24-90-R

Northridge Consulting Engineers, Inc.

Roof Condition Report

Documentation, Analysis and Recommendations for the Standing Seam Metal and EPDM Roof Assemblies

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Carroll County
Annex Building
10 County Farm Rd
Ossipee, NH 03864

June 26, 2024

1645 Falmouth Road, Suite 1 F
Centerville, Massachusetts 02632
Phone: 508-790-8190, Fax: 508-790-8862

General Roof Data Sheet

Color Satellite Image Key Plan

Analysis & Documentation of the Metal and EPDM Roof Assemblies

Summary & Recommendations

Restorative Work Outline Sheet

Color Photograph Section

Scale Roof Plan Drawing

General Building Data

Annex Building Address: **10 County Farm Rd in Ossipee, New Hampshire 03864** Northridge # **24-90-R**

Total Building Roof Area: ~ **27,601 sq ft** Roof Access: **Exterior Fixed Ladder** Roof Leaks: **None**

Entranceway Roof: **Vertical Leg Standing Seam Metal Assembly Atop Wood Plank Decking ~ 822 sq ft**

Standing Seam Metal Roof System Data

Roof System Manufacturer: **Butler Manufacturing (# 816-968-3000)** Roof Installation: **Possibly ~ 2010**

Roof Configuration: **Central Ridge on East Wings, SW & South Central Areas** Slope: **~ 1½" per lin ft**

Drains: **No Dedicated Drainage Provision on Any Metal Roof Aside From Valley on East Center Area Sheet Drainage Is Allowed to Free Fall Off the Lower Metal Panel Edges, No Gutter Channels**

Metal Panel Finish: **Galvalume** Metal Roof Insulation: **Vinyl Face Fiberglass** Surface Rust: **None**

Total Metal Roof Areas: **~ 26,181 sq ft** Overlap Seams: **None, Full Length Panels Ridge to Low Edges**

Metal Panel Securement: **Integral, Folded Metal Clips Within The Trapezoidal Standing Seam Profiles**

Note: **Metal Roof Assembly Supported by Steel Framework Installed Directly Atop the Original BUR Limited Inspection of the Steel Frame Member Interface With BUR, Failed to Reveal Fastening**

Note: **Underlying BUR May Contain Asbestos, Limited Access for Test Cuts, BUR Has Gravel Cover**

Ridgeplate: **Elevated, Bowed Metal Panel with Overlap Transverse Seams Pop Rivet Secured in Place**

Panel Note: **Lower Panel Edges Fitted With Custom Formed Metal Batten With Angle Weep Channels**

Flashing Note: **Penetrations Flashed With Variety of Materials, EPDM Membrane, Sealant and Asphalt**

Adhered EPDM Roof System Data

Roof System Manufacturer: **Unknown** Roofs Installed: **Assumed ~ 2015** EPDM Roof Size: **~ 598 sq ft**

System & Membrane: **Fully Adhered, Assumed 60 mil Unreinforced EPDM** Construction Type: **New**

Insulation: **Polyisocyanurate Foam** Drainage: **Free Fall Off Lower Edges** Roof Deck: **Tectum Panels**

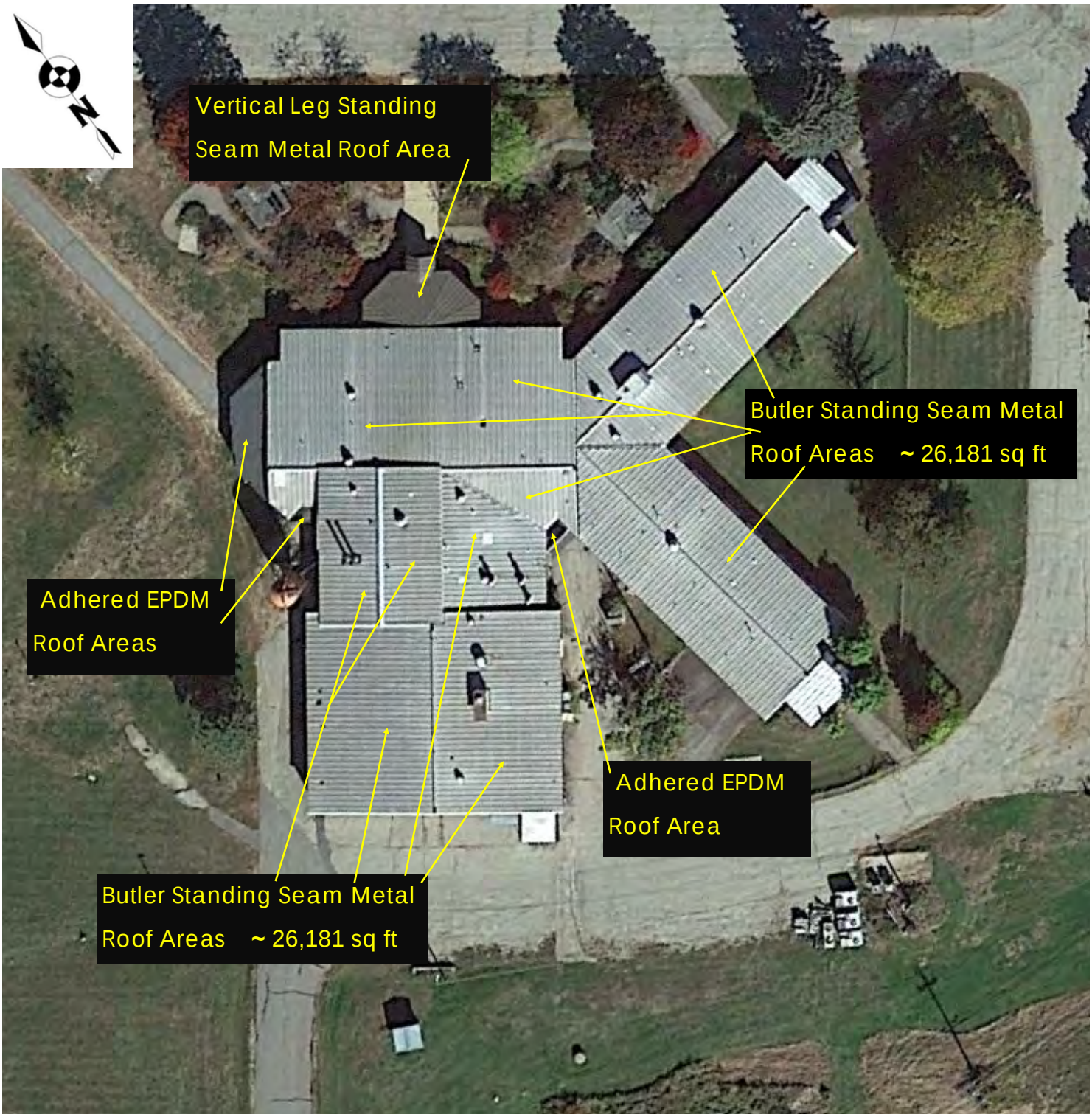
Roof Inspection Data

Name and Title of Northridge Professional Performing the Roofing Inspection: **Frank J. Gilroy, *Field Technician***

Roof Inspection and Report Requested by: **Bob Murray, Director of Maintenance for Carroll County, NH**

Date of the Northridge Roof Inspection: **June 13, 2024** Annex Building Contact Person: **Mellisa Seamans**

Weather Conditions During Northridge Roof Inspection: **Partly Cloudy** Temperature: **74° F** Wind: **Breezy**



2024 Comprehensive Roof Condition Report

KEY PLAN of the Carrol Country Annex Bldg

County Farm Road in Ossipee, New Hampshire

Northridge Consulting Engineers, Inc.

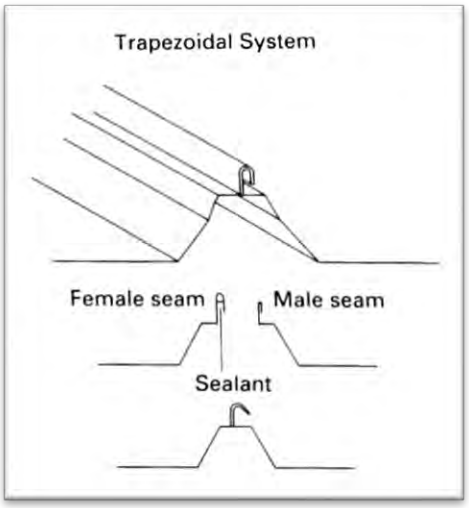
Project # 24-90-R

24-90-R

Analysis, Documentation & Review
of the Trapezoidal Standing Seam Metal
Roof Systems & Adhered EPDM Roof Areas

Comprehensive Inspection and report of the metal roof assemblies and adjacent EPDM roof areas atop the Annex Building was requested by Bob Murray, Director of Maintenance for Carroll County facilities as per the County Commissioners. Such an inspection and report is intended to obtain information regarding the condition of the roofs and the viability of performing restoration work to obtain additional service or replacement with a new roof system and what the options for such would be along with cost estimates.

General Overviews of the Butler trapezoidal standing seam metal roof systems atop the various areas that comprise the Annex Building are provided in the series of photographs # 1 through 12 with the areas shown on the scale Roof Plan and Key Plan on Drawing A - 1. Access to the metal roof surface was accomplished via the fixed exterior ladder positioned along the East elevation of the main portion of the Annex building as shown in photograph # 13 and identified on the scale Roof Plan. The access ladder is not fitted with a safety cage or personal fall arrest system which is adequate at present but must be upgraded by November 18, 2036 to comply with OSHA 29 CFR 1910.28(b)(9), without any modification work required at this time due to the overall low height of the fixed ladder. An inquiry with management personnel indicated this Annex building is effectively watertight at the time of the Northridge inspection with previous leakage having been addressed. The metal panels have a 24” wide profile with the trapezoidal standing seams rising up 3”. The Butler trapezoidal standing seam metal roof system is secured to the underlying steel support substructure with a series of vertical steel tabs integrally folded and double locked within the vertical portions of the standing seams with sealant within the fold profile as diagramed to the right. Drainage on the Butler trapezoidal standing seam metal roof areas is allowed to free fall off lower edges of the areas as identified on the scale Roof Plan on Drawing A – 1.



Concrete Roof Deck panels were noted in service beneath the standing seam metal roof areas of the Annex building, comprised of a wire reinforced thing form panel beneath the deck panels as seen in the series of photographs #14 through 18. These panels were set on the top chords of the bar joists and held in place with periodic heavy wire clips seen in photographs # 15 and 16.

The panels appear to be structural concrete panels as opposed to the more common gypsum or lightweight concrete panels based on the areas observed from the underside, without any facility to test the deck panels for compressive strength, which is not required at this time and may be performed as part of the future roof replacement project. The concrete panel roof deck assembly is in adequate condition without any apparent signs of deterioration and should be sufficient to accept the subsequent roof assembly which will more than likely require use a low rise adhesive grade urethane foam to attach the new insulation to the deck without penetrating the panels, which weakens the concrete deck panels via the series of drill penetrations. With two (2) roof systems in place, the exposed standing seam metal panels and the underlying BUR system atop the concrete roof deck panels, the future roof replacement will be a very costly venture involving removal of the standing seam metal roof panels, underlying steel roof panel support structure, vinyl clad insulation, aggregate covered BUR membrane and BUR insulation prior to installing new code compliant insulation.

Steel Support Structure for the trapezoidal standing seam metal roof assembly is positioned atop the aggregate covered BUR membrane as shown in the series of photographs # 19 through 24. Due to tight dimensions of the accessway panel, actual inspection of the steel framework was unable to be performed in that enclosed space; however, it appears the steel framework and standing seam metal roof system may rely on dead weight to restrain the assembly atop the BUR assembly as there was no evidence of mechanical fasteners into or through the structural concrete roof panels. Such a scenario is unusual and comes with a degree of risk of uplift failure if exposed to severe wind loads such as associated with a microburst, derecho, or tornado. There is no remediation work to secure the steel structure in place at this time as such would be a costly venture, complicate eventual removal of the assembly to reroof the building and penetrations in the deck could easily compromise the panels. In addition, the loose laid metal roof assembly appears to have sufficient dead weight to restrain the framework and panels in place as evidenced by long term service. Note that such dead weight restraint of a metal roof assembly is neither common nor code compliant and may be supplementally secured to the structural concrete roof deck panels or to the top chords of the bar joists.

Insulation on the Butler standing seam metal roof assembly consist of vinal faced fiberglass that extends between the top flanges of the series of Zee purlins, held against the underside of the metal roof panels as seen in photographs # 19 through 24. Numerous sections of the insulation were encountered dislodged and hanging down onto the BUR membrane as seen in photographs # 23 and 24 with other areas notably bowed which creates a gap between the insulation and metal panel underside, allowing for condensation to form and drip onto the BUR surface providing the plenum is exposed to warm moist air that can condense on the cold underside metal panel surfaces.

The monolithic BUR membrane serves as an effective vapor barrier, limiting the condensation condition on these areas. Due to the age, condition and tight enclosed working conditions around the fiberglass insulation, there is no recommendation to address or remedy the missing and/or hanging insulation, all of which will eventually be removed and discarded as part of the eventual and future roof replacement project.

Impact Damaged Panel Areas were encountered about the metal roof assembly in no distinguishable pattern, with examples of the impact damaged area shown in the series of photographs # 33 through 41. At first glance the impact damaged areas could have been attributed to hail damage; however, with close observation of the dimple depressions, physical scrap marks can be seen such as in photographs # 37, 40 and 41. Hail impact dimples on a metal roof are circular not erratically shaped and do not have physical scrape marks, which indicates physical damage. These dimple depressions are not an imminent leakage threat but are commencing to experience surface rust as seen in photograph # 41, due to depressed surface areas holding water for a period of time after each precipitation event. The additional exposure to water while limited, takes a toll over an extended period of time. As it is the intent to maximize the length of effective service from this metal roof assembly, the impact damaged panel areas should be addressed with a skim coat of a solvent base flashing grade elastomeric which will bring the dimpled area flush with the metal panel surface and the solvent base elastomeric will neutralize the early stage oxidation process. Solvent base elastomeric materials specified for Northridge projects include; Truco Super Seam Seal, Topps RivetGard, Karnak Karna-Flex 502 Seam Sealer and GAF TopCoat SB-900. This work should be initiated within the next 12 months, coordinated with other metal roof restorative work items as outlined within this report. The cost for performance of the solvent base flashing grade elastomeric material within impact damage panel areas is estimated at **$535.00,** reflecting five (5) man hours of labor at $85.00 per hour along with a material allotment of $110.00.

Ridgeplate Assemblies on the Butler standing seam roof areas consist of an elevated bowed metal panel as shown in photographs # 42 through 47 with pop rivets along the lower edges of the bowed plate profile and within each transverse overlap seam. Beneath the ridgeplate assembly is a formed metal closure strip that remains tightly secured with sealant along edges of the baffle plates. As the sealant continues to age, dry out, crack and erode, a point of entry may be created for wind driven precipitation to enter the building. At that time, a dry tool bead of sealant should be applied along interface edges of the metal baffle and the metal panel surface; however, no such work is required at this time or anticipated to any degree over the next ~ 5 years. Despite the age of the sealant beneath this ridgeplate the sealant and metal baffles are protected by the ridgeplate overhang which moderates deterioration of these components.

Butt edges of the bowed ridgeplate assemblies are typically fitted with a rubber bellows style ridge cap which is absent on these roofs, rather the butt ends of the ridgeplates were overextended to offer protection to the recessed formed closure panels, as seen in photograph # 46. There is no dedicated restorative work effort for the ridgeplates, with any future leaks to be addressed at the direction of management with the cost deducted from phased leak repair allotments as outlined in a separate paragraph later within this report.

Mechanical Units were located in two (2) areas atop the standing seam metal roof assemblies, with an example shown in photograph # 48 with locations and type of units identified on the scale Roof Plan. Cabinet surface rust is noted to be addressed by mechanical service personnel. Flashings at the curbed mechanical units consist of formed metal curbs augmented with what appears to be uncured EPDM flashing membrane in a fair condition. Te flat profile top surfaces of the larger Rapid style heaters are in poor condition as seen in photographs # 101 and 102 with what appears to be latex acrylic coatings with widespread microbial growth and evidence of rust compromise of the thin gauge steel surface areas. Same as for the previously reviewed cabinet surface rust, such should be addressed by mechanical service personnel, independent of the roof assembly. Mechanical units appear to have sufficient curb height so as to accept a PVC flashing assembly without lifting the curbs.

Steel Chimney Stacks were located in on the central portion of the West elevation of the Butler standing seam metal roof areas as identified on the scale Roof Plan and shown in photographs # 49 and 50. The chimneys are round, insulated steel assemblies that extend high above the metal roof surface as seen in photograph # 50. The stacks were flashed to the metal roof surface with uncured EPDM membrane as shown in photograph # 49 which is an acceptable flashing application and both chimneys were fitted with functional caps and storm collars. Due to the overall height of the steel chimneys, a series of guide wires was employed, secured through the top of standing seams after drilling a hole atop the vertical seam and fitting with screw pin clamps, through which the steel cables were run with a protective sleeve as seen in photograph # 51. Holes in the standing seams are not optimal but away from sheet drainage and only be a risk for leaks during periods when covered with by frozen precipitation. With the clamp areas covered with sealant, there is no recommended restorative work for these areas. For reference, securing any equipment to a metal roof system should employ the proper S-5 clamp, of which there are many different sizes and configurations with an example provided in the image to the right.

Vent Pipe Penetrations were located about the Butler trapezoidal standing seam metal roof assemblies flashed with residential style molded boots set within metal flanges as seen in photographs # 52 through 58. The watertight integrity of these flanges relies on sealant under tension between the metal plate and the roof panel as well as the tension seal; between the vent pipes and the top of the molded boots. Based on the number of sealant applications at the pipe boot flashings, it appears they have been less than effectively watertight. Same as for the gas flues reviewed later in this report, the flanges should be covered with a suitable flashing membrane that encapsulates the exposed fasteners and flange edges to ensure a watertight service for an extended period of time estimated at 8+ years. For reference, pipe vents on a metal roof should be fitted with a suitable boot set in sealant and secured with a series of EPDM washer stainless steel screw fasteners through the lower flashing ring into the metal panel with a stainless steel clamp ring atop the boot with an example of such provided in the image to the right for reference. Once the existing pipe vent were fitted with the residential pipe boot flanges, the option to install a proper commercial boot was eliminated as the oversized flanges of the residential boots that are designed to be installed under asphalt shingles, interfere with the round commercial boot installations. The recommended single ply membrane re-flashing has membrane options that include EternaBond AlumiBond and MFM Peel and Stick, both with reflective aluminum foil facers and cross-link polymer films that are easily applied atop cleaned and primed metal surfaces and very malleable, suitable to be hand molded around protruding fastener heads and over flange step off edges. A narrow strip of the membrane may be employed around the pipe vent interface with the molded boots to ensure effective watertight service. This recommended pipe vent flashing work should be initiated within the next 12 months to allow pipe vent penetrations to provide an additional 8+ years of effective watertight service. The cost for the pipe vent penetration re-flashing work is estimated at **$1,875.00**, reflecting eighteen (18) man hours of labor at $85.00 per hour with a material cost of $345.00.

Exhaust Curb Penetrations as located about the Butler standing seam metal roof assemblies are noted on the scale Roof Plan on Drawing A – 1 with examples shown in photographs # 59, 60, 61, 62 and 63. Each of the curb penetrations were previously flashed with asphalt mastic which is not a proper material for use on a metal roof system and if left in service, will eventually leak as the difference in coefficients for thermal expansion between the non-compatible materials will create a shear plane that allow drainage to pass beneath the asphalt and result in active leaks and rust compromise of the areas exposed to leakage.

Taking into consideration the fan curbs experience a fair degree of vibration as well as the fact they also impede the free flow of sheet drainage, it is relatively common for leakage to develop at the curbs. Note that these curbs have a proper design with drainage gaps along the upper edges allowing sheet drainage to pass around the curbs as opposed to creating a vertical dam and ponding water along the upper curb surfaces. Despite the use of curbs with narrow drainage channels, watertight integrity of the curbs rely on the aging asphalt flashings experience a degree of stress due to a combination of vibratory, thermal and differential movement. With the present mechanical curb units are presently flashed with asphalt cement, it will be costly to effectively clean and properly prepare the curb surfaces to accept a high grade peel and stick flashing membrane but as Carroll County will attempt to obtain the maximum level of service from the metal roof assemblies, such pro-active re-flashing of the exhaust fan curb penetrations is a prudent use of maintenance funds. The curb fan units should be prepared with a pressure wash cleaning to remove loose asphalt coatings, flashings and any sealant. This recommended curb flashing work should be initiated within the next 12 months to allow these penetrations to provide an additional 8+ years of effective watertight service. The cost for recommended exhaust fan curb penetration re-flashing work is estimated at **$2,525.00**, reflecting twenty-four (24) man hours of labor at $85.00 per hour with a material cost of $485.00.

Asphalt Flashing Patches were encountered atop the Butler standing seam metal roof panels in a limited number of areas, identified on the scale Roof Plan Drawing A – 1 and seen in photographs # 64, 65, 66 and 67. Same as with the asphalt flashing cement employed at the exhaust fan curb units, the cost effective option to remediate these substandard patch areas is to properly clean the areas, removing loose asphalt cement with a pressure wash followed by cleaning, priming and covering the areas with new high grade foil face peel and stick flashing membrane, installed to exceed the parameters of the asphalt patches at least 2" all around. This recommended asphalt patch covering work should be initiated within the next 12 months, coordinated with the other peel and stick flashing work on these Butler metal standing seam metal roof areas. The cost for recommended foil face membrane covering the asphalt flashing patches is estimated at **$455.00**, reflecting four (4) man hours of labor at $85.00 per hour with a material cost of $115.00.

Gas Flue Stacks were located about the central metal roof areas and both angular wing areas as seen in photograph # 68 and noted on the scale Roof Plan. The gas flue stacks were flashed with raised metal flanges with the flat steel plates set in sealant and screw fastened to the metal panels and protected with storm collars. The watertight integrity of these gas flue stack flanges relies on the aging embrittle sealant along the perimeters of the flanges, similar to the exhaust fan curbs but without asphalt flashing, which is not a long term flashing assembly and should be replaced within the next 12 months.

The recommended pro-active restoration work is to utilize a high grade foil face peel and stick flashing membrane along the flange surfaces after cleaning and priming the areas. The new foil face flashing should extend up the angular flange surface 2" and out past the edges of the flanges onto the metal panels also by 2". Gas flue stack flashing work with foil face peel and stick membrane has an estimated cost of **$865.00**, reflecting eight (8) man hours of labor at $85.00 per hour along with a material cost of $185.00.

Debris or Foreign Matter were not located about the Butler standing seam metal roof assemblies at the Annex building which tends to indicate the metal roofs are receiving an adequate degree of maintenance. Same as for all low slope commercial roof systems, the Butler standing seam metal roof assemblies on the Annex building and the ancillary EPDM roof areas should be observed by qualified personnel clearing gutter channels, removing debris and observing various aspects of the metal roof assemblies including all penetrations, ridgeplates and perimeter flashings. Roof maintenance inspections should be performed at six months intervals, optimally in the Spring and Autumn with an additional inspection performed after the roofs are exposed to a significant storm event. Roof maintenance has an annual estimated cost of **$1,700.00**, as performed by a roofing contractor, allowing for a total of 20 man hours (2 visits for 2 roofers at 5 hours each) with a unit cost of $85.00 per hour. This roof maintenance cost includes the adjacent adhered EPDM roof areas reviewed later in this report along with the separate metal roof atop the entranceway.

Lower Panels were encountered with a formed Butler batten along the edges as seen in the series of photographs # 69 through 74 without any instances of rusting or failed battens noted. The lower sections of the metal panels have screw fasteners through the panels as seen in photographs # 73 and 74, a percentage of which have been replaced including some with what appear to be proper stainless steel fasteners with an integral washer and flange while others were replaced with a standard screw fasteners and standard flat washers which is not an acceptable assembly as the interface between the flange on the screw fastener and the flat washer is not watertight. Such fasteners may properly function in light precipitation but in periods of heavy precipitation and exposure to snow and ice, the fasteners will leak water into plenum between the metal roof and underlying BUR assembly. In order to proactively address the substandard replacement fasteners, such should be field located, removed and replaced with oversized stainless steel EPDM washer fasteners, a diagram of which is provided to the right of this text for reference.

As washers age, they dry out, shrink and crack, resulting in a small source of ingress for sheet drainage running down the panel surfaces which on an aging metal roof, may commence to be an issue that will justify corrective attention with leak repair to such fasteners be performed at direction of Carroll County management with cost deducted from the phased leak repair allotment outlined in a separate paragraph. The recommendation is for the substandard lower panel screw fasteners to be replaced within the next 12 months as part of a metal roof restoration project. Cost for this fastener replacement work is estimated at **$1,675.00** reflecting sixteen (16) man hours of labor at $85.00 per hour along with a material cost of $315.00.

Foam Closure Strips are positioned between the lower panel drip edges and the trapezoidal standing seam metal roof profiles along the lower panel edges, held in place with tension created by the lower panel edge fasteners as seen in photograph # 72. Eventually the closure strips will shrink, crack and compromise by falling out or skewing. At such time, the foam closure strips would require removal and replacement with new formed strips with a diagram of readily available trapezoidal foam closure strip provided to the right of this text for reference. Foam closure strips should continue being monitored as part of routine maintenance with repairs initiated as required including re-set closure strips in adhesive grade silicone and future replacing assemblies with new closure strip without any notable areas of such work required or anticipated within ~ 5+ years.

Valley Gutter was encountered between separate metal roof areas in the East central section of the building as seen in photographs # 75 and 76 and noted on the scale Roof Plan. Such valley gutter channels are not optimal on a metal roof assembly but necessary in select construction environments. The lower metal panels are not fitted with formed batten as the lower panel edges are, due to the elongated angular cut of the channels between the raised standing seams. The recessed gutter channel should be sufficient to accommodate sheet drainage without issue as the size of the metal panels above the valley gutter is limited. If the metal panel areas were larger, the flow of sheet drainage could in a heavy precipitation event, impact against the opposite drainage flow and splash back on the lower panel edges. The lower panel edges against the valley gutter has already been addressed with asphalt flashing cement, indicating a prior issue along this area. The recommendation is for the lower panel edges on both sides of the valley gutter to be proactively flashed with foil face peel and stick membrane, ~ ½” from edge of the gutter to 2” past the edge of asphalt.

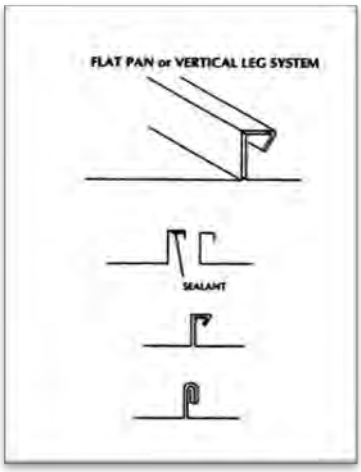
In addition, the lower foam closure strips within the angular cut trapezoidal standing seam profiles should be rejuvenated with a generous tolled bead of a flashing grade solvent base material as outlined earlier in this report for addressing impact damaged panel areas. This sealant work should also be initiated within the next 12 months, coordinated with other metal roof restorative work items as outlined within this report. The cost for installation of the foil face high grade peel and stick flashing membrane along the lower panel edges on both sides of the valley gutter as well as elastomeric re-sealing the adjacent closure strips with a solvent base flashing grade material is estimated at **$1,565.00,** reflecting fourteen (14) man hours of labor at $85.00 per hour along with a material allotment (foil face peel and stick membrane and elastomeric) of $375.00.

Rake Edge Flashings were positioned along the sloping non-drip edge elevations of the Annex building as shown in photographs # 77, 78 and 79. Connection between the standing seam metal panels and sloping edge rake flashing panels was accomplished with a series of screw fasteners through the horizontal flange of the flashings after being set in a generous bead of sealant with metal counter-flashings. There is no issue with the rake edge metal assemblies on any of the roof areas.

Leakage on the Butler trapezoidal standing seam metal roof assembly was reported to the Northridge field technician by Annex personnel as having been experienced periodically in the past; however, with recent repair work, the metal roofs remain effectively watertight. Note that as outlined throughout the report, most of the repair work performed on these metal roof were substandard and being proactively upgraded to allow the meal roof to provide an additional level of extended watertight service, particularly as the metal roof is unable to be recovered and would require the costly complete removal and replacement to satisfy code, hence the service life of the standing seam metal roof assemblies is slated to be extended through timely maintenance work and prompt repairs to leakage. Recommendation is for a local, experienced low slope roofing contractor to track and subsequently repair future roof leaks as they develop using appropriate materials as outlined throughout this report. Taking into consideration the overall size of this metal roof assembly, number of penetrations and age, periodic roof leaks may be anticipated with budgetary provisions to address such included herein. For reference, there are estimated roof leak repair costs provided for the next ~ 4½ years. The cost for metal roof leak repairs on all metal roofs for the period covering the rest of year 2024 and all of calendar years 2025 and 2026 is estimated at **$2,045.00**, increasing to **$2,425.00** for years 2027 and 2028 covering the subsequent two year period. These figures reflect labor of twenty (20) and twenty-four (24) man hours of labor at $85.00 per hour with repair material costs of $345.00 and $385.00 respectively. Roof leak repair costs take into account the continued aging of the Butler trapezoidal standing seam metal roofs in contrast with performance of the recommended system enhancements.

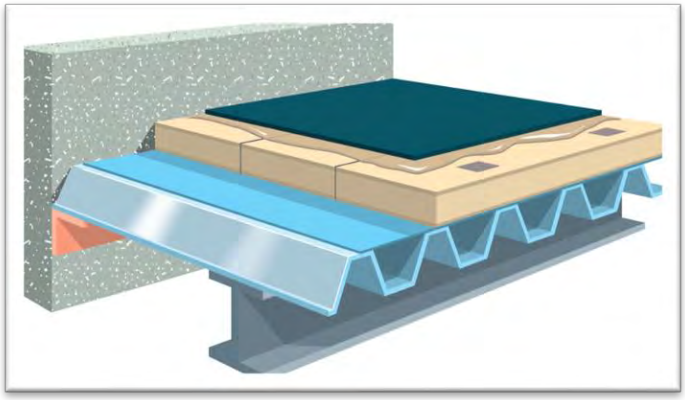
Effective Service is anticipated from this aging Butler trapezoidal standing seam metal roof assembly for a period of time at least ~ 8+ years assuming the restorative work items are performed as outlined. This estimate assumes that the roof restorative work items as recommended within this report are completed in accordance with the 12 month time frame as outlined. Restorative work items should be performed as a single stage over the next year as part of a comprehensive roof restoration project rather than sectioned off into a series of smaller projects. Performance of the recommended metal roof restoration and flashing modification work items should allow the trapezoidal standing seam metal roof systems to provide an extended period of service with subsequent repair work as required, to achieve ~ 15 to 20 years of added service prior to the eventual roof replacement project, which for this metal roof assembly would require removal of the metal panels, insulation and more than likely the steel support framework to expose the BUR system which would also be removed to the concrete roof deck prior to being fitted with a new code compliant commercial roofing assembly. Such a future roof replacement project is anticipated to carry a significant cost and as such, is best pushed off to allow for maximum service from the standing seam metal roof assembly. Routine roof maintenance should be performed twice annually as recommended and include removal of debris, visually inspecting flashings, penetration flashings as well as clearing interior valley gutter channel. Future roof leaks on the Butler standing seam metal roof assembly should be performed at the direction of management with the cost for such work deducted from the phased roof leak repair allotments outlined earlier within this report. A subsequent professional roof evaluation is recommended within the year 2028 to establish the roof condition at that time and determine the viability of extending the service of the metal roof assemblies and with subsequent repair and restorative work.

Overviews of the unidentified standing seam metal roof assembly atop the front entranceway as shown in photographs # 80 and 81 and noted on the scale Roof Plan. This metal roof area measures off at ~ 822 sq ft and includes a raised dormer over the front doorway to shed snow and ice away from the passageway. The metal roof is a vertical leg style assembly as diagramed to the right in contrast to the trapezoidal standing seam assembly on the main building. The vertical leg standing seam metal panel securement was free of exposed fasteners with the lower panel edge folded over onto the underlying panel. There is no direct access to the entranceway roof surface.



The interior of the entranceway metal roof assembly was inspected with views of the steel support members and what appears to be tongue and groove wood planks shown in photographs # 82, 83 and 84. There is no evidence of fasteners through the wood decking panels which tends to indicate the brackets and tabs for the vertical leg standing seam metal roof were secured into the wood planking. A review of leakage conditions on this angular metal roof entranceway roof area was conducted with Annex management who indicated the steeper slope metal roof is effectively watertight which is not surprising considering the slope and absence of penetrations. Drainage from this entranceway metal roof area is allowed to free fall off the lower edges.

Overviews of the adhered EPDM roof system atop the designated areas of the Annex building are shown in photographs # 85, 86, 87 and 88 for that larger section of roof along the West elevation of the building, shown on the scale Roof Plan. This roof area measures ~ 494 sq ft and appears to have been installed as part of the Annex building modification that saw demolition of the West elevation angular wing areas. The manufacturer of the EPDM roof system is unknown. The adhered EPDM roof membrane appears to be 60 mil installed atop a stratum of assumed polyisocyanurate insulation, without any penetrations and with butyl tape used in the seams. The EPDM roof membrane was extended up the vertical wall leading to the metal roof assembly as seen in photographs # 87 and 92. There were two other small fully adhered EPDM roof areas noted during the inspection, as seen in photographs # 89, 90 and 91 with the areas noted on the Key Plan and scale Roof Plan on Drawing A – 1. Drainage is allowed to free fall off the lower EPDM roof edges except for the East elevation area noted in photograph # 91 which is fitted with a gutter channel. For general reference, a diagram of a fully adhered EPDM roof assembly is provided to the right of this text for general reference showing a mechanically secured polyisocyanurate roof insulation layer atop a corrugated steel deck with the EPDM membrane adhered to the insulation facer with a vapor barrier. The deck on the larger EPDM roof area rests atop newer composite deck panels shown in photographs # 93, 94, 95 and 96. The adhered EPDM roof systems may be covered under Warranty which is typically issued for 10 or 15 years; however, without penetrations, use of butyl seam tape and a quality installation, no leaks are anticipated on these EPDM roof assemblies for the next ~ 5 years.



24-90-R

Summary and Recommendations

Butler Trapezoidal Standing Seam Metal Roof Systems at the Carroll County Annex building should continue being monitored on a regular basis as part of a roof maintenance program. Periodic leaks are not anticipated to any degree over the next ~ 5 to 8 years providing the flashing enhancements are performed as recommended within the report. Budgetary provisions to address leak repair on all metal roof areas at the Annex building are provided in two (2) stages commencing with the rest of 2024 and all of calendar years 2025 and 2026 and then a second leak repair allotment for subsequent calendar years 2027 and 2028. A series of restorative work items are recommended for performance within the next year to allow the metal roof assemblies to achieve addition effective service prior to any subsequent restorative or repair work and to delay the costly eventual insulated reroof assembly as there are already two (2) roof systems in service at this Annex building. The metal roof system work items include filling the impact damaged metal roof surface dimples with a solvent base flashing grade elastomeric. Within the next 12 months, re-flash the pipe vents, exhaust fan curbs, and gas flue stacks with foil face peel and stick membrane as well as covering the asphalt flashing patches. Also, within the next 12 months, field locate, remove and replace substandard lower panel fasteners with new oversize stainless steel EPDM washer screw fasteners. The final work item for performance within the next 12 months is flashing the lower panels on both sides of the valley gutter with new high grade peel and stick foil face membrane along with sealing around the adjacent standing seam closure strips with a solvent base flashing grade elastomeric. The cost for recommended Butler standing seam metal roof system restoration items each to be initiated over the next 12 month period is estimated at **$16,762.00**. This figure includes generous allotments for future metal roof leak repairs through 2028 as well as a 7% allotment for AIA General Conditions and the entire cost of one (1) year's allotment for annual metal roof maintenance work on all roof areas at the Annex building. The metal roofs should be closely inspected and reported upon by a roofing professional in year ~ 2028 to allow for detection of compromised and aging roof components and facilitate subsequent recommendation for future repair work to allow for an optimal level of service to be achieved from the Butler standing seam metal roof assemblies.

Vertical Leg Standing Seam Metal Roof System atop the entranceway of the Annex building is in exemplary condition without any corrective work required. The metal roof assembly is devoid of seams and penetrations with drainage allowed to free fall off the lower panel edges. The roof should be maintained in the same manner as the metal roof assemblies with an annual cost provision to facilitate such maintenance included in the section for the metal roof assemblies, earlier in this Summary.

Adhered EPDM Roof Systems atop the designated lower roof areas at the Annex building are in very good condition and may still be covered by a Warranty as the areas appear to have been installed in ~ 2015. Without any penetrations and butyl tape used in the limited seams and edge flashings, there is no cost provision to address repair to any future leakage for the next 5 years. The roofs should be maintained in the same manner as the metal roof assemblies with an annual cost provision to facilitate such maintenance included in the section for the metal roof assemblies, earlier in this Summary. Aside from routine maintenance, there is no work required for this newer adhered EPDM roof systems which should be suitable to provide upwards of ~ 30 years of effective watertight service with proper maintenance and timely repairs performed as required.

Reference Material, technical data sheets, CAD details and application guidelines for the metal roof restoration work items as outlined within this report are available upon request. A separate one (1) page line item Outline of Northridge recommended metal roof repair and restoration work was assembled and included in this report for reference. The Outline provides a brief description of each work item, the estimated cost value for each item and the recommended time frame by which each item should be initiated. Such data is sufficient for Carroll County to reference in completing the appropriate roof audit pages and budget the metal roof work items for the next year.

Carroll County Annex Bldg in Ossipee, NH – Standing Seam Metal and EPDM Roof Systems **Northridge # 24-90-R**

Outline of Roof Restoration Work, As Recommended Within the Northridge Roof Condition Report

Work Item Number	Recommended Scope of Work and/or Additional Project Cost	Brief Description of the Roof Repair Materials and Restoration Applications	Estimated Cost for this Restoration Work Item	Time Frame for this Work to be Initiated
1.	**Apply Solvent Base Sealant In Impact Damage Dimples**	**Field Locate Impact Metal Panel Surface Dimples, Clean & Fill Areas with Solvent Base Elastomeric**	**$535.00**	**Within 12 Months**
2.	**Re-Flash Pipe Vents With Foil Face Peel and Stick**	**Prep Pipe Vent Flanges to Remove Sealants, Re-Flash With Foil Face Peel and Stick Flashing Membrane**	**$1,875.00**	**Within 12 Months**
3.	**Re-Flash Exhaust Fan Curbs With Foil Face Peel and Stick**	**Prep Fan Curb Flanges to Remove Sealants, Re-Flash With Foil Face Peel and Stick Flashing Membrane**	**$2,525.00**	**Within 12 Months**
4.	**Flash Over Asphalt Patches With Foil Face Peel and Stick**	**Surface Clean the Asphalt Flashing Patches, Prepare and Cover With Foil Face Peel and Stick Membrane**	**$455.00**	**Within 12 Months**
5.	**Re-Flash Gas Flue Stacks With Foil Face Peel and Stick**	**Prep Gas Flue Stacks to Remove Sealants, Re-Flash With Foil Face Peel and Stick Flashing Membrane**	**$865.00**	**Within 12 Months**
6.	**Perform Roof Maintenance on Annex Building Roof Assemblies**	**Clear Gutter and Remove Foreign Matter From All Roof Areas & Inspect Metal & EPDM Components & Flashings**	**$1,700.00**	**Perform Annually**
7.	**Replace Substandard Lower Panel Screws With New SS Oversized**	**Field Substandard Lower Panel Screw Fasteners, Replace With New Oversize Stainless Steel, EPDM Washer Screws**	**$1,675.00**	**Within 12 Months**
8.	**Re-Flash Panels Along Valley Gutter with Foil Face Peel & Stick**	**Prep Panel Ends Along Valley Gutter & Flash With Foil Face Peel & Stick Membrane, Sealant at Closure Strips**	**$1,565.00**	**Within 12 Months**
9.	**Future Metal Roof Leak Repairs**	**Track & Repair Future Roof Leakage on the Butler Trapezoidal Standing Seam Metal Roof Assemblies**	**$2,045.00**	**Thru Year 2026**
10.	**Future Metal Roof Leak Repairs**	**Track & Repair Future Roof Leakage on the Butler Trapezoidal Standing Seam Metal Roof Assemblies**	**$2,425.00**	**Years 2027 & 2028**
11.	**AIA General Conditions**	**7% AIA General Conditions & Permits, Insurance, etc.**	**$1,097.00**	
		Total Roof Repair Cost	**$16,762.00**	

NOTE: Work Items Listed Should Be Performed As Part Of A Comprehensive Metal Roof System Restoration Project Within The Next Year, Initiated At The Direction And Discretion Of The Carroll County Facilities Director of Maintenance Based On Managerial / Budgetary Considerations.

Photograph # 1

Photograph # 2

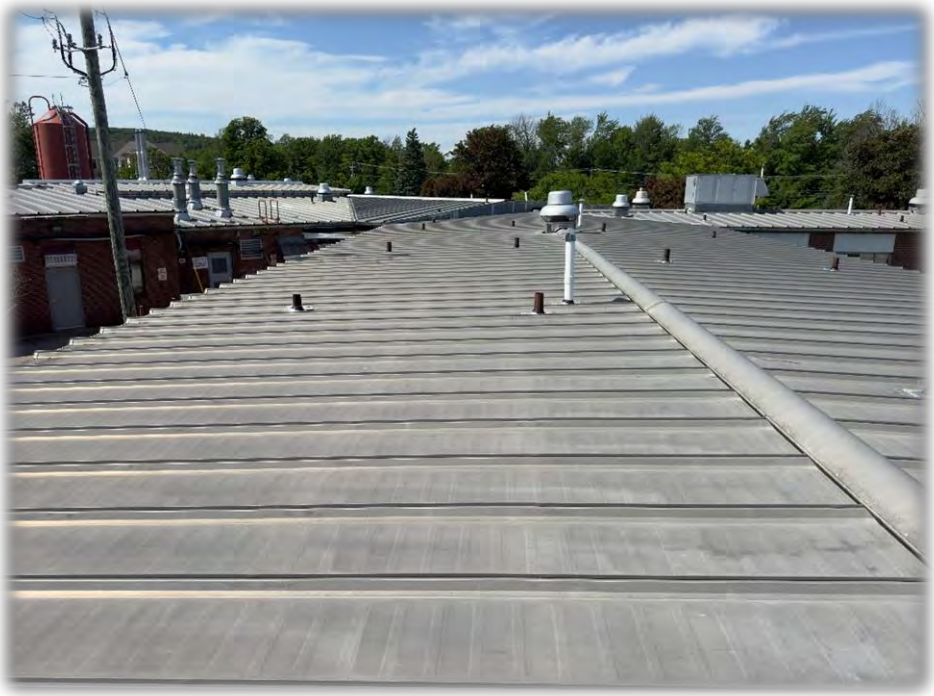
Photograph # 3

Photograph # 4

Photograph # 5

Photograph # 6

Photograph # 7

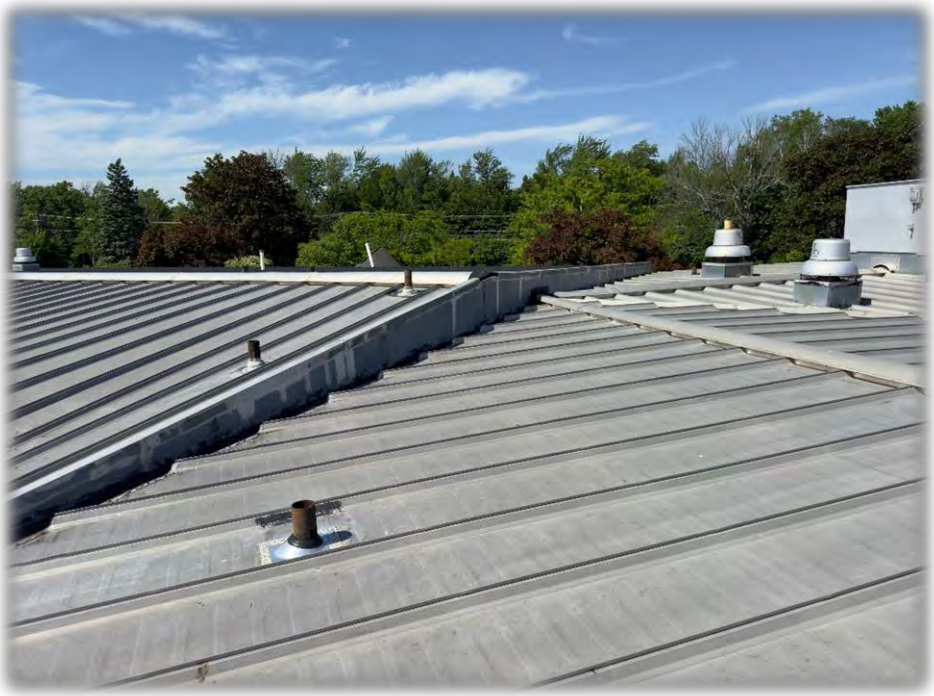


Photograph # 8

Photograph # 9

Photograph # 10

Photograph # 11



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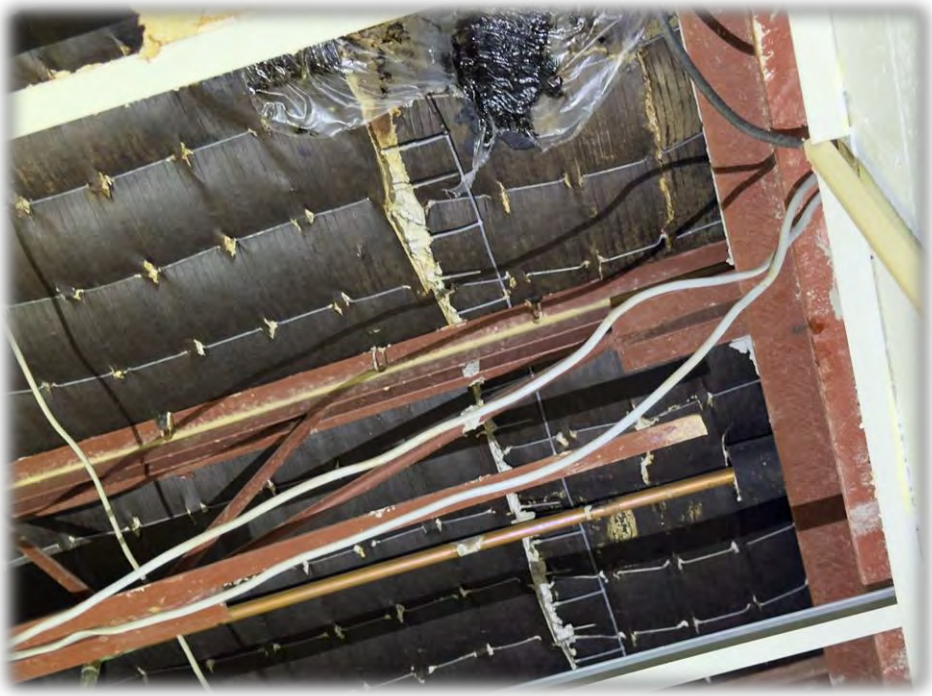
Photograph # 13



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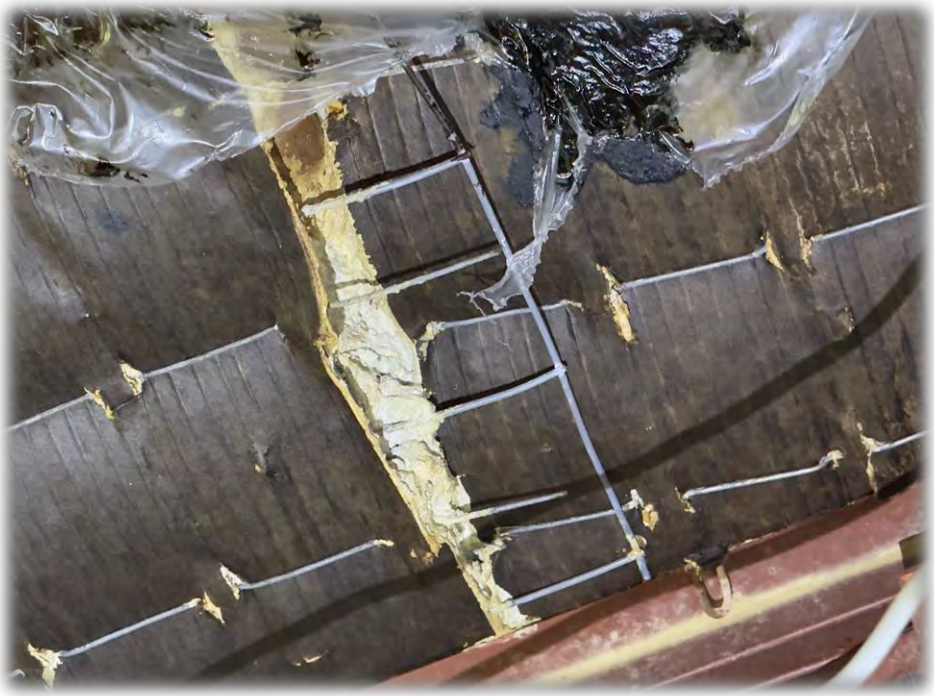

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Photograph # 33

Photograph # 34

Photograph # 35

Photograph # 36

Photograph # 37

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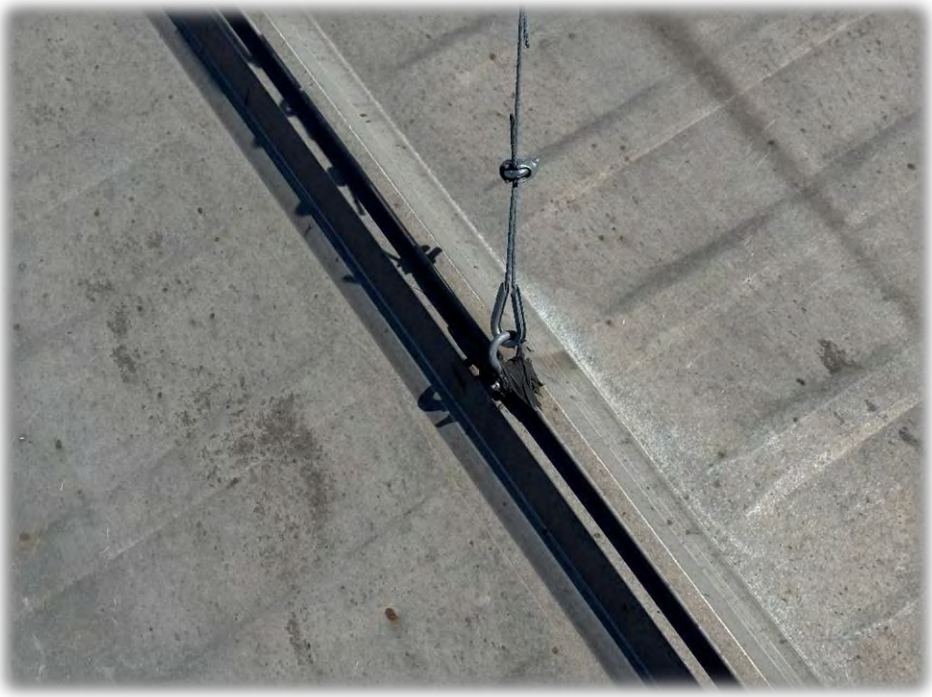
Photograph # 50



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Photograph # 61

Photograph # 62

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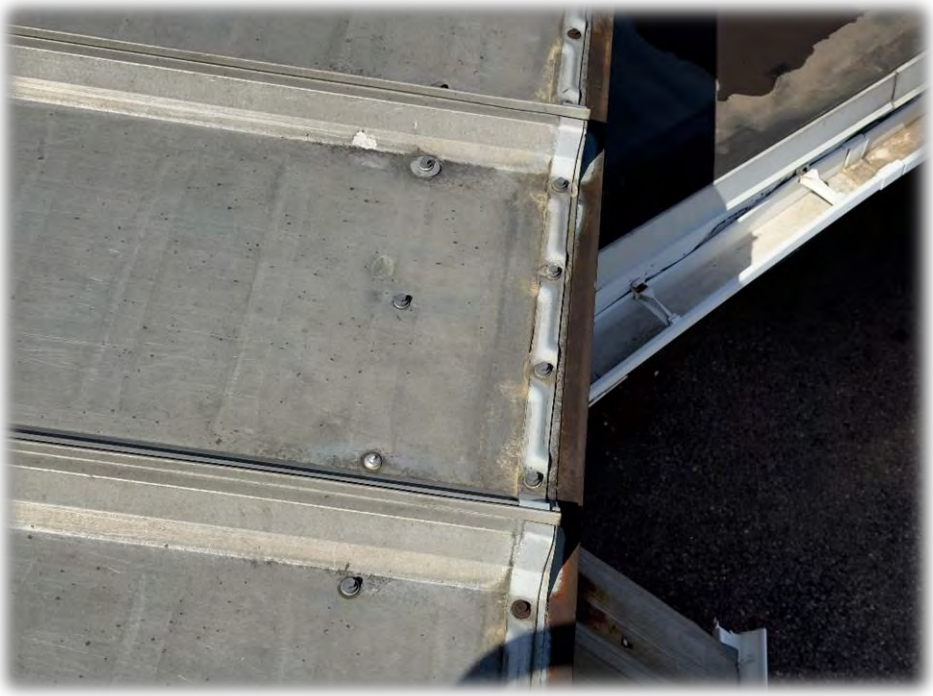

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Photograph # 84

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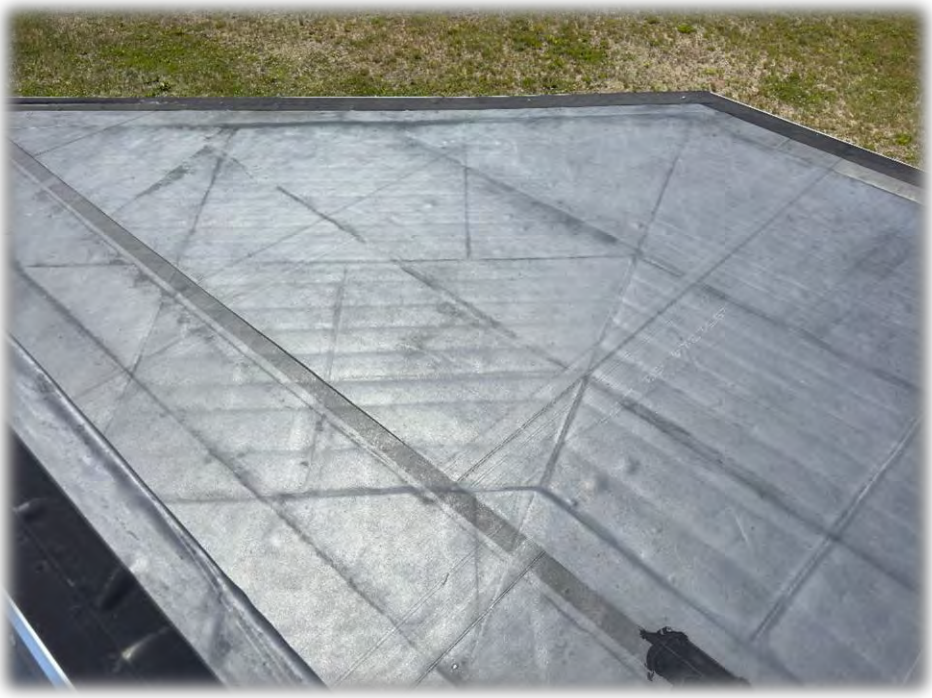
Photograph # 87



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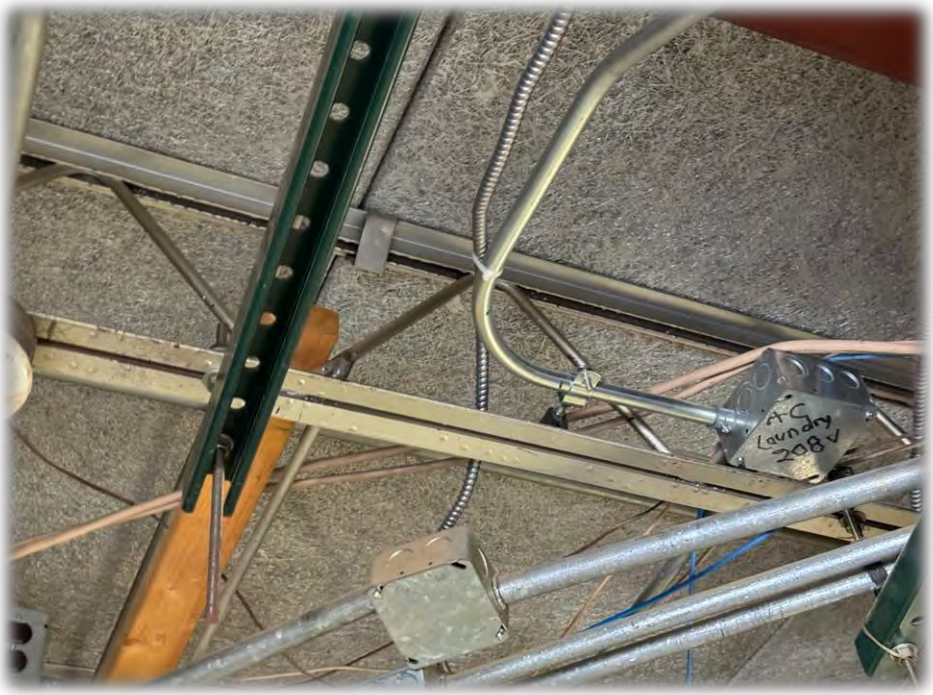
Photograph # 91

Photograph # 92

Photograph # 93



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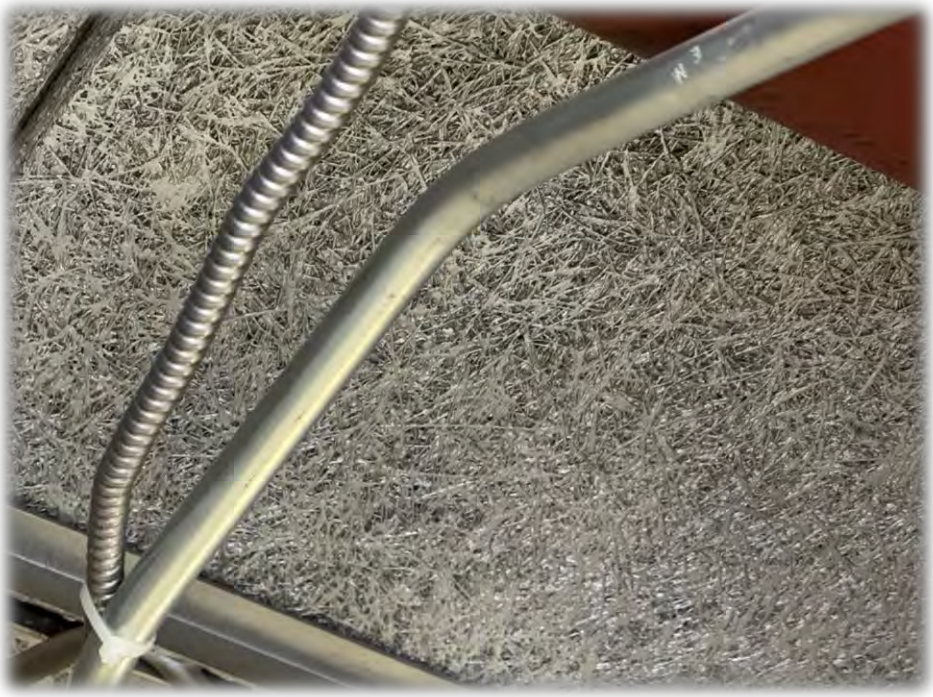

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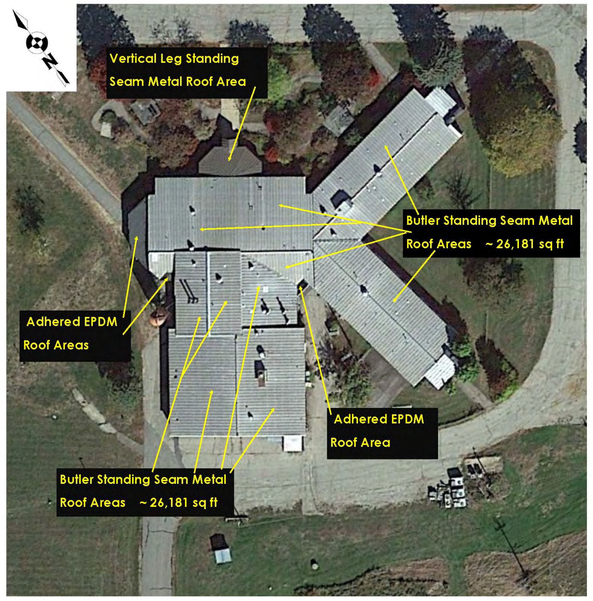
Photograph # 96



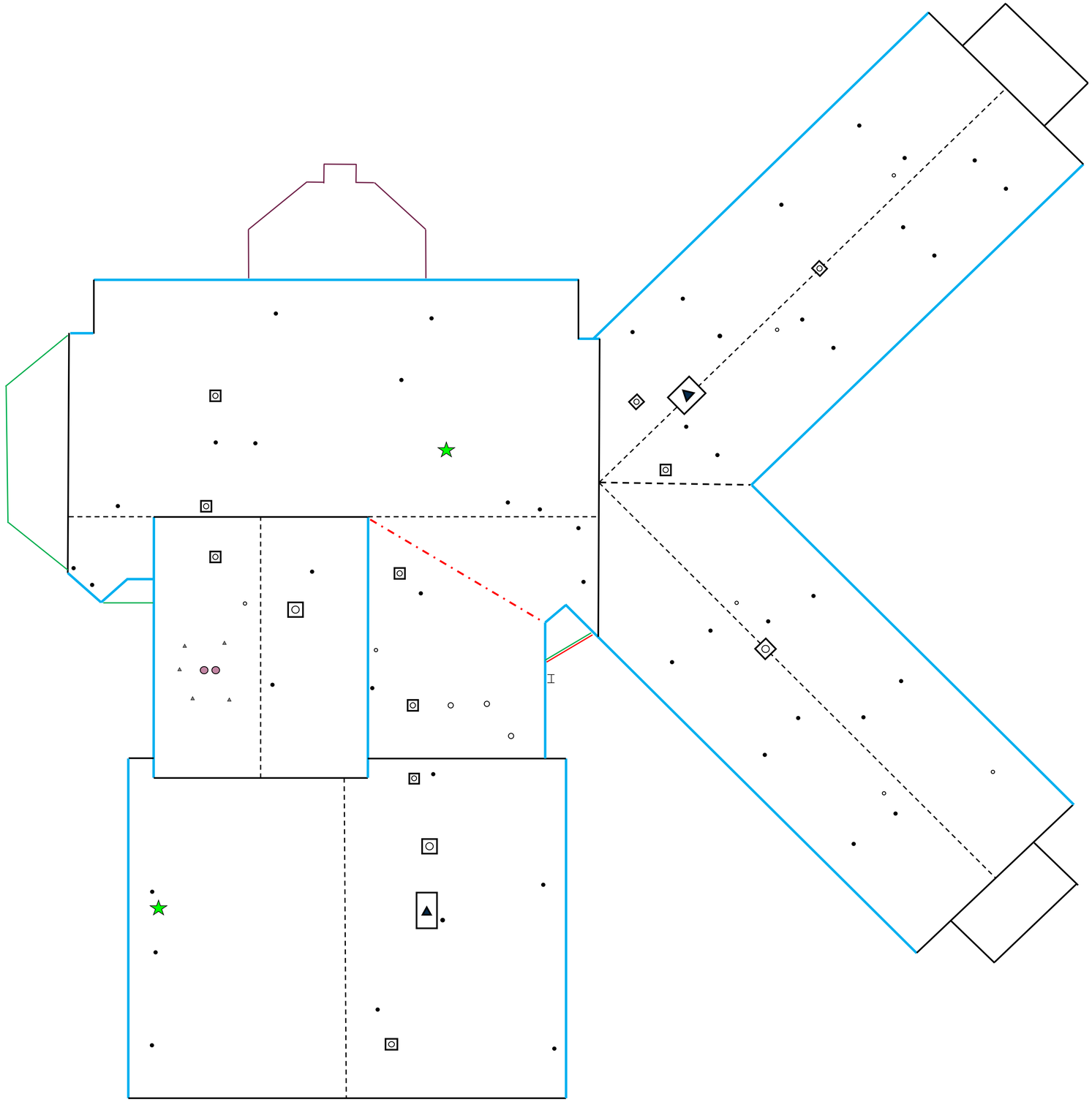
2024 Comprehensive Roof Condition Report

KEY PLAN of the Carrol Country Annex Bldg

County Farm Road in Ossipee, New Hampshire

Northridge Consulting Engineers, Inc.

Project # 24-90-R



ROOF PLAN LEGEND *no scale*

- Curbed Exhaust Fan Unit
- Guide Wire Attachment Area
- Extended Steel Chimney
- Valley Gutter Assembly
- Asphalt Flashing Patch Area
- Edge of Vertical Leg Metal Area
- Fixed Roof Access Ladder
- Gas Flue Stack Assembly
- Drip Edge Metal Assembly
- Rake Edge Metal Assembly
- Pipe Vent / Conduit Penetration
- Exterior Gutter Channel
- Curbed Mechanical Unit
- Metal Roof Ridgeline
- Edge of EPDM Roof Area

SCALE ROOF PLAN

Carroll County Annex Building

Ossipee NH **Scale: 1" = ~ 12'**

Comprehensive Metal Roof Report Project

Carroll County Annex Building in Ossipee, NH

SCALE: As Noted	APPROVED BY: Marc N. Boulay, NCE Project Engineer	DRAWN BY: DJ Gonsalves
DATE: 6/26/2024		REVISED:

Northridge Consulting Engineers, Inc.
1645 Falmouth Road, Suite 1 F
Centerville, Massachusetts 02632
Tel: 508-790-8190, Fax: 508-790-8862

Roof Plan, Key Plan and Legend — DRAWING #: A – 1