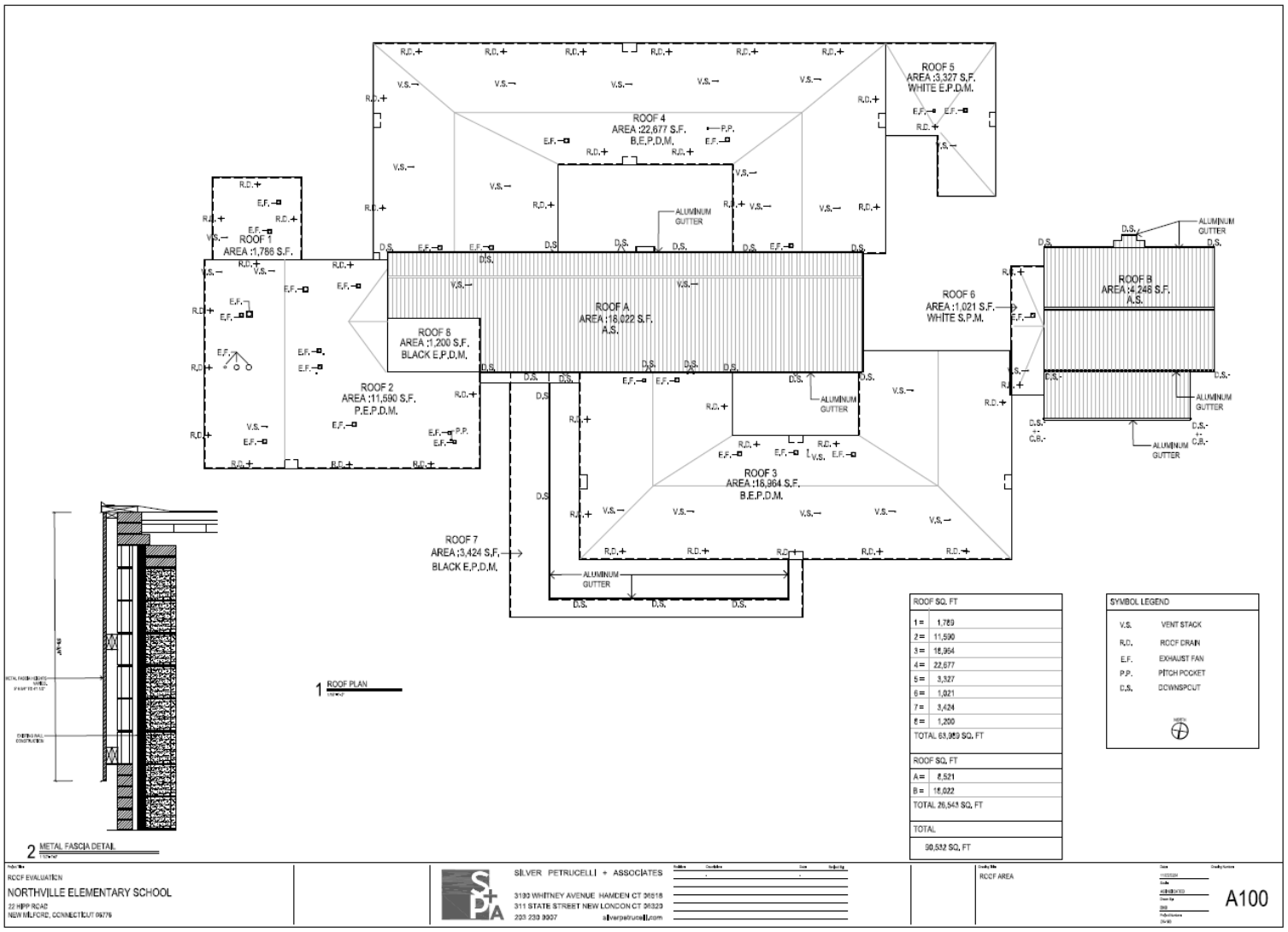
Option: **Year:**

	2024	**2025**	**2026**	**2027**	**2028**	**2029**
Option 1	**$4,044,013**	$4,246,214	$4,458,524	$4,681,450	$4,915,523	$5,161,299
Option 2	**$4,329,849**	$4,546,341	$4,773,658	$5,012,341	$5,262,958	$5,526,106
Option 3	**$4,514,752**	$4,740,490	$4,977,514	$5,226,390	$5,487,709	$5,762,095
Option 4	**$4,796,322**	$5,036,138	$5,287,945	$5,552,342	$5,829,959	$6,121,457

SECTION VII – STATE REIMBURSEMENT PROCESS

School roof replacement projects are eligible for State Reimbursement and are considered “non priority projects” which mean that they are automatically approved once the district submits their on-line application and a State Project Number is issued by the State. Therefore, the Town of New Milford should file for this roof replacement project as soon as funds become available. The Reimbursement rate is adjusted each year by the State of Connecticut. The only items that will not be elibible for reimbursement will be the few items that are non-roof related, such as the standing seam metal fascia panels, the canopy painting work and the exterior soffit repairs. Most all other items should be eligible for reimbursement.

APPENDIX "A" EXISTING ROOF PLAN



New Milford Public Schools HVAC 5 Year Reporting

NEW MILFORD
PUBLIC SCHOOLS
A collaborative partnership of students, educators, family, and community

Prepared by:
Consulting Engineering Services, Inc.
811 Middle Street, Middletown, CT 06457
CES PN 2024151.00

Table of Contents

New Milford Public Schools 5 Year Reporting

Overview

CES was hired by New Milford Public Schools to comply with legislation recently passed by the State of Connecticut to ensure that all schools conduct periodic evaluations of HVAC equipment, with specific attention paid to ventilation within each school. There are a total of five public schools in New Milford that range in age from the 1960s to the newest school, which was built in 2000. The overall goal of this effort is to evaluate HVAC systems at each school to understand how they operate and where repairs or replacements are needed to achieve better indoor air quality.

Objectives and Goals

Objectives

The process for evaluating each school consisted of two main components:

- A thorough review of equipment that introduces outside air, filters air, and systems that exhaust air. This includes but is not limited to: air handlings units (AHUS), rooftop units (RTUs), exhaust fans (EFs), and unit ventilators (UVs).

  - ✓ CES requested and received any documents pertaining to air moving systems such as building HVAC drawings and, where applicable, building automation system documentation. Various levels of documentation were available for each school given the difference in building age. Where documentation was scarce or incomplete, CES worked with facilities staff to understand and document systems.

- Measurements - Documenting airflow (supply, return, outside air, exhaust) by taking comprehensive air measurements in each school. These readings will show actual system performance.

  - ✓ Airflow measurements were taken at all supply diffusers, return and exhaust grills, and outside air intakes. Those measurements were used to calculate outdoor air rates for the existing equipment/spaces.

Goals

1. Document the current operating condition for HVAC systems serving all public schools in New Milford, including damper function, filter status, and system controls. The specific scope for HVAC systems was anything that either brought in outside air or exhausted air from a space with the intent being to evaluate the efficiency of ventilation.
2. Compare and report findings from the equipment evaluation performed by CES with those outlined by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers, or ASHRAE.
3. Compile a list of deficiencies of items that require correction, and recommendations for how to fix them, in order to return the equipment to proper working condition.

5 Year Reporting Requirements Met

1. HVAC Assessment

- ✓ Review of maximum filter efficiency, quantity, condition, and last date of change
- ✓ Verification of ventilation components operation including fans, dampers, filters, etc.
  - Detailed review of fan operation /damper operation / filter condition
  - Applies to RTUs, AHUs, HVs, MAUs, EFs, UVs, FCUs with OA
  - Document sheave sizes, motor nameplate information, belt information, etc. when possible.
- ✓ Verification of unit operation and performance of required maintenance, as it pertains to ventilation.
- ✓ Verification of control sequences
  - Any applicable controls builts available was be provided to CES for review
  - The controls review will be based on what is available through the controls system and any applicable as-builts available.
  - Control sequences were reviewed based on industry standards and through BMS controls where applicable. Observations can be found in the Pictures tab as well as the Master Deficiency and Resolution Log.
- ✓ Verification of carbon dioxide sensors (where applicable)
  - There were no CO2 sensors available for review/verification.
- ✓ Collection of field data for the potential of installation of mechanical ventilation if none exists
  - There were no areas observed where mechanical ventilation does not exist for classroom spaces.
- ✓ Review of current maintenance practices including setpoints and schedules
  - Maintenance practices were discussed with the with the facilities staff. Based on the schools age and condition, there were instances where staff relied on manually turning equipment on and off from a schedule standpoint while other equipment is controlled via BMS.
  - Suggestions were made for regular filter changes and belt changes.

2. Measurements Assessment

- ✓ Measurement of all air distribution inlets and outlets that are accessible for our review
- ✓ Air Handling Equipment total airflow readings (when possible - total Supply Air, Return Air, Outdoor Air, and Exhaust Air readings are taken directly at the units)
- ✓ Static Pressure Profile of each accessible unit
- ✓ Airflow measurement of outside air rate at each unit that delivers outdoor air
- ✓ Physical measurements of each accessible space (to calculate air change rates)
- ✓ Calculations for ventilation rates and outdoor air delivery rates for each space

Process and Report Contents

To kick off the process, CES requested all documentation available including drawings, as-builts and controls program credentials. The schools had various levels of building automation system integration while most had a mixture of systems on the BAS and others operated manually. Working through the summer, we scheduled our work over the course of the summer months. Onsite work included reviewing the respective schools with the facilities staff. Initial site visits focused on physical review of equipment and its components to condition, associated component operation, system/equipment sequence, cleanliness, etc. The second part of our work included taking physical measurements of the equipment airflows to identify levels of ventilation. The goal of this process was to identify the systems, associated condition, operational deficiencies and measurements of airflows. Resulting documentation included the following:

1. Executive Summary (This document)
2. 5 Year Reporting Workbook: One workbook per school with worksheets for the following:
    - Tab 1: Distribution Sheet (Airflow)
    - Tab 2: Air Changes Sheet
    - Tab 3: Unit Totals
    - Tab 4: Notes Page
    - Tab 5: Pictures of existing conditions
    - Tab 6: Issues and Recommendation Log
3. New Milford Schools Workbook: One workbook provided for all schools tabbed as worksheets
    - This Excel Document lists all of the ventilation equipment within the building identifying the associated components, condition, operation and notes.
    - The intent of this workbook is to be used as a tool for the school's facilities staff for reference to equipment, areas served, components present, filter sizes, etc.
4. Roof Overviews for the following Schools as a means of reference.
5. Observation Reports from initial site visits for record.

Schools Assessed

1. Hill and Plains Elementary School
2. Northville Elementary School
3. Sarah Noble Intermediate School
4. Schaghticoke Middle School
5. New Milford High School

Systems Evaluated

1. Roof Top Units – RTUs
2. Air Handling Units – AHUs
3. Unit Ventilators – UVs
4. Outside Air Intake Hoods
5. Kitchen Make Up Air Unit
6. Fan Operation – Supply Fans, Exhaust Fans, Return Fans
7. Damper operation
8. Unit Interiors and Filters – Cleanliness and sizing where available

Systems by School

Hill and Plain

School Description

Hill and Plain Elementary School is a 70,000 sq. ft. school built in the 1960s. Since then it has undergone renovations to upgrade some HVAC equipment, particularly the replacement of exhaust fans. The majority of the school is served by perimeter radiation. All classrooms are served by exhaust fans with the exception of rooms 23 – 26, which are served by a single unit. A total of six cabinet unit heaters serve various vestibules and there is one unit heater in each of the bathrooms adjacent to the gym.

Air Handling Units – AHUs

The AHUs serving the gym provide fresh air to the space and condition it according to the needs within the space. Located on a mechanical mezzanine above the gym floor, these units are available on the BMS with limited controls. There are two AHUs labeled AHU-1 and AHU-2.

Unit Ventilators

The unit ventilators the main source of ventilation available to the school. Typically serving one area, they are mounted above the ceiling, ducted to provide outside air and have a hot water coil to heat air as needed. The following list indicates which unit serves which area:

- UV-1 – physical therapy
- UV-2 – Cafeteria
- UV-3 – Cafeteria
- UV-4 – Teacher's Lounge
- UV-5 – Teacher's Workroom

AC Units

The AC units have heating and cooling coils to condition air as needed for demand within the space. The units are ducted to provide outside air and operate using local controls. ACU-1 serves Room 15b and the Computer Lab. ACU-2 serves the Library.

Exhaust Fans – Classrooms

The classrooms are ducted to bring in outside air passively. There are exhaust fans to remove air from the space and the OA is able to passively move into the spaces along the exterior walls.
Various rooftop and inline exhaust fans provide ventilation for classroom spaces. General maintenance should be performed on all existing fans, and a maintenance schedule for exhaust fans should be created to keep fans in operable conditions.

Conclusions:

Summary: Building systems and equipment are consistent with a building/equipment of this age. Many of the units that provide ventilation air specifically unit ventilators are beyond their useful service life and would benefit from replacement.

Northville Elementary School

School Description

Northville Elementary School is an 80,000 square foot building originally built in 1981.

Air Handling Units (AHUs)

There are seven AHUs that serve common areas and offices including administrative areas, cafeteria, media center, nurse/faculty, and the gym. Each classroom has its own unit ventilator which can bring in outside air and has a heating coil. Exhaust fans are used to remove air from toilets and some classrooms. The units described here are not controlled through the BMS and the heating/cooling coils, as well as unit ventilators, are operated using thermostats in the space.

Exhaust Fans (EFs)

There are 19 exhaust fans listed as serving Northville Elementary School, all of which have local controls, and typically run continuously. These rooftop exhaust fans are in various conditions, as multiple were found non-operational or with damaged / loose belts.

Exhaust fans serve as ventilation for classroom spaces, as well as areas such as restrooms, storage closets, and mechanical spaces. General maintenance should be performed on all existing fans, and a maintenance schedule for exhaust fans should be created to keep fans in operable conditions.

Conclusions:

Summary: Building systems and equipment are consistent with a building/equipment of this age. Exhaust fans are actively being serviced by facilities for belt replacements. The unit ventilators are in serviceable condition but could benefit from replacement and or general maintenance and thermostat upgrades. AHUs are beyond their useful service life and should consider being replaced.

Sarah Noble Intermediate School

School Description

Sarah Noble Intermediate School is a 186,000 sq. ft. building serving grades 4 - 6. The school has undergone several reconfigurations since being renovated from a high school to an intermediate school in 2001. A variety of equipment serves the school including: rooftop units, a makeup air unit, unit ventilators, exhaust fans, variable air volume (VAV) boxes, and fan coil units.

Rooftop Units – RTUs

RTUs serve mostly non-classrooms areas: admin, multi-purpose rooms, library, media center, computer rooms, faculty rooms, and art rooms. The only classrooms served by a rooftop unit are "E" classrooms. Some units have an exhaust fan internal to the unit, others have an associated exhaust fan, and some have no associated exhaust fan. Nearly all units have the ability to bring in outside air, although the components to do so may not be functional. The RTUs are connected to VAV boxes, with a small number of fan-powered VAVs being used in common areas such as corridors and vestibules. All VAVs, including fan powered, have hot water reheat coils.

Exhaust Fans – EFs

The exhaust fans serve most common areas including classrooms, toilets, gym, science rooms, and corridors. Most exhaust fans have been added to the BMS but some remain under local control. Fans of this type typically run continuously.

General maintenance should be performed on all existing fans, and a maintenance schedule for exhaust fans should be created to keep fans in operable conditions.

Unit Ventilators – UVs

The unit ventilators, which are located in classrooms, are comprised of a hot water coil, an outside air/return air damper, and a fan to draw air through the unit. The damper can modulate based on the need within the space and has been set up to provide a minimum amount of outside air, which gets mixed with return air from the space. The unit ventilators are the main source of outside air for the classrooms.

Conclusions:

Summary: Building systems and equipment are consistent with a building/equipment of this age. The equipment surveyed at Sarah Noble was serviceable, but most equipment is in need some level of maintenance. In particular, the exhaust fans serving the schools need to be serviced and some of the unit ventilators need repairs. This work is actively being worked on by facilities staff.

Schaghticoke Middle School

School Description

Schaghticoke Middle School is 155,000 square feet and was originally built in 1973. The school was renovated in 1993 to upgrade a portion of the equipment while some original equipment remains.

Rooftop Units (RTUs), Air Handling Units (AHUs), and Associated

The rooftop and air handling units primarily serving classrooms. Each unit brings in outside air and has the ability to heat air using either an internal or duct-mounted hot water coil. Some AHUs/RTUs also have a cooling coil.

Overall, rooftop air handling units and interior air handling units were observed operational but past their useful service life. The majority of the controls are pneumatic, and dampers/valves are manually manipulated by school facilities staff, when the weather dictates a change. Currently, controls are being provided by multiple vendors (ESC and Siemens), which can be challenging for the end users. Many instances of non-operational dampers and controls were observed during our onsite review. Repair of these conditions is recommended.

Exhaust Fans (EFs)

The exhaust fans are either standalone or work in conjunction with an associated AHU/RTU. They're typically controlled through the BMS when associated with an AHU/RTU and operate manually when standalone.

It is recommended that general maintenance and controls work be performed on existing rooftop exhaust fans at Schaghticoke Middle School. Various belts and pulleys were observed loose or damaged. These issues should be repaired to restore fans back to operating conditions.

A maintenance schedule for exhaust fans should be created to keep fans in operable conditions.

Conclusions:

Summary: Building systems and equipment are consistent with a building/equipment of this age. The units are beyond their service life and are not fully integrated with the BMS. The AHUs located inside the school would be difficult to remove, making replacement much more labor and cost intensive. As such, service and BMS integration is recommended for these units. Additionally, a small number of exhaust fans require service to return them to operable condition. Service and maintenance of the exhaust fans is actively being worked on by the school's facilities department.

New Milford High School

School Description

New Milford High School is a three-story building totaling 285,000 square feet.

Air Handling Units (AHUS), Return Air Fans (RAFs), and Exhaust Fans (EFs)

The AHUs provide all the outside and conditioned air to the school. Downstream of the AHUs are VAVs with hot water reheat coils. Each AHU also has an associated return fan which operates concurrently. In addition to these systems, there are also exhaust fans that serve a variety of spaces including kitchen areas, toilets, and mechanical rooms. All systems reviewed were controlled through the building management system with the exception of fans controlled by the end user (kitchen, kiln, paint hood).

Exhaust Fans (EFs)

There are 32 exhaust fans listed as serving New Milford High School, with a variety of controls. Majority of the school's exhaust fans are integrated with the BMS and can be viewed / manipulated from the BMS head end workstation. These fans are assumed to be newer and in good condition, but many could not be verified during our on-site assessment. Exhaust Fans on the roof were assessed and operationally tested. General maintenance should be performed on all existing fans, and a maintenance schedule for exhaust fans should be created to keep fans in operable conditions.

Conclusions:

Summary: Building systems and equipment are consistent with a building/equipment of this age. This schools' controls platform is more advanced than the other schools benefiting the school with use of BMS for review, servicing, adjustments, etc. Overall, the equipment at New Milford High School is in serviceable condition.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