



ADDENDUM TO THE CONTRACT

for the

SAYÉIK GASTINEAU ELEMENTARY SCHOOL ROOF REPLACEMENT Contract No. BE21-189

ADDENDUM NO.: THREE

CURRENT DEADLINE FOR BIDS:
March 18, 2021

PREVIOUS ADDENDA: TWO

ISSUED BY: City and Borough of Juneau
ENGINEERING DEPARTMENT
155 South Seward Street
Juneau, Alaska 99801

DATE ADDENDUM ISSUED: March 15, 2021

The following items of the contract are modified as herein indicated. All other items remain the same. This addendum has been issued and is posted online. Please refer to the CBJ Engineering Contracts Division webpage at: <http://www.juneau.org/engineering-public-works>

INFORMATION:

- Technical report dated March 11, 2021 – Dahlberg Design

QUESTION:

Question: *"The attached came out as an addendum for the Juneau ES (CBJ Contract BE 21-189 Addendum No. 1). They are relying on an email from Tom Carson that was received back in 2010. The email states the material is in good shape and because it is non-friable it is "not regulated" and that there is no need to make the removal an abatement project. I do not know what the circumstances were back in 2010 that made Tom generate this email but...it is misleading to the roofers because they will be in violation of the EPA when they start cutting it without a notification. The notification is required on roofing projects that involve more than 5,580 SF."*

Response: Thank you for raising this issue. The email from Tom Carson included in Addendum No. 1 is misleading, because while nonfriable roofing coatings and mastics are excluded from the OSHA Asbestos in Construction standard (29 CFR 1926.1101(a)(8)), this material is not excluded from the EPA Asbestos NESHAP. The silver coating on the Sayéik Gastineau School classroom wing roof is contains greater than 1% asbestos and is classified as a Category I nonfriable asbestos-containing material, subject to the removal standards set forth by EPA.

Rather than rely on information from a sampling event in 2010 alone, CBJ authorized a roof condition inspection on March 10, 2021 to identify the condition of the silver coating on the roof of Sayéik Gastineau School. Note that this investigation was limited to the classroom wing because the silver coating is only present on the classroom wing roof (Base Bid) and is not present on any of the Alternate roof areas.

The roof inspection report is included in this Addendum. The inspection indicates that where the silver coating is still present, it was found to be nonfriable and moderately pliable at 30F, indicating that it will be softer and even less likely to be friable at the expected temperatures during the contract execution. The coating was only found to cover the roof surface at two of the sample locations, but the contractor should plan for the case that it is present across most of the roof.

This project is planned as a nonfriable roofing removal project where the only asbestos-containing material is a roof coating:

1. OSHA Asbestos Abatement certification is not required.
2. All workers must hold current Asbestos Awareness (2-hour) training since they will be working around materials that contain asbestos.
3. EPA regulations apply to this project (40 CFR Part 61 Sub-Part M, National Emission Standard for Hazardous Air Pollutants (NESHAP) for Asbestos). This includes notification for disturbance of greater than threshold quantities of asbestos-containing roofing as well as work practices, training, and disposal requirements.
4. EPA disposal requirements apply to all materials containing greater than 1% asbestos, which requires that disposal be at a site permitted to take the type of waste generated. Waste type generated will be dependent on the removal methods chosen by the contractor.
5. As with all demolitions of any type, EPA regulations require that there be no fugitive dust generated on the project, which includes dust from non-hazardous materials such as the OSB layer on the classroom wing roof.

Pertinent EPA Asbestos NESHAP Regulation Details:

Based on the Asbestos NESHAP, EPA notification is required 10 days in advance of the beginning of work if more than the threshold quantity of material will be disturbed. Based on EPA roofing removal guidance documents, the threshold quantities are:

- a. 5,580 square feet of roofing that is cut by a rotating blade cutter, then removed using manual methods; or
- b. No limit if roofing is cut by slicing methods only and removed using manual methods.

If a rotating-blade cutting tool is used on the roof:

- A. EPA notification will be required.
- B. A trained individual will be required to oversee the removal operations, with this training being AHERA-based training or OSHA Asbestos Abatement certification.
- C. Wet methods must be employed to control any potential dust that could be released, unless the rotating-blade cutter is fitted with a HEPA-filtered exhaust.
- D. Grindings from the cut lines must be bagged and disposed of as regulated ACM (RACM) at a landfill that accepts asbestos waste (CBJ Hazardous Waste Center or ship out of Juneau to an approved facility). Contractor shall include all costs for such disposal in the Base Bid for this contract.

For both slicing methods and manual removal of roofing sections cut by rotating blade:

Manually removed sections of roofing are classified as nonfriable non-RACM asbestos and can be disposed of at the Juneau Capitol Disposal landfill under special permit conditions. Contractor shall include all costs for such disposal in the Base Bid for this contract.

Pre-Work submittal documents are included in this project to communicate to the Owner the planned methods for removal and compliance with the EPA Asbestos NESHAP.

Bidders that are not familiar with the EPA Asbestos NESHAP and the removal and disposal of asbestos-containing roofing are advised to work with a specialist that can guide them through the process. Contractors bidding on this project are assumed to have understood the requirements included herein and in the included contract documents.

PROJECT MANUAL:

Item No. 1 **Add** the attached "SECTION 028213 – ASBESTOS ABATEMENT"

By: 
Greg Smith,
Contract Administrator

Total number of pages contained within this Addendum: 21

**Technical Memorandum****Date:** 11 March 2021**Subject:** Sayéik Gastineau School
Pre-Renovation Roof Inspection**To:** Lisa EaganLagerquist,
CBJ Engineering Dept.**Reference:** 21012**From:**  Sigrid Dahlberg, P.E.

Pre-Renovation Roof Condition Inspection Report**ROOF SYSTEM**

The existing roof system over the classroom wing of Sayéik Gastineau School has aged and is ready for replacement. The original asphaltic built-up roofing layers are still present over the wood roof deck. The east half of the roof is older than the west half (1956 vs 1965) but construction is similar, with the east half of the roof having a thin top-coat of silver asphaltic roofing sealant, and the west half having silver coating to an unknown extent. The entire classroom wing was overlaid with mechanically-fastened oriented strand board and an EPDM membrane around 2001. A photo is attached to the end of this report, showing the roof system as seen in 2010.

Historic sampling indicates that the roof makeup includes:

- wood roof deck,
- gypsum board (of varying thicknesses),
- built-up roofing,
- silver coating in some areas,
- mechanically fastened OSB, and
- EPDM membrane.

The silver layer, where present, contains 3% chrysotile asbestos. If this material is in nonfriable condition, it is exempt from the OSHA Asbestos in Construction rules per 29 CFR 1926.1101(a)(8) and can be removed by workers that do not hold current ADOL asbestos abatement certification. However, workers should have current OSHA Lead Awareness training (a 2-hour class). The intent of this inspection was to identify the condition of the existing silver coating layer.

INSPECTION

I inspected the condition of the silver coating at four locations on the classroom wing on 10 March 2021. The roof was divided into quadrants and a random location was chosen within each quadrant. A two-inch inspection hole was cut through the EPDM membrane and underlying OSB layer to identify the presence and condition of the silver roof coating. The sample map is attached for reference.

Environmental conditions at the time of the report were clear and cold (approximately 30F), with calm wind. Present for the inspection were Lisa EaganLagerquist and Nathan

Coffee of CBJ Engineering, and Daniel Bryant and Mark Ibias from the Juneau School District.

Sample No. 1, NW Quadrant

A few small droplets of silver coating were present, possibly splashed product from nearby application. The top of the asphalt surface was malleable and no friable materials were visible.

Sample No. 2, SW Quadrant

No silver coating was seen at this location. The top of the asphalt surface was malleable and no friable materials were visible. The OSB at this location was wet.

Sample No. 3, NW Quadrant

A thin layer of silver coating was seen across the entire inspection hole. The coating and the top of the underlying built-up roofing were flexible enough to easily make an impression with a tool. Gouging with a tool caused the coating to flex with the asphaltic layer and no friability was detected. There is no sign of flaking or separation of the silver coating.

Sample No. 4, NE Quadrant

As with Sample No. 3, the silver coating covered the entire surface at the inspection hole. The top surface was malleable and the coating is non-friable and fully adhered to the asphaltic layers.

Sampling Summary

At all four inspection locations, the existing roofing was smooth (no alligatoring or cracking evident) and the top surface was flexible and intact. All of the silver coating seen during this inspection was nonfriable and fully adhered to the underlying roofing layers.

REGULATORY SUMMARY

Asphaltic roofing coatings and mastics are specifically exempted from the OSHA Asbestos in Construction rules (29 CFR 1926.1101(a)(8)) if they have maintained their original nonfriable condition. The material seen during this inspection meets the intent of the regulations, which is to exempt a material where the fibers are bound in the asphaltic matrix to the extent that the likelihood of exposure is de minimus.

There is no similar exemption provided in the EPA regulations. Any material with greater than 1% asbestos is a regulated material and must be handled in accordance with the EPA Asbestos NESHAP regulations and additional transportation and disposal regulations. EPA offers specific guidance for roofing projects, because asbestos is a common material within older asphaltic built-up roofing systems (see EPA Applicability of the Asbestos NESHAP to Asbestos Roofing Removal Operations, Guidance Manual, 1994).

Asphaltic roofing such as this is classified by EPA as Category I ACM. Depending on which removal operations are used on the project, the material may or may not be rendered friable. Pieces of roofing that have not been made friable are considered

non-regulated asbestos-containing material (non-RACM) and disposal is less restricted. Removal methods will dictate whether the roofing material is non-RACM or has been converted to RACM through the forces of demolition:

- Removal via rotating-blade cutter can cause the roofing materials at the cut line to be broken into bits of debris that contain measurable asbestos. If a rotating cutter is to be used on this project, any roof area greater than 5,580 square feet is expected to disturb greater than 160 square feet of material (threshold quantity) and all aspects of the Asbestos NESHAP apply. The contractor will have to provide notification to EPA (10-day notice period required) and to use wet methods or exhaust control to contain the debris from the cutting blade. The debris from cutting must be bagged separately and disposed of as regulated ACM (RACM). [Note that the local landfill can only accept non-RACM, and any RACM will need to be delivered to a hazardous materials landfill.]
- Removal using slicing methods (a non-rotating blade) have been shown to create no visible debris or dust. Slicing methods therefore create less than 160 square feet of friable material and are below the threshold for notification and other aspects of the Asbestos NESHAP. Debris is classified as non-RACM and can go to a municipal landfill.
- Manual methods of removal (generally implemented after cutting areas of the roof into sections) have also been shown to create no visible debris or dust, and any materials removed via manual methods are classified as non-RACM and can go to a municipal landfill for disposal.

RECOMMENDATIONS

Contractors bidding on this project need to understand that EPA regulations apply to the roofing removal project at Sayéik Gastineau School, and that their approach to removal of the roofing will affect the overall costs for preparing notification paperwork, overseeing work, and disposal of all types of debris from the removal operations. Contractors may need to secure the services of an abatement subcontractor to guide them through this process. This information needs to be added to the contract by addendum to assure that all bidders are aware of how this affects costs and what constraints are in place.

SAYEIK GASTINEAU SCHOOL ROOF – CLASSROOM WING

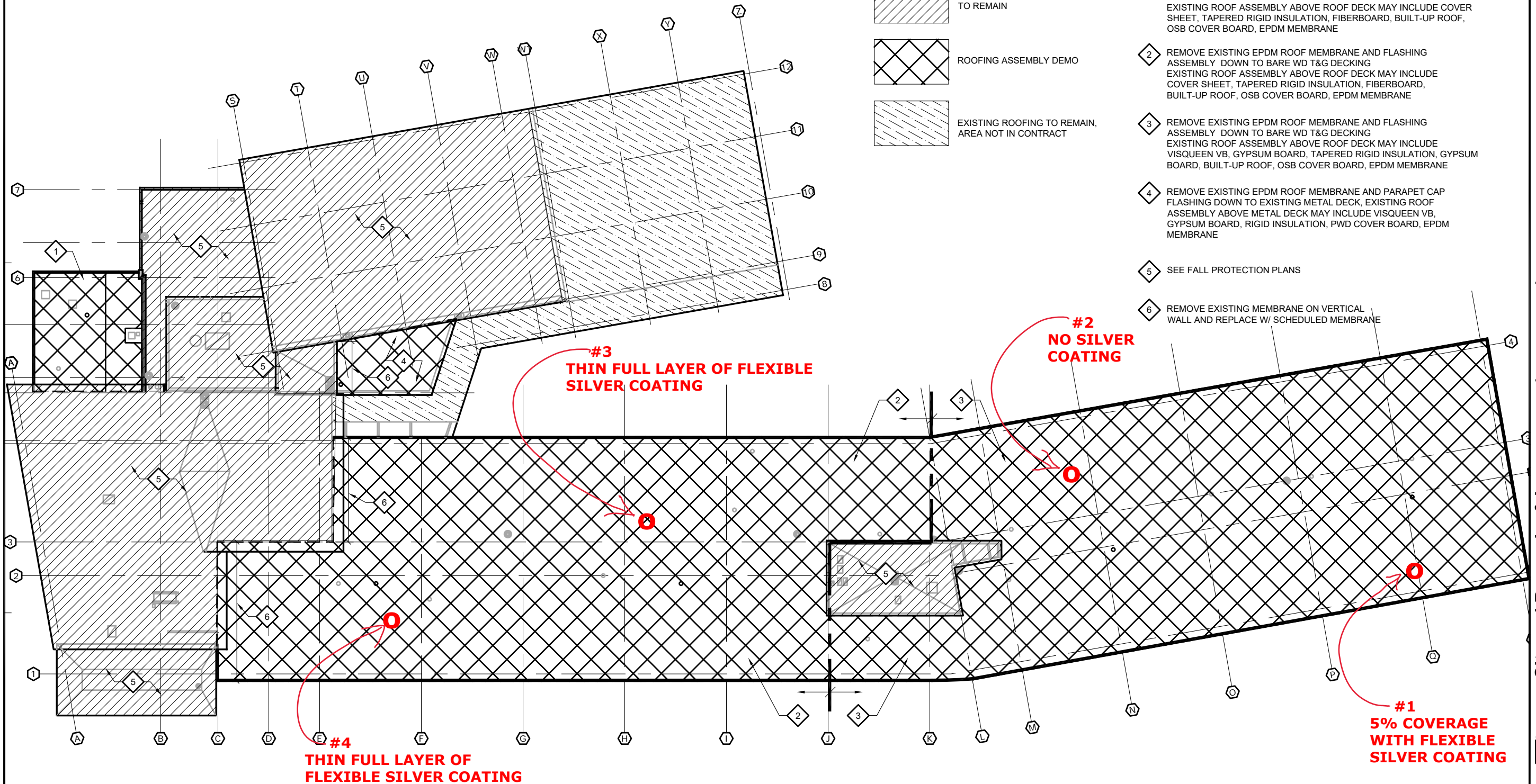
7. Holes cut allowed visual inspection of the original and addition roof construction and we were all shocked to find the following roof assembly at addition: 3x wood deck, ½”gypsum board, ½” polystyrene insulation, ½” gypsum board, ½” built-up roof, ½” OSB, and then new roof membrane. Engineer estimated that roof assembly has an R-value of ~6 and we noted that no new insulation was installed during reroof that occurred in 2000. For comparison purposes new roof areas have an R-value of ~36.



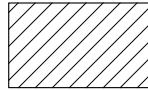

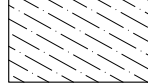
8. The original roof assembly was no better than the addition with the following composition: 3x wood deck, ½ ” polystyrene insulation, 1” fiberboard, ½ ” built-up roof, ½” OSB, and then new roof membrane. It is estimated that the roof membrane has 5-10 years of useful life before replacement should be contemplated. However, this time frame may be shortened if energy prices continue to climb.



ROOF INSPECTION LOCATIONS, 10 MARCH 2021



LEGEND

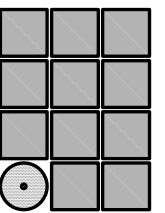
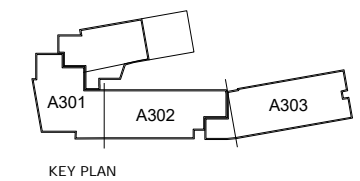
-  EXISTING ROOFING TO REMAIN
-  ROOFING ASSEMBLY DEMO
-  EXISTING ROOFING TO REMAIN, AREA NOT IN CONTRACT

KEY NOTES ROOFING DEMO:

- 1 REMOVE EXISTING EPDM ROOF MEMBRANE AND FLASHING ASSEMBLY DOWN TO BARE WD T&G DECKING AND 3/4" PWD DECK AT OVER-FRAMING
EXISTING ROOF ASSEMBLY ABOVE ROOF DECK MAY INCLUDE COVER SHEET, TAPERED RIGID INSULATION, FIBERBOARD, BUILT-UP ROOF, OSB COVER BOARD, EPDM MEMBRANE
- 2 REMOVE EXISTING EPDM ROOF MEMBRANE AND FLASHING ASSEMBLY DOWN TO BARE WD T&G DECKING
EXISTING ROOF ASSEMBLY ABOVE ROOF DECK MAY INCLUDE COVER SHEET, TAPERED RIGID INSULATION, FIBERBOARD, BUILT-UP ROOF, OSB COVER BOARD, EPDM MEMBRANE
- 3 REMOVE EXISTING EPDM ROOF MEMBRANE AND FLASHING ASSEMBLY DOWN TO BARE WD T&G DECKING
EXISTING ROOF ASSEMBLY ABOVE ROOF DECK MAY INCLUDE VISQUEEN VB, GYPSUM BOARD, TAPERED RIGID INSULATION, GYPSUM BOARD, BUILT-UP ROOF, OSB COVER BOARD, EPDM MEMBRANE
- 4 REMOVE EXISTING EPDM ROOF MEMBRANE AND PARAPET CAP FLASHING DOWN TO EXISTING METAL DECK. EXISTING ROOF ASSEMBLY ABOVE METAL DECK MAY INCLUDE VISQUEEN VB, GYPSUM BOARD, RIGID INSULATION, PWD COVER BOARD, EPDM MEMBRANE
- 5 SEE FALL PROTECTION PLANS
- 6 REMOVE EXISTING MEMBRANE ON VERTICAL WALL AND REPLACE W/ SCHEDULED MEMBRANE

1 DEMO ROOFING PLAN

SCALE: 0 8' 16' 32'



Jensen
Yorba
Wall Inc.

522 West 10th Street
Juneau, Alaska 99801
907.586.1070
AEC137
jensenyorbawall.com



City and Borough of Juneau
Sayéik Gastineau Elementary School
Roof Replacement
CBJ Contract No. BE 21-189
Juneau, Alaska

Bid Documents

- REVISIONS
- ▲
 - ▲
 - ▲

SHEET TITLE
DEMO
ROOFING PLAN

DATE: February 10, 2021
FILE: 20048

AD300

G:_Projects\20048\CAD\CD\Arch\AD300.dwg, Layout1, 2/10/2021 1:51:27 PM, Dan, Adobe PDF 11X17.pc3, Tabloid, 1:2

SECTION 028213 – ASBESTOS ABATEMENT

PART 1-GENERAL

1.1 RELATED DOCUMENTS

- A. General provisions of the Contract, including General and Supplementary Conditions.
- B. Contract Drawings.

1.2 SUMMARY

- A. The Work described in this section is in support of the re-roofing of Sayéik Gastineau Elementary School in Douglas, Alaska.
- B. Bulk sampling has identified the following asbestos containing materials (ACM) on the classroom wing roof (Base Bid area) that will impact this project:
 - 1. Silver coating on areas of the asphaltic built-up roof, under the non-ACM roofing membrane. The silver coating layer is located at the top of the built-up roofing system, just under the mechanically-fastened OSB and fully-adhered EPDM.
- C. Bulk sampling shows the following suspect materials to be non-ACM:
 - 1. Built-up roof tars, and
 - 2. Roofing papers in the roof system.
- D. The condition of the silver coating and roofing were inspected at four locations on 10 March 2021 (Report included as part of Addendum No. 2). The coating was present on three of the four samples. Both the roofing and the coating were pliable and nonfriable at 30F during the inspection and are expected to be softer during the execution of the contract. If the coating is nonfriable (no flaking areas), this material is categorically exempted from the OSHA Asbestos in Construction regulations (29 CFR 1926.1101) and workers are not required to hold current ADOL Asbestos Abatement certification. OSHA Lead Awareness training is required.
- E. For bidding purposes, contractors should assume that the roof is nonfriable throughout.
- F. This condition is present on the Base Bid (classroom wing) roof area only and is not part of any Alternate Bid areas.
- G. The EPA Asbestos NESHAP applies to this material. Contractor will need to provide any necessary notification paperwork, 10 days in advance of the start of work, to the regional office of the EPA. All quantities of removal within the Asbestos NESHAP apply to this project, based on type of tools and work approach. Contractor is responsible for all costs related to understanding and following the EPA Asbestos NESHAP and following all disposal regulations.

SECTION 028213 – ASBESTOS ABATEMENT

- H. If, during the execution of this contract, it is discovered that the silver coating is friable in any areas, the Engineer shall be notified immediately, and no work shall be done on those areas until full abatement controls are in place.
- I. The intent of the abatement portion of the project is to remove asphaltic roofing with a thin nonfriable ACM coating layer from the classroom wing roof to prepare for installation of a new roof, in accordance with all federal, state, local, and school district regulations.
- J. The abatement project includes all material, labor, equipment and other related costs for:
 - 1. coordinating with prime contractor to determine the timing for abatement.
 - 2. mobilizing (including moving all plant and equipment onto the site; providing necessary project utilities or improving existing utilities as necessary, arranging for approved storage areas, issuing and posting all notices, and submitting all submittals),
 - 3. installing any necessary critical barriers to establish non-permanent asbestos control areas to isolate the various abatement areas, should the need arise,
 - 4. completing all abatement elements as described in Paragraph B, above,
 - 5. cleaning all surfaces and spaces within the confines of any asbestos control areas,
 - 6. providing air monitoring, including appropriate elements summarized in Asbestos Air Monitoring in DEFINITIONS below, and in accordance with PART 3 EXECUTION of this section, if friable asbestos is found?
 - 7. disposing of ACM and related demolition debris in accordance with these contract documents,
 - 8. removing the non-permanent asbestos control areas, should they be needed, and
 - 9. general cleanup and demobilization.

1.3 COORDINATION AND TIMING OF ABATEMENT ACTIVITIES

- A. The building will be unoccupied during the project.
- B. The Owner will provide access to temporary power and to cold water for direct project use. The Contractor is responsible for all costs and effort required to develop those utilities for his use.
- C. Security to the site shall be maintained for the duration of the abatement project. It will be the responsibility of the Contractor to coordinate with other trades to sequence the work.

1.4 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. The publications listed below form a part of the specification to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. Code of Federal Regulations (CFR) Publications:
 - 29 CFR 1910.1001 Asbestos (for general industry standards)
 - 29 CFR 1910.134 Respiratory Protection
 - 29 CFR 1910.145 Specifications for Accident Prevention Signs and Tags
 - 29 CFR 1910.1200 Hazard Communications

SECTION 028213 – ASBESTOS ABATEMENT

29 CFR 1926.1101	Asbestos (for construction and demolition standards)
40 CFR 61 Sub-part A	General Provisions
40 CFR 61 Sub-part M	National Emission Standard for Asbestos (NESHAP)
40 CFR 241	Guidelines for Land Disposal of Solid Wastes

2. Alaska Department of Labor Construction Code:
Subchapter 05.045 (as amended November 27, 1991)-Construction Code (Asbestos)
Subchapter 15.0101-Hazard Communication
1. Additional References:
US EPA Publication 560/5-85-024: A Revision to the US EPA's 1985 Guidance for Controlling Asbestos Containing Materials in Buildings, March 2015
ASTM1368-14 Standard Practice for Visual Inspection of Asbestos Abatement Projects
EPA Applicability of the Asbestos NESHAP to Asbestos Roofing Removal Operations, Guidance Manual, 1994

1.5 DEFINITIONS

- A. ACM: See Asbestos Containing Material (ACM).
- B. Abandonment: Leaving in place existing asbestos materials. An example is leaving pipes inside walls when new piping is to be routed differently. Complete documentation must be made of the exact location and condition of the asbestos before abandonment, including the type and method of use of any encapsulant.
- C. Action Level: See Exposure Standards.
- D. Aggressive Conditions: Required technique to prepare an area that has passed visual inspection for clearance sampling. Before starting the sampling pumps, the exhaust from forced air equipment (such as a 1 horsepower leaf blower) shall be directed against all walls, ceilings, floors, ledges and other surfaces in the room. This effort shall take at least 5 minutes per 1,000 square feet of floor. Next, a 20-inch fan shall be placed in the center of the space (one such fan shall be employed for every 10,000 cubic feet of room volume), directed towards the ceiling, and set to run on slow speed. Once the fans are set up and operational, the sampling pumps shall be started and run for the required time. Once sampling is complete all 20-inch fans shall be secured.
- E. Amended Water: Water containing a wetting agent specifically designated by the manufacturer for the wetting of asbestos.
- F. Approved Laboratory: An independent laboratory properly staffed and equipped for the collection and analysis of asbestos bulk and/or air samples, and who maintains demonstrable satisfactory performance from all technicians involved in the performance of these analyses. For air samples, participation and a documented record of satisfactory performance in either the NIOSH Proficiency Analytical Testing (PAT) program, equivalent American Industrial Hygiene Association (AIHA) program, or an equivalent inter-laboratory testing protocol in accordance with 29 CFR 1926.1101, Appendix A is required. The lab must be capable of performing both phase contract illumination

SECTION 028213 – ASBESTOS ABATEMENT

microscopy, and transmission electron microscopy, and be capable of the required short turn around times. For bulk analysis, participation in and maintenance of a satisfactory record with the bulk asbestos analysis program with the Research Triangle Park, NC 27709-2194, (919) 541- 6000, is required. If any participation in any equivalent program is proposed to meet this requirement, the details of the program, documentation of satisfactory performance, and name, address and telephone number of the operator of the program must be submitted as part of the asbestos work plan for approval.

- G. Area Monitoring: See Asbestos Air Monitoring.
- H. Asbestos: A class of six naturally occurring fibrous hydrous mineral silicates. Minerals included in this group are chrysotile, crocidolite, amosite and the fibrous forms of anthophyllite, tremolite and actinolite.
- I. Asbestos Air Monitoring: An approved air monitoring plan is required if air monitoring is part of the abatement work. To be approved such a plan must include the following elements:
1. Area Monitoring: Sampling for airborne concentrations of asbestos fibers within the existing or planned asbestos control area that is representative of the fiber levels that may reach the worker's breathing zone. Area pumps drawing 10 liters per minute through the filter cassette are used for area monitoring and should pull at least 1,200 liters of air for each sample.
 2. Environmental Monitoring: Sampling for airborne concentrations of asbestos fibers outside the asbestos control area to assure that no asbestos fibers are escaping the enclosure, and that personnel outside the control area are not being exposed. Where a sealed area is not used, such as during exterior siding removal, this will refer to sampling conducted at the perimeter of the control area to assure that a sufficient buffer zone around the work in progress has been established, and that personnel outside this zone are not being exposed. Area pumps drawing 10 liters per minute through the filter cassette are used for environmental monitoring and should pull at least 1,200 liters of air for each sample.
 3. Baseline (Background) Monitoring: Sampling conducted to determine the initial level of airborne asbestos fibers present prior to the start of asbestos work. Area pumps drawing ≥ 1 but < 10 liters per minute through the filter cassette are used for this monitoring and should pull at least 1,200 liters of air for each sample. This sampling can be subdivided into three parts:
 - a. Natural Background Sampling: Sampling conducted outside the structure where the work will be accomplished to determine the naturally occurring fiber levels present in that locale. When results indicate that this level may reach or exceed 0.01 f/cc, a minimum of 5 consecutive days of sampling will be used to establish an arithmetic average. This average will be used as the background level.
 - b. Environmental Background Sampling: Sampling conducted to determine the background fiber levels within a structure, but outside the planned asbestos work area. This sampling is accomplished to ascertain the normal background fiber level within these areas of the structure. Special care must be taken during this sampling to minimize sample contamination by non-asbestos fibers, such as from cloth, paper and carpet.
 - c. Work Area Background Sampling: Sampling conducted in the area where asbestos work is planned, normally used to determine the level of personal and other protective measures required by personnel preparing the area for asbestos work and to establish the level of contamination present prior to the beginning of asbestos operations.

SECTION 028213 – ASBESTOS ABATEMENT

4. Initial Exposure Assessment Monitoring: Sampling conducted by a “competent person” immediately before or at the initiation of the operation to ascertain the expected exposures during that operation. Initial Exposure Assessment Monitoring must be completed in time to allow compliance with requirements which are triggered by exposure data or the lack of a “negative exposure assessment”, and to provide information necessary to assure that all control systems planned are appropriate for the operation and will work properly. Until Initial Exposure Assessment Monitoring confirms that employees on the job will not be exposed in excess of the PEL, or a “negative exposure assessment” for non-friable asbestos has been accepted, it shall be assumed that employees are exposed in excess of the TWA and excursion limit.
5. Negative Exposure Assessment: For any one specific asbestos job involving non-friable material which will be performed by trained employees, it may be demonstrated that employee exposures will be below the PEL by data which conform to the following criteria:
 - a. Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos.
 - b. Where the employer has monitored prior asbestos jobs for the PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analyses were performed in compliance with the asbestos standard in effect; and the data were obtained during work operations conducted workplace conditions “closely resembling” the processes, type of material, control methods, work practices, and environmental conditions in the current operations, the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job, and these data show that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that employee exposures will not exceed the TWA and excursion limit.
 - c. The results of initial exposure monitoring of the current job made from breathing zone air samples that are representative of the 8-hour TWA and 30 minute short-term exposures of each employee covering operations that are most likely during the performance of the entire asbestos job to result in exposures over the PEL.
6. Clearance Monitoring: Sampling occurring at the completion of the asbestos work or at the completion of a specific phase of asbestos work, prior to removing the enclosure. It is accomplished to prove that the clean-up activities have been effective, and that remaining fiber levels both inside and outside the enclosure comply with airborne fiber concentrations defined in “Clearance Levels” below. Clearance sampling is normally accomplished in the same locations and by the same methods as the baseline monitoring, and is done in an aggressive manner (see EPA 560/5-85-024 for description of methods). Transmission Electron Microscopy (TEM) analysis is required for clearance monitoring inside schools and sometimes for inside public buildings to assure that the area is truly safe for reoccupancy. For public buildings the requirement for TEM analysis can be waived in favor of Phase Contrast Illumination Microscopy (PCM) at the Owner’s option. See PART 3-EXECUTION, MONITORING for additional information.
7. Personal Monitoring: Sampling for asbestos fiber concentrations at the breathing zone of a worker, used to document individual exposures, and, in conjunction with the work area sampling, to determine the required degree of personal and respiratory protection. A minimum of two samples shall be collected per eight-hour shift at a flow rate of 0.5 to 2.5 liters per minute. At least 25% of the workers doing a particular job shall be sampled each

SECTION 028213 – ASBESTOS ABATEMENT

eight-hour shift. See Exposure Standards for more information.

- J. Asbestos Containing Material (ACM): Material composed of asbestos of any type, and in any amount equal to or greater than 1 percent by weight, either alone or mixed with other fibrous or non-fibrous materials.
- K. Asbestos Control Area: An area where operations involving asbestos are performed which is isolated by physical barriers designed to prevent the spread of asbestos dust, fibers, and debris, and to prevent or deter the entry or unauthorized and unprotected personnel. For areas where isolation is not feasible, it will be an area that is physically demarcated, e.g., bounded by a physical barrier such as a rope, barricade, etc., separating the known "clean" zone from the asbestos work area and buffer zone.
- L. Asbestos Fibers: This expression refers to a particular form of asbestos, fibrous tremolite, anthophyllite, or actinolite having a length to diameter aspect ratio of 3:1 or greater, and an overall length of 5.0 micrometers or longer. Where specialized analytical techniques, such as electron microscopy, are utilized for analysis, this shall refer to the number of fibers considered to equate to a specific weight of asbestos.
- M. Asbestos Survey: A detailed survey accomplished by specially trained, experienced technicians of a specific area to determine the presence, absence, condition, and amount of asbestos and asbestos contamination present in that area.
- N. Asbestos Workers' Personal Hygiene Area: A dedicated area containing shower(s), change room and, if required, toilet facilities where personnel working with asbestos (where a control area is not established) can change into protective clothing, and can disrobe, shower, and change into clean clothing without danger of transferring contamination to themselves or others.
- O. Baseline Monitoring: See Asbestos Air Monitoring.
- P. Bulk Sampling and Analysis: Representative samples taken from materials suspected to contain asbestos, analyzed by an approved laboratory using polarized light microscopy (PLM). When specialized methodology, such as electron microscopy is required, collection and analysis shall be in accordance with the recommendations of the laboratory providing the analysis, and the result expressed as both mass per unit volume and percent by weight shall be given.
- Q. Clean: As used in these documents, "clean" means that the surface in question is free of visible asbestos, to the point where no physical sample can be collected for analysis.
- R. Clean Room: An uncontaminated room having facilities for storage of employees' street clothing, uncontaminated materials and equipment.
- S. Clearance Levels: The maximum fiber levels present after completion of the asbestos work, or a given phase of work, sampled during initial or final clearance monitoring. This level shall be the lower of the baseline work area monitoring value for the location, or less than **0.01 fibers/cc**, whichever is lower. In the special case where the naturally occurring outdoor background levels outside the structure are greater than or equal to 0.01 f/cc, averaged arithmetically over a minimum 5-day period, the clearance level shall be the interior work area background level prior to the start

SECTION 028213 – ASBESTOS ABATEMENT

of CONTRACTOR work, or less than or equal to the average natural background level, wherever is lower.

- T. Clearance Monitoring: See Asbestos Air Monitoring.
- U. Competent Person/Supervisor: An individual experienced in the abatement and control of asbestos who has received specialized additional training in the supervision and management of asbestos abatement projects. This individual is the full-time on-site manager responsible for ensuring that all safety, health and environmental protection requirements are met, that approved operational methods are followed, and that all personnel on the site comply with these requirements. Specialized training must include an EPA recognized course in the management of asbestos abatement projects. The Competent Person shall report to the Industrial Hygienist.
- V. Containment: See Enclosure.
- W. Decontamination Area: An enclosed area adjacent and connected to a sealed asbestos control area and consisting of an equipment room, shower area, and clean room used for the decontamination of workers, materials and equipment. This also forms the only authorized entry and exit for the control area, except as required in Equipment Decontamination Area below.
- X. Encapsulant: A liquid material which can be applied to ACM which reduces the potential for release of asbestos fibers from a material, either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).
- Y. Encapsulate: The process whereby an encapsulant is applied to ACM to seal in or bind together the individual asbestos fibers, thereby reducing the potential for the release of these fibers.
- Z. Enclosure: Construction of a sealed, permanent structure around asbestos. Complete documentation must be made of the exact location and condition of the asbestos before the enclosure is finished, including the type and method of use of any encapsulant.
- AA. Equipment Decontamination Area: When used, a separate area designed similarly to the personnel decontamination area, but on a large scale. Used to decontaminate large items, or for the purpose of a separate exit for asbestos waste removal where the normal means of egress is not effective (such as the removal of long pieces of pipe from the basement of a structure).
- BB. Equipment Room (Change Room): A room located within the decontamination area that is supplied with impermeable bags or receptacles for the disposal or storage of contaminated protective clothing and equipment, and lockers for the storage and contaminated tools and work shoes.
- CC. Exposure Standards
1. Workers:
 - a. Action Level: An action level concept shall be used by the Contractor to ensure that no personnel are exposed to airborne concentrations of asbestos, actinolite, anthophyllite, or tremolite fibers, or a combination of these mineral fibers, equaling or exceeding **0.1 fibers per cubic centimeter** (0.1 f/cc) expressed as an 8-hour time weighted average (TWA) without placement on a medical monitoring program for asbestos. Personnel

SECTION 028213 – ASBESTOS ABATEMENT

exposed at or above this level must be provided proper training in the removal of asbestos containing materials, and must be provided proper personal protective equipment.

- b. Excursion Limit (EL): An airborne concentration of asbestos of **1.0 fiber per cubic centimeter** of air (1 f/cc) as averaged over a sampling period of 30 minutes.
 - c. Permissible Exposure Level (PEL): The Contractor shall ensure that no employee is exposed to an airborne concentration of asbestos, actinolite, anthophyllite, or tremolite fibers, or a combination of these mineral fibers, exceeding **0.1 fibers per cubic centimeter** (0.1 f/cc) expressed as an 8-hour time weighted average (TWA) as defined by the NIOSH sampling and analytical method 7400. (Reference 29 CFR 1926.1101, Appendix A.)
2. Non-Workers:
- a. Personnel who are not asbestos workers as defined by OSHA and this specification shall not be exposed to levels of asbestos fibers exceeding the EPA clearance level criteria of **0.01 f/cc**.

DD. Fibers: All fibers, regardless of composition, as determined by analysis in accordance with the method described in 29 CFR 1926.1101, Appendix A. When specialized methodology, such as electron microscopy is required, collection and analysis shall be in accordance with the recommendations of the laboratory providing the analysis, and the equivalent fiber level, expressed in both mass per unit volume and fibers per cubic centimeter shall be given.

EE. Glovebag Technique: A method with limited applications for removing small amounts of friable asbestos-containing material from HVAC ducts, short piping runs, valves, joints, elbows, and other non planar surfaces not isolated inside an enclosure. The glovebag assembly is a manufactured or fabricated device consisting of a glovebag (typically constructed of 6-mil transparent polyethylene or polyvinyl chloride plastic), two inward projecting long sleeve gloves, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains all asbestos fibers released during the process. All workers who are permitted to use the glovebag technique must be highly trained, experienced and skilled in this method.

FF. HEPA Filter Equipment: High Efficiency Particulate Air (HEPA) filtered vacuuming, local exhaust, or respiratory protective equipment equipped with specialized filters capable of collecting and retaining asbestos fibers. Filters must be of 99.97 percent or greater efficiency at collection of 0.3-micron diameter particles. Filters must be factory tested and certified as meeting this filtration requirement.

GG. Industrial Hygienist: An individual certified by the American Board of Industrial Hygiene, and having significant prior experience in managing and evaluating the health and safety aspects on asbestos projects of similar nature and scope to ensure capability of performing asbestos work in a satisfactory manner. Prior project similarities shall be in areas related to material composition, project size, number of employees, and in the engineering, work practice, environmental, and personal protection control required. An equivalent individual, such as a Licensed Professional Safety Engineer, Certified Safety Professional, and other qualified person with a minimum of 5 years of experience in industrial hygiene, including extensive experience in the management and evaluation of health and safety aspects of asbestos abatement, may substitute for the Certified Industrial Hygienist, subject to approval by the Engineer. The Industrial Hygienist shall be

SECTION 028213 – ASBESTOS ABATEMENT

responsible for all monitoring, training and asbestos work, for ensuring that all safety and health requirements prescribed by State and Federal regulations, as well as these specifications, are compiled with, and for ensuring that the competent person performs all assigned duties in accordance with this specification and applicable Federal and State regulations.

HH. Initial Exposure Assessment Monitoring: See Asbestos Air Monitoring.

II. Lockdown Sealant: A spray-on liquid-type sealant applied to surfaces from which ACM has been removed. It is applied after final cleaning and visual inspection has occurred, but prior to initial clearance sampling. Its purpose is to control and minimize the amount of airborne asbestos fiber generation that might result from any residual ACM debris on the substrate. All lockdown sealant shall be acrylic copolymer blend that forms a durable non-combustible barrier that when cured becomes an excellent primer for spray back insulation and water based architectural coatings.

JJ. Lower Limit of Detection (LLD): The smallest quantifiable amount of a substance, or number of fibers, present in a given sample that can be determined accurately by the sampling and analysis methods in use. A LLD is normally specified to represent a 95% confidence level. All samples taken for baseline, background, environmental or clearance sampling shall have an LLD of 0.01 f/cc or less. Samples taken for bulk analysis shall have an LLD of less than 0.1 percent by weight of the sample of homogeneous samples.

KK. Negative Exposure Assessment: See Asbestos Air Monitoring.

LL. Negative Pressure: A minimum of **minus 0.02 inches of water pressure** (negative pressure) differential between the asbestos control area and all adjacent areas, at a minimum flow rate of **four air changes per hour** at all points within the asbestos control area. See PART 3-EXECUTION; SAFETY AND HEALTH COMPLIANCE; Vacuums and local exhaust systems for additional information.

MM. Permissible Exposure Level (PEL): See Exposure Standards.

NN. Personal Monitoring: See Asbestos Air Monitoring.

OO. Phase Contrast Illumination Microscopy (PCM): An analytical method for counting fibers in air sampling filters.

PP. Polarized Light Microscopy (PLM): An analytical method for determining asbestos content in bulk samples.

QQ. Time Weighted Average (TWA): The TWA is an average of the airborne concentration of asbestos fibers, expressed as the number of fibers per cubic centimeter (f/cc) of air, measured and calculated for a minimum of 8 hours, and taken into account the relative proportions of time exposed when averaging different exposure levels.

RR. Transmission Electron Microscopy (TEM): A procedure whereby an electron beam is scanned through a specially prepared air-sampling filter. The beam diffraction pattern is then analyzed by computer, which differentiates between the patterns of asbestos and the non-asbestos materials, and quantifies the mass of the asbestos present on the filter. This mass can then be referenced to an

SECTION 028213 – ASBESTOS ABATEMENT

equivalent number of fibers per cubic centimeter. By far the most sensitive and specific test for airborne asbestos, it is expensive and results cannot normally be provided for several days. Used for detection of extremely low levels, or when suspected non-asbestos fibers are believed to be interfering with the accuracy or readability of normal sampling methods. All clearance samples for projects inside school buildings must use TEM in accordance with methods set forth in 40 CFR 760, Subpart E.

1.6 PRE-WORK SUBMITTALS

- A. The Pre-Work Submittal shall be submitted digitally as a complete package and modified as necessary to obtain approval by the Engineer five working days prior to any work on the project. The Contractor shall perform his work in compliance with the approved Pre-Work Submittal which shall include:
1. Asbestos Work Plan: A plain language plan describing work procedures to be used during each and all operations involving removal of roofing with asbestos-containing coating s. Annotated building plans or site plans no larger than 11 inches by 17 inches shall be included to detail locations for asbestos control areas, monitoring locations, access and disposal routes, and other activities where needed. The plan shall include as a minimum the following elements:
 - a. Sequencing of roof removal work, to include separate sequences if the work is to be accomplished in separate sections or phases, including detail regarding tools and methods planned for use.
 - b. Transport and disposal plans.
 - c. A contingency plan for potential emergencies/accidents/incidents covering, but not limited to:
 - Medical emergencies/accidents inside the control area.
 - Release of asbestos fibers at the work site.
 - Fire inside and outside the control area.
 - Site instability encountered during the project.
 - Spills during transport or disposal.
 - d. A notification listing of personnel and organizations to be contacted by the Contractor in the event of an incident, emergency or contingency.
 - e. The 24-hour contact point for the in case of an on-site problem. Response time to the site shall not exceed 1 hour from the time of the notification.
 2. Notifications: Copies of EPA and OSHA notifications (as needed) submitted prior to work.
 3. Training: Submit certificates that each employee has received the training required by 29 CFR 1910.1001, 29 CFR 1926.1101, and appropriate State of Alaska Regulations and this specification. Include proof that each employee has current OSHA Asbestos Awareness training.
 4. Testing Laboratory: If Asbestos Air Monitoring is included in the Contract, submit the name, address, telephone number and qualifications of the independent testing laboratory selected to perform the monitoring, testing and reporting of airborne asbestos fibers. Include documentation certifying that all technicians performing the analysis have been judged proficient by successful participation within the last year in the NIOSH PAT program or the

SECTION 028213 – ASBESTOS ABATEMENT

equivalent AIHA program, or an equivalent inter-laboratory testing program.

- B. Any changes to procedures, methods, conditions, etc., identified in the approved Pre-Work Submittal must be submitted in writing for review and approval by the Engineer prior to the inception of the change. The changes must be reviewed and approved by the Certified Industrial Hygienist prior to being submitted to the Engineer for review. Where changes must be implemented immediately for the protection of workers, personnel outside the work area, the structure or the environment, and the change established an environment more stringent than that previously existing, the changes may be implemented by the competent person or other individuals with appropriate authority, and the Engineer notified immediately. These changes will then be submitted in writing within 24 hours for final review and approval.
- C. Any analytical data collected as part of the pursuit of the WORK shall be considered the property of the Owner and shall be submitted to the Owner within 24 hours of receipt of such data.

1.7 POST-WORK SUBMITTALS

- A. The Post-Work Submittal shall be submitted digitally and approved by the Engineer as complete before final payment is approved. The Post-Work Submittal shall include:
 - 1. Work Log: A detailed log of all operations involving the asbestos portion of the work, to include but not be limited to:
 - a. A summary of each problem, incident, contingency, and emergency that occurred, and the actions taken to resolve the situation.
 - b. A copy of all shipping manifests that document disposal of all ACM at an approved solid waste facility.

PART 2-PRODUCTS-NOT USED

PART 3-EXECUTION

3.1 PROTECTION OF ADJACENT AREAS

- A. Perform all asbestos work in such a way as to not contaminate 1) adjacent areas, or 2) interior spaces of components within the abatement area. At the finish of the abatement project, all areas should be asbestos-free and ready for demolition as non-hazardous construction. Should any areas become contaminated during the implementation of the abatement plan, such areas shall be cleaned and/or restored to their original condition as directed by the Engineer at the abatement Subcontractor's expense.

3.2 NOTIFICATIONS AND PERMITS

- A. The Contractor shall notify the regional office of the United States Environmental Protection Agency (US EPA) in accordance with 40 CFR 61 Subpart M.

SECTION 028213 – ASBESTOS ABATEMENT

- B. The Contractor shall also notify the Alaska Department of Labor, Occupational Safety and Health Division (AK OSHD) in accordance with current State of Alaska asbestos regulations, should it become necessary.
- C. The Contractor shall notify the Engineer 48 hours prior to commencement of any abatement work, and immediately upon completion or termination of the work.
- D. The Contractor shall carry out removal, transportation, and disposal in accordance with state and federal requirements, and shall secure necessary permits in conjunction with asbestos removal and transport and provide timely notification of such actions as may be required by Federal, State, regional and local authorities.

3.3 COMPETENT PERSON

- A. A supervisor meeting the EPA requirements for training under 40 CFR Part 61 Subpart M shall be included if methods selected for removal cause this project to disturb more than 5,580 square feet of roof using non-slicing methods.
- B. Should friable asbestos be revealed as the project unfolds, all asbestos work, including setup and teardown of the asbestos enclosure(s) and control area(s), and all asbestos disposal operations shall be under the direct and continuous on-site supervision of a Competent Person, who shall be appointed when such conditions occur.

3.4 SAFETY AND HEALTH COMPLIANCE

- A. The Contractor shall comply with all laws, ordinances, rules and regulations of Federal, State, regional and local authorities regarding demolition, handling, storing, transporting and disposing of asbestos and asbestos containing materials. He shall also comply with the applicable requirements of the current issues of 29 CFR 1910.1001, 29 CFR 1926.1101, and 40 CFR 61 Subparts A and M. Asbestos removal is also required to comply with the provisions of the State of Alaska, Solid Waste Management Codes, title 18 of the Alaska Administrative Code, and the State of Alaska OSHA Standards.

3.5 ASBESTOS WORK PROCEDURES

- A. The work specified in these contract documents shall be carried out in accordance with all applicable local, state, and federal regulations, and the following special requirements:
 - 1. Nonfriable roofing coatings and mastic: Work that is exempt from OSHA Asbestos in Construction regulations shall comply with all pertinent areas of the EPA Asbestos NESHAP. Lead Awareness training is required for this WORK.
 - 2. OSHA Class II asbestos WORK: Class II WORK shall comply with the appropriate sections of OSHA 1926.1101(g)(7) “Work Practices and Engineering Controls for Class II WORK” and OSHA 1926.1101(g)(8). Certified asbestos abatement workers are a requirement for Class II asbestos WORK.
 - 3. Asbestos Handling Procedures: The CONTRACTOR shall sufficiently wet ACM with a fine spray of amended water during removal, cutting or other handling to reduce the emission of airborne fibers. All removed and waste materials shall be placed in plastic disposal bags or other approved containers. Under no circumstances shall asbestos waste or debris be allowed

SECTION 028213 – ASBESTOS ABATEMENT

to accumulate in the WORK area.

4. Disposal of Asbestos: Procedures for hauling and disposal shall comply with 40 CFR Part 61, Subpart M, 40 CFR 241 and 257, and state, regional, and local standards. Abated material and associated debris shall be packaged in accordance with applicable regulations and disposed of at an approved facility. All ACM shall be transported in an enclosed vehicle.

3.6 CLEARANCE PROCEDURES

1. After abatement activities are complete the Contractor and the Engineer or his representative shall perform a detailed visual inspection of the work area for any visible asbestos residual. If any is found, a complete re-cleaning of the area shall be performed, and the area re-inspected.
2. The Contractor shall be responsible for all costs relating to all visual inspections after the second failed visual inspection.

END OF SECTION