ADDENDUM

PROJECT:	Transportation Museum - Roundhouse Roof Replacement	NO.:	01
		DATE OF ISSUANCE:	8/27/2024
OWNER:	NC Department of Natural & Cultural Resources	ENGINEER:	REI Engineers
	SCO# 22-25307-01A	REI PROJECT NO:	023CLT-063

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated 8/8/2024 as noted below.

This addendum consists of 2 page(s), and the attached revised Specification Sections 12; 01 21 00; 01 22 00; and 07 52 16.13.

CHANGES TO BIDDING REQUIREMENTS:

1. The **Bid Due Date** is being changed from September 4, 2024, to **September 18, 2024**. The Bid Time remains unchanged.

2. The **Bid Opening Location** is being changed from the Raleigh address to **411 So. Salisbury Ave., Spencer, NC 28159.** The bids will be opened in the conference room above the gift shop.

3. Section 12 – FORM OF PROPOSAL, replace with the attached, Section 12 – FORM OF PROPOSAL Addendum 01.

4. Pre-Bid Meeting Minutes: the Pre-Bid Meeting Minutes dated 08-14-2024 are incorporated into the Contract Documents by reference.

CHANGES TO SPECIFICATIONS:

1. Section 01 21 00 - ALLOWANCES, replace with the attached, Section 01 21 00 – ALLOWANCES Addendum 01.

2. Section 01 22 00 – UNIT PRICES, replace with the attached, Section 01 22 00 – UNIT PRICES Addendum 01.

3. Section 07 52 16.13 TORCH-APPLIED MODIFIED BITUMEN ROOFING, replace with the attached, Section 07 52 16.13 TORCH-APPLIED MODIFIED BITUMEN ROOFING Addendum 01.

QUESTIONS/CLARIFICATIONS

1. Due to the coordination of specialty contractors required for this project, can the bid date be extended?

    a. Yes, the bid date will be extended as indicated above.

2. Will access at front (Turntable) side of building be available?

    a. The question has been forwarded to the Owner for clarification. The answer will be issued in a later Addendum.

3. How will the site be accessed for delivery of materials, staging, and construction traffic?

    a. An access road map and staging area map is being reviewed by the Owner. It will be issued in a later Addendum.

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		REI PROJECT NO:	023CLT-063

ALL OTHER REQUIREMENTS AND PROVISIONS OF THE BIDDING DOCUMENTS REMAIN UNCHANGED. ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID FORM. FAILURE TO DO SO MAY BE CAUSE FOR REJECTION OF THE BID.

END OF ADDENDUM

REI ENGINEERS

F O R M OF P R O P O S A L
(Addendum 01)

Roundhouse at NC Transporation Museum

Roof Replacement — Contract: Single Prime

Department of Natural & Cultural Resources — Bidder: _____

SCO ID # 22-25367-01A — Date: _____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

The Bidder proposes and agrees if this proposal is accepted to contract with the

State of North Carolina through the Department of Natural and Cultural Resources

in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of

Roundhouse at NC Transportation Museum Roof Replacement

in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the State of North Carolina, and the

Department of Natural and Cultural Resources and REI Engineers, Inc.

with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents, for the sum of:

SINGLE PRIME CONTRACT: _____

Base Bid:

_____ Dollars($) _____

General Subcontractor: _____ Lic _____

Plumbing Subcontractor: _____ Lic _____

Mechanical Subcontractor: _____ Lic _____

Electrical Subcontractor: _____ Lic _____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

ALTERNATE PRICES

Alternate prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Alternate prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents.

No. 1. Provide spray applied fire protection as specified in Section 07 81 00 "Applied Fire Protection" to underside of new steel deck, paint with color selected by Owner.

ADD (Words)_____ ($)_____

No. 2. Provide access ladders where indicated on the roof plan as specified in Section 05 51 33 "Metal Ladders"

ADD (Words)_____ ($)_____

No. 3. Enhance the specified roof system to provide a 30-year roof No-Dollar Limit Roof System Warranty.

ADD (Words)_____ ($)_____

UNIT PRICES

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents.

No. 1.	Repair Corroded Steel Deck with Coating	SF	Unit Price ($)_____
No. 2.	Repair Steel Deck with Steel Plates	SF	Unit Price ($)_____
No. 3.	Overlay Deteriorated Steel Deck with Steel Deck	SF	Unit Price ($)_____
No. 4.	Replace Deteriroated Steel Roof Deck	SF	Unit Price ($)_____
No. 5.	Replace Metal Louver	EA	Unit Price ($)_____
No. 6.	Replace Metal Frame Covers	EA	Unit Price ($)_____
No. 7.	Replace Deteriorated Wood Blocking	BF	Unit Price ($)_____
No. 8.	Replace Deteriorated Plywood	SF	Unit Price ($)_____
No. 9.	Repoint Deteriorated Mortar Joint	LF	Unit Price ($)_____
No. 10.	Replace Deteriorated Face Brick	EA	Unit Price ($)_____
No. 11.	Replace Deteriroated Sealant	LF	Unit Price ($)_____
No. 12.	Replace sheet metal flashing (sill, jamb, head)	EA	Unit Price ($)_____
No. 13.	Replace Windowpanes	EA	Unit Price ($)_____
No. 14.	Replace Wood Louvers	EA	Unit Price ($)_____
No. 15.	Replace Wood Fascia Boards	EA	Unit Price ($)_____
No. 16.	Replace Sheet Metal Flashing at Wood Louver	LF	Unit Price ($)_____
No. 17.	Replace Window Unit	EA	Unit Price ($) _____
No. 18.	Replace Unit Skylight	EA	Unit Price ($) _____
No. 19.	Paint/stain Wood Fascia Boards	EA	Unit Price ($)_____

No. 20. Paint Metal Louvers EA Unit Price ($)_____

No. 21. Paint Glazing Blocks EA Unit Price ($)_____

No. 22. Replace Louver Unit EA Unit Price ($) _____

No. 23. Provide Restoration of Reinforcing Steel within a Concrete Void. Price includes mortar required to fill void at this repair. Refer to Detail 3/S0-02. *CF* *Unit Price ($)* _____

No. 24. Provide Application of Concrete Bonding Agent with Corrosion Inhibitor. Price includes mortar required to fill void at this repair. Refer to Detail 4/S0-02. *CF* *Unit Price ($)* _____

No. 25. Provide Filling a Prepared Concrete Void with Repair Mortar. Refer to Detail 5/S0-02.
CF *Unit Price ($)* _____

No. 26. Provide Epoxy Injection of Vertical and Overhead Cracks. Refer to Detail 6/S0-02.
CF *Unit Price ($)* _____

The bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the designer and shall fully complete all work thereunder within the time specified in the Supplementary General Conditions Article 23. Applicable liquidated damages amount is also stated in the Supplementary General Conditions Article 23.

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B)** to that effect in lieu of Affidavit (**A)** required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

*** OR ***

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit A **or** Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

_____
(Name of firm or corporation making bid)

WITNESS:

_____
(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

_____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5 _____ Addendum No. 6 _____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 _____

SECTION 01 21 00

ALLOWANCES (Addendum 01)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements governing allowances.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections apply to this Section, including but not limited to:

1. Section 04 05 24 "Masonry Repointing"
2. Section 05 01 30 "Steel Roof Deck Repair and Securement"
3. Section 06 10 00 "Rough Carpentry"
4. Section 06 15 00 "Wood Decking"
5. Section 07 01 50 "Preparation for Reroofing"
6. Section 07 22 16 "Roof Insulation"

1.3 ABBREVIATIONS

A. Abbreviations for typical units of measurement:

1. Square Foot (SF)
2. Square Yard (SY)
3. Cubic Foot (CF)
4. Board Foot (BF)
5. Linear Foot (LF)
6. Each (EA)
7. Tonnage (TON)

1.4 QUANTITY ALLOWANCES

A. Include the specified quantity allowances in the base bid. Use the unit price submitted on the Bid Form to compute the quantity allowances. The quantities indicated on the Bid Form are estimated quantities only for the purpose of comparing bids. Compensation for the unit price bid made for the exact quantity of work performed under the unit price item. Deductive amounts of unit price work included in the Contract Sum are calculated at 100% of the quoted add unit price.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

A. Quantity Allowances:

1. Repair 100 SF of Corroded Steel Deck (Corrosion Degree 1) with Coating. Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
2. Repair 50 SF of Steel Deck (Corrosion Degree 2) with Steel Plates. Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
3. Overlay 100 SF of Deteriorated Steel Deck (Corrosion Degree 3) with Steel Deck. Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
4. Replace 100 SF of Deteriorated Steel Deck (Corrosion Degree 4). Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
5. Replace 3 EA Metal Louvers. Refer to Section 05 01 70 "Metal Louver Restoration".
6. Replace 5 EA Metal Frame Covers. Refer to Section 05 01 70 "Metal Louver Restoration".
7. Replace 200 BF of Deteriorated Wood Blocking. Refer to Section 06 10 00 "Rough Carpentry".
8. Replace 96 SF of Deteriorated Plywood. Refer to Section 06 10 00 "Rough Carpentry".
9. Repoint 500 LF of Deteriorated Mortar Joints. Refer to Section 04 05 24 "Masonry Repointing".
10. Replace 100 EA of Deteriorated Face Brick. Refer to Section 04 20 00 "Unit Masonry".
11. Provide 1300 LF of Elastomeric Sealant Joints at Windows. Refer to Section 07 92 00 "Elastomeric Joint Sealants".
12. Replace 90 EA sheet metal flashings at sill, jamb, and head of window. Refer to Section 08 01 53 "Maintenance of Steel Windows".
13. Replace 28 EA Window Panes. Refer to Section 08 01 53 "Maintenance of Steel Windows".
14. Replace 27 EA Wood Louvers. Refer to Section 08 01 59 "Maintenance of Wood Louvers".
15. Replace 15 EA Wood Fascia Boards. Refer to Section 08 01 59 "Maintenance of Wood Louvers".
16. Provide 220 LF of Sheet Metal Flashing at Wood Louver (head, jamb, sill). Refer to Section 08 01 59 "Maintenance of Wood Louvers".
17. Replace 1 EA Window Unit. Refer to Section 08 51 13 "Aluminum Windows".
18. Replace 1 EA Unit Skylight. Refer to Section 08 62 00 "Unit Skylights".
19. Paint/stain 45 EA Wood Fascia Boards. Refer to Section 09 90 00 "Paint and Finishing".
20. Paint 13 EA Metal Louvers. Refer to Section 09 90 00 "Paint and Finishing".
21. Paint 12 EA Glazing Blocks. Refer to Section 09 90 00 "Paint and Finishing".
22. Replace 1 EA Louver Unit. Refer to Section 08 91 01 "Aluminum Louver".
23. *Provide 300 CF Restoration of Reinforcing Steel within a Concrete Void. Refer to Detail 3/S0-02.*
24. *Provide 200 CF Application of Concrete Bonding Agent with Corrosion Inhibitor. Refer to Detail 4/S0-02.*

25. *Provide 100 CF Filling a Prepared Concrete Void with Repair Mortar. Refer to Detail 5/S0-02.*
26. *Provide 500 LF Epoxy Injection of Vertical and Overhead Cracks. Refer to Detail 6/S0-02.*

END OF SECTION

SECTION 01 22 00

UNIT PRICES (Addendum 01)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for unit prices.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections apply to this Section, including but not limited to:

1. Section 04 05 24 "Masonry Repointing"
2. Section 05 01 30 "Steel Roof Deck Repair and Securement"
3. Section 06 10 00 "Rough Carpentry"
4. Section 06 15 00 "Wood Decking"
5. Section 07 01 50 "Preparation for Reroofing"
6. Section 07 22 16 "Roof Insulation"

1.3 DEFINITION

A. Unit price is an amount proposed by Bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 ABBREVIATIONS

A. Abbreviations for typical units of measurement:

1. Square Foot (SF)
2. Square Yard (SY)
3. Cubic Foot (CF)
4. Board Foot (BF)
5. Linear Foot (LF)
6. Each (EA)
7. Tonnage (TON)

1.5 UNIT PRICE MEASUREMENT

A. Prior to performing work under a unit price as specified herein, notify the Engineer to allow for measurement of the actual quantities of work. Work performed under these items without prior approval and measurement is at the Contractor's expense.

B. Maintain a daily log including visual documentation (i.e. digital photographs) showing dates, location and exact quantities of unit price work.

C. Owner and Engineer reserve the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent party.

1.6 UNIT PRICE PAYMENT

A. Include in unit prices costs associated with performing the unit price work including but not limited to labor, material, equipment, insurance, applicable taxes, overhead and profit, etc.

1.7 UNIT PRICE PERFORMANCE

A. Install unit price work in accordance with the applicable specification sections and Contract Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Provide a unit price for:

1. Repair Corroded Steel Deck (Corrosion Degree 1) with Coating. Unit of Measurement: Square Foot (SF). Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
2. Repair Steel Deck (Corrosion Degree 2) with Steel Plates. Unit of Measurement: Square Foot (SF). Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
3. Overlay Deteriorated Steel Deck (Corrosion Degree 3) with Steel Deck. Unit of Measurement: Square Foot (SF). Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
4. Replace Deteriorated Steel Deck (Corrosion Degree 4). Unit of Measurement: Square Foot (SF). Refer to Section 05 01 30 "Steel Roof Deck Repair and Securement".
5. Replace Metal Louvers. Unit of Measure: Each (EA). Refer to Section 05 01 70 "Metal Louver Restoration".
6. Replace Metal Frame Covers. Unit of Measurement: Each (EA). Refer to Section 05 01 70 "Metal Louver Restoration".
7. Replace Deteriorated Wood Blocking. Unit of Measurement: Board Foot (BF). Refer to Section 06 10 00 "Rough Carpentry".
8. Replace Deteriorated Plywood. Unit of Measurement: Square Foot (SF). Refer to Section 06 10 00 "Rough Carpentry".
9. Repoint Deteriorated Mortar Joint. Unit of Measurement: Linear Foot (LF). Refer to Section 04 05 24 "Masonry Repointing".
10. Replace Deteriorated Face Brick. Unit of Measurement: Each (EA). Refer to Section 04 20 00 "Unit Masonry".
11. Replace Deteriorated Sealant. Unit of Measurement: Linear Foot (LF). Refer to Section 07 92 00 "Elastomeric Joint Sealants".

12. Replace sheet metal flashings at sill, jamb, and head of window. Unit of Measurement: Each (EA). Refer to Section 08 01 53 "Maintenance of Steel Windows".
13. Replace Window Panes. Unit of Measurement: Each (EA). Refer to Section 08 01 53 "Maintenance of Steel Windows".
14. Replace Wood Louvers. Unit of Measurement: Each (EA). Refer to Section 08 01 59 "Maintenance of Wood Louvers".
15. Replace Wood Fascia Boards. Unit of Measurement: Each (EA). Refer to Section 08 01 59 "Maintenance of Wood Louvers".
16. Provide Sheet Metal Flashing at Wood Louver (head, jamb, sill). Unit of Measurement: Linear Foot (LF). Refer to Section 08 01 59 "Maintenance of Wood Louvers".
17. Replace Window Unit. Unit of Measure Each (EA). Refer to Section 08 51 13 "Aluminum Windows".
18. Replace Unit Skylight. Unit of Measure Each (EA). Refer to Section 08 62 00 "Unit Skylights".
19. Paint/stain Wood Fascia Boards. Unit of Measurement: Each (EA). Refer to Section 09 90 00 "Paint and Finishing".
20. Paint Metal Louvers. Unit of Measurement: Each (EA). Refer to Section 09 90 00 "Paint and Finishing".
21. Paint Glazing Blocks. Unit of Measurement: Each (EA). Refer to Section 09 90 00 "Paint and Finishing".
22. Replace Louver Unit. Unit of Measure Each (EA). Refer to Section 08 91 01 "Aluminum Louver"
23. *Provide Restoration of Reinforcing Steel within a Concrete Void. Price includes mortar required to fill void at this repair. Unit of Measure Cubic Foot (CF). Refer to Detail 3/S0-02.*
24. *Provide Application of Concrete Bonding Agent with Corrosion Inhibitor. Price includes mortar required to fill void at this repair. Unit of Measure Cubic Foot (CF). Refer to Detail 4/S0-02.*
25. *Provide Filling a Prepared Concrete Void with Repair Mortar. Unit of Measure Cubic Foot (CF). Refer to Detail 5/S0-02.*
26. *Provide Epoxy Injection of Vertical and Overhead Cracks. Unit of Measure Linear Foot (LF). Refer to Detail 6/S0-02.*

END OF SECTION

SECTION 07 52 16.13

TORCH-APPLIED MODIFIED BITUMEN ROOFING (Addendum 01)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Prime concrete deck/existing vapor retarder and provide temporary membrane/vapor retarder.
2. Mechanically attach base sheet to LWIC.
3. Provide a torch-applied modified bituminous membrane system consisting of two plies of asphalt elastomeric membrane reinforced with polyester and/or fiberglass mat.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections apply to this Section, including but not limited to:

1. Section 01 35 00 "Hot Work Operations"
2. Section 03 52 16.16 "Lightweight Aggregate Insulating Concrete"
3. Section 05 01 30 "Steel Roof Deck Repair and Securement"
4. Section 06 10 00 "Rough Carpentry"
5. Section 07 01 50 "Preparation for Reroofing"
6. Section 07 22 16 "Roof Insulation"
7. Section 07 62 00 "Sheet Metal Flashing and Trim"
8. Section 22 14 26 "Roof Drains"

1.3 REFERENCES

A. Refer to Section 01 42 00 "References" for referenced standards and applicable building code.

B. Refer to the following references, current edition for specification compliance:

1. National Roofing Contractors Association (NRCA)

    a. NRCA Roofing and Waterproofing Manual

2. ASTM International

    a. ASTM D 41 Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
    b. ASTM E 108 Standard Test Methods for Fire Tests of Roof Coverings
    c. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction Materials.
    d. ASTM D 3019 Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos Fibered and Non-Asbestos Fibered.

e. ASTM D 3409 Standard Test Method for Adhesion of Asphalt-Roof Cement to Damp, Wet, or Underwater Surfaces.
f. ASTM D 4479 Standard Specification for Asphalt Roof Coatings - Asbestos Free.
g. ASTM D 4586 Specification for Asphalt Roofing Cement, Asbestos Free.
h. ASTM D 6162 Specification for SBS Modified Bitumen Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
i. ASTM D 6163 Specification for SBS Modified Bitumen Sheet Materials Using Glass Fiber Reinforcements.
j. ASTM D 6164 Specification for SBS Modified Bitumen Sheet Materials Using Polyester Reinforcements.
k. ASTM D 6222 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
l. ASTM D 6223 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Reinforcements.
m. ASTM D 6509 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Base Sheet Materials Using Glass Fiber Reinforcements.

3. Asphalt Roofing Manufacturers Association (ARMA)
4. FM Global

a. FM 4450 - Approval Standard for Class 1 Insulated Steel Deck Roofs
b. FM 4470 - Approval Standard for Class 1 Roof Coverings

5. Underwriters Laboratories, Inc. (UL)

a. UL 580 - Test for Uplift Resistance of Roof Assemblies
b. UL 790 - Tests for Fire Resistance of Roof Covering Materials
c. UL 1897 - Uplift Resistance for Roof Covering Systems

1.4 PERFORMANCE REQUIREMENTS

A. Install roofing system to meet UL 790 Class A/ASTM E 108 Class A Fire Rating.

B. Wind Design: Provide an approved, tested roof assembly to resist the design wind uplift pressures specified in the Contract Drawings.

1.5 SUBMITTALS

A. Refer to Section 01 33 00 "Submittal Procedures".

B. Product Data: Manufacturer's Product Data Sheets for materials specified certifying material complies with specified requirements.

C. Manufacturer's Instructions: Latest edition of the Manufacturer's current material specifications and installation instructions.

D. Roof System Assembly Letter: Letter from roof system manufacturer listing roof assembly components along with their method of attachment and acceptance of the specified roof system warranty terms. Assembly letter should match the submitted test report documentation and specified assembly.

E. Test Reports: Submit documentation of approved, tested roof system to meet the specified requirements for the following:

1. Wind uplift pressures
2. UL Fire Resistance Rating

1.6 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Approved by the roof membrane manufacturer and have the experience of 5 similar roof projects. Provide verification of similar experience to the Engineer upon request.

B. Manufacturer Qualifications:

1. Producing modified bitumen products in the United States for a minimum of 10 years.
2. Maintained a consistent composition for a minimum of five years without a change in the basic product design or SBS modified bitumen blend (e.g. no substantive changes in product composition, polymer specification, asphalt or filler formulation).

C. Inspect the base ply and reinforcing/stripping ply application by the Contractor and Manufacturer's technical representative. Repair and prepare to meet the Manufacturer's requirements prior to installing the surface ply.

D. Do not exceed exposure limits of the base ply for longer than the manufacturer's maximum requirement. Base ply exposed longer than the maximum requirement is subject to rejection or additional remedial requirements prior to application of the surface ply.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery. Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements on pallets at least 4 inches above ground level at location acceptable to the Owner.

1. Storage trailers are acceptable provided they are equipped with a lock and located at a site location acceptable to the Owner.
2. Utilize tarps that cover materials to prevent moisture contamination. Remove or slit factory shrouds and/or visqueen; do not use these materials as tarps.
3. Install vapor retarders under material storage areas located on the ground.
4. Store roll goods on end on a clean flat surface.
5. Remove damaged or deteriorated materials from the job site.

C. Handling. Handle material in such manner as to preclude damage and contamination with moisture or foreign matter.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply roofing during precipitation. Do not start roofing operations in the event there is a probability of precipitation during applications.
2. Do not apply the membrane or flashings at or below the dew point temperature.
3. When conditions are damp and where adjacent roof areas have moisture or dew, dry surfaces to prevent tracking water over the membrane substrates.
4. At ambient temperatures of 40°F and below, including wind chill, take precautions to ensure adhesives and other materials maintain the minimum acceptable temperature at the point of roofing application as recommended by the membrane manufacturer.

B. Protection:

1. Protect against staining and mechanical damage of adjacent surfaces and work areas during application. Staining, mechanical damage, or discoloration of the membrane is cause for rejection.
2. Refer to Section 01 14 00 "Work Restrictions" for requirements to prevent odors or smoke/fumes from entering the building.
3. Protect materials being installed and storage of materials against wind related damage.

C. Torch Operation and Safety:

1. Refer to Section 01 35 00 "Hot Work Operations" for torch operation and safety.

1.9 WARRANTY

A. Manufacturer's Guarantee: Manufacturer's standard form, non-pro-rated, without monetary limitation or deductibles, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks or breaches in the primary roof membrane causing moisture to enter the substrate below (even if visible leaks are not observed inside the facility).

1. Warranty to include but not be limited to membrane, insulation, base sheet, mastics, adhesives, fasteners, sealants, base flashings, etc.
2. Warranty Period: 20 years from date of Final Acceptance
3. Warranty to remain in effect for wind speeds up to 72 mph.
4. Warranties requiring the Owner's signature are not acceptable.

B. Contractor's Warranty:

1. Five Year Warranty: Manufacturer's Representative and Contractor's Representative will attend two post construction field inspections: 1) the first two years from the date of commencement of the Contractor's Warranty plus or minus one month and 2) the second no earlier than one month prior to the expiration date of the Contractor's Warranty. Submit a written report within seven (7) days of the site visit to the Engineer listing observations, conditions and recommended repairs or remedial action.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements herein, provide roof system from a single source. Manufacturers:

1. Derbigum
2. Siplast
3. Soprema, Inc.
4. Engineer's Accepted Equivalent

2.2 MEMBRANE MATERIALS

A. Roof Membrane:

1. A dimensionally stable roof membrane assembly consisting of 2 plies of a prefabricated, reinforced, homogeneous modified asphalt membrane torch applied to a prepared substrate.

    a. Both reinforcement mats impregnated and coated each side with a high-quality modified bitumen blend of Styrene-Butadiene-Styrene (SBS) or Atactic Polypropylene (APP).
    b. Pass ASTM D 5849, Resistance to Cyclic Joint Displacement at 14°F. Passing results show no signs of membrane cracking or interply delamination after 500 cycles as manufactured and 200 cycles after heat conditioning according to ASTM D 5147.

2. Base Ply Membrane: Glass fiber and/or polyester reinforced ply sheet manufactured for torch application, meeting or exceeding requirements of ASTM D 6163, D 6164 or D 6509, Type I or II, Grade S.

    a. Derbigum Derbibase Ultra
    b. *Siplast Paradiene 20 TG*
    c. Soprema Sopralene Flam 180

3. Surface Ply Membrane: Glass fiber and/or polyester reinforced ply sheet manufactured for torch application, meeting or exceeding requirements of ASTM D 6163, D6164 or D6222, Type I or II, Grade G. Granules to be white.

    a. Derbigum Derbicolor P-FR
    b. Siplast Paradiene 30 FR TG
    c. Sopralene Flam 180 FR GR

B. Flashings: Consist of a minimum of two plies.

1. Reinforcing/Stripping Ply:

    a. Derbigum Derbibase Ultra
    b. Siplast Paradiene 20 TG
    c. Soprema Sopralene Flam 180

2. Reinforcing/Stripping Ply (Self-Adhered):

   a. Derbigum PRS SA Base Sheet
   b. Siplast Paradiene 20 SA
   c. Soprema Sopralene Stick

3. Flashing/Target Ply:

   a. Derbigum Derbicolor P-FR
   b. Siplast Parafor 30 TG or Paradiene 40 FR TG
   c. Soprema 180 Flam GR

C. Fluid Applied Flashing: Membrane manufacturer's PMMA based resin with polyester fleece flashing system.

1. Derbigum Derbiflash
2. Siplast Parapro
3. Soprema Alsan RS

2.3 RELATED MATERIALS

A. Temporary Membrane/Vapor Retarder:

1. Torch: Glass fiber and/or polyester reinforced ply sheet manufactured for torch application, meeting or exceeding requirements of ASTM D 6163 or D 6164, Type I or II, Grade S; or ASTM D 6509.

   a. Derbigum Derbibase Ultra
   b. Siplast Paradiene 20 TG or Irex 40
   c. Soprema Elastophene SP 3.0

B. Base Sheet: Glass-reinforced, asphalt-coated base sheet meeting ASTM D 4601 or ASTM D 4897, Type II. Provide vented sheets for application over lightweight insulating concrete substrates as required by the membrane manufacturer.

1. Derbigum PRS Glass Base
2. Siplast Parabase FS
3. Soprema Modified Sopra G

C. Asphalt primer: ASTM D-41 and be approved for intended use by membrane manufacturer.

D. Solvent Free Adhesive: A single component, solvent-free modified asphalt adhesive designed for application of the specified roof membrane in areas below the fluid applied flashing.

E. Utility Roof Cement: An asphalt cutback general utility mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges and temporary seals conforming to ASTM D 4586 Type II requirements.

F. Sealant: An SBS polymer modified asphaltic flashing cement in a 10.4-ounce cartridge conforming to ASTM 4586 requirements approved by the roofing membrane manufacturer for use in conjunction with the roofing membrane materials.

G. Ceramic granules: Color scheme matching the granule surfacing of the cap sheet comparable to No. 11 granules.

H. Reinforcing Fabric: Woven fiberglass fabric treated with asphalt primer conforming to ASTM D 1668/D 1668M and approved by roof system manufacturer for intended use.

I. Walk Pad Material: Prefabricated (by the membrane manufacturer), puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic granule wearing surface.

2.4 FASTENERS

A. Base Sheet Fasteners:

1. G-90 galvanized steel one-piece unit with minimum 2.7-inch diameter plate and minimum 1.2-inch length. Approved by the membrane manufacturer for use in lightweight insulating concrete and inclusion in warranty.

    a. Olympic CR Base Sheet Fastener 1.2
    b. Siplast NVS Fastener
    c. Trufast FM-75 Base Sheet Fastener

B. Base Flashing Fasteners (Wood): Galvanized ring shank nail with 1 inch diameter cap, minimum 1 inch length and approved by the membrane manufacturer for inclusion in warranty:

1. Simplex Nails Regular Round Head Fasteners
2. Engineers accepted equivalent

C. Base Flashing Fasteners (Concrete/Masonry): 1/4-inch diameter metal-based expansion anchor for use in concrete or masonry substrates with length to penetrate substrate a minimum of 1-1/2 inch.

D. Termination Bar: 1/8-inch by 1-inch aluminum or stainless-steel flat bar with pre-drilled oversized or slotted holes 6 inches on center.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Conduct a pre-job conference including the Owner, Engineer, Contractor, and the membrane manufacturer's representative prior to the application of the roofing.

B. Verify work penetrating the roof deck or work affecting the roofing has been properly completed.

C. Inspect insulation system substrate prior to application of membrane. Commencement of work signifies acceptance of substrate. Correct defects in work resulting from accepted substrates at no additional expense to the Owner.

3.2 PREPARATION

A. Sweep or vacuum surfaces prior to commencement of roofing.

B. Coordinate closure of air intakes prior to application of primer and cold adhesives.

C. Unroll membranes and allow to relax in accordance with membrane manufacturer's recommendations or a minimum of thirty minutes, whichever is greater.

D. Where walls, curbs, expansion joints, etc. present an unacceptable substrate for flashing and where flashings substrates are combustible, fasten a layer of non-combustible cover board to provide a suitable substrate for flashing.

3.3 APPLICATION

A. General:

1. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements.
2. Complete base ply application following base sheet/insulation system application as a continuous operation on the same work day.
3. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is required. Make necessary preparations, utilize recommended application techniques, apply the specified materials (i.e. granules, etc.), and exercise care in ensuring that the finished application is acceptable to the Owner. Excessive footprints or impressions in the surface ply are grounds for rejection thereby requiring membrane replacement.
4. Priming:

    a. Prime metal flanges, concrete and masonry surfaces with a uniform coating of asphalt primer.
    b. Provide coverage of primer to ensure surfaces are dark brown to black with minimum application rate of 1 to 1-1/4 gallons.
    c. Allow primer to dry prior to application of asphalt/adhesive.

5. Inspect membrane and flashing application each day. Repair deficiencies daily prior to beginning or resuming other work.

    a. Cut open and remove membrane deficiencies as necessary.
    b. Make repairs to extend from lap to lap.

B. Base Sheet: Mechanically attach in accordance with the base sheet fastening pattern to as required by the manufacturer's tested assembly. Starting at the low point of the roof, over a properly prepared substrate, apply base sheet in a shingle fashion with minimum 6-inch end laps and 3-inch side laps. Apply asphalt primer to head and plates of fasteners.

C. Temporary Membrane/Vapor Retarder:

1. Apply membrane in accordance with the manufacturer's instructions and the following requirements.
2. Apply layers of roofing free of wrinkles, creases or fishmouths.

3. Exert sufficient pressure by use of roller or broom on the roll during application to ensure prevention of air pockets.
4. Apply layers of roofing perpendicular to the slope of the deck.
5. Bond to the prepared substrate, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps following sheet application. Stagger end laps a minimum of 3 feet.
6. Provide flashings consisting of the following:

    a. Provide fluid applied flashing at roof drains, soil pipes, pipe penetrations and/or where specified in the Contract Documents. Extend height of fluid applied flashing above the finished height of the lightweight insulating concrete.
    b. Provide separate temporary membrane/vapor retarder flashing ply at curbs and walls to extend 4 inches onto temporary membrane and height to extend above the finished height of the lightweight insulating concrete. Utilize manufacturer approved self-adhering modified bitumen ply at combustible substrates and/or cant strips and install self-adhering flashing prior to torching temporary membrane.

D. Roof Membrane:

1. Apply membrane in accordance with the manufacturer's instructions and the following requirements.
2. Apply layers of roofing free of wrinkles, creases or fishmouths.
3. Exert sufficient pressure by use of roller or broom on the roll during application to ensure prevention of air pockets.
4. Stagger the lap seams between the base ply layer and the surface ply layer.
5. Apply layers of roofing perpendicular to the slope of the deck with laps shingled to prevent back water laps or strap as required by roof membrane manufacturer due to slope.
6. Back nail as required by roof membrane manufacturer due to roof slope.
7. Bond the base ply to the prepared substrate, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps following sheet application. Stagger end laps a minimum of 3 feet.
8. Bond the surface ply to the base ply, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the torch applicator. Stagger end laps of the surface ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps following sheet application. Stagger side laps of the surface ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the surface ply a minimum 3 feet from end laps in the underlying base ply.
9. Follow membrane manufacturer's recommendations if hot air welding of laps is required.

E. Torch:

1. Utilize heat welders experienced in torch application.

2. Warm the surface to which the membrane is being applied, preheat portions of the roll and melt the modified asphalt on the back of the sheet to adhere the membrane. The area of the roll where the modified asphalt is being melted is the most critical. Heat roll evenly across the width of the sheet being heat welded.
3. Ensure a small bead of asphalt precedes the roll as it is laid down. Ensure bead of asphalt flows out on both sides of the sheet and be visible.
4. Granule Embedment: Embed granules at locations where membrane material is installed over a granulated surface and a selvage edge is not present. Using a torch or embedment tool, heat the area and push the granules down into the heated bitumen. Do not scrape or remove the granules from the surface.

F. Water cut-off: At end of day's work, or when precipitation is imminent, construct a water cut-off at open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Remove cut-offs prior to the resumption of roofing.

G. Flashings:

1. Install concurrently with the membrane installation.
2. Prior to installing flashings over plywood substrates, install a layer of rosin paper and base sheet. Secure to plywood with specified fasteners at 6 inches on center staggered.
3. Prior to torch application along cant strips, provide self-adhered flashing ply in accordance with the below requirements.
4. Base flashing consists of a reinforcing ply and flashing ply.

    a. Lap reinforcing ply a minimum of 3 inches at side laps, extend a minimum of 4 inches onto the base ply from the base of the cant and extend a minimum of 3 inches up the vertical termination above the toe of the cant or as noted in the detail drawings.
    b. Lap flashing ply a minimum of 3 inches at side laps, extend a minimum of 6 inches from the toe of the cant onto the surface ply and extend a minimum of 3 inches up the vertical termination above the toe of the cant or as noted in the detail drawings.
    c. Stagger side laps in the reinforcing ply and flashing ply.
    d. Cut off the end of the roll and be apply reinforcing ply and flashing ply vertically, always working to a selvage edge.

5. Mechanically terminate base flashing a minimum of 8 inches above the finished roof surface.

    a. Wood Substrate: Mechanically terminate base flashings using specified fasteners 6 inches on center.
    b. Concrete/Masonry Substrate: Mechanically terminate base flashing 6 inches on center using specified fasteners and termination bar.
    c. Gypsum Sheathing Substrate over Metal Stud Wall: Mechanically terminate using specified fasteners and termination bar into each metal stud.

6. Seal top of base flashings and termination fasteners with 3-course of roof cement and reinforcing fabric after termination.

7. Terminate base flashing at roof edges by extending the base flashing at least two inches beyond the edge of the roof and mechanically attaching a termination bar vertically with appropriate fasteners six inches on center. Provide a continuous bead of sealant along outside edge of termination bar.
8. Seal off sheet metal incorporated into the roofing system with stripping ply.

    a. Torch apply and fit tight to the edge of the sheet metal.
    b. Extend four inches beyond sheet metal onto roof membrane.
    c. Install prior to application of surface ply.

9. Provide sealant installed to fill void between edge of sheet metal and surface ply edge (i.e. at metal edge, pipe penetrations, etc.) properly tooled to ensure adhesion and slope to shed water. Broadcast granules into properly installed sealant.

H. Fluid Applied Flashing:

1. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to set.
2. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.
3. Refer to manufacturer's installation instructions for application rates and additional installation information.
4. Broadcast granules into horizontal surface of fluid to match adjacent surface ply.

I. Retrofit Roof Drain:

1. Adhere base ply in bed of solvent free adhesive around drain bowl.
2. Install retrofit roof drain according to manufacturer's installation instructions and strip-in with stripping membrane to extend 4" beyond drain flange.
3. Provide fluid applied flashing as shown in the contract drawings and indicated above.
4. Refer to Section 22 14 26 "Roof Drains".

J. Walk Pad Material:

1. Apply walk pad material to a clean, dry surface.
2. Prior to application, cut walk pad material into maximum 5 foot lengths and allow to relax until flat. Use a straight edge or chalk line to ensure straight square cuts. Do not cut the walk pad material directly on the roof surface.
3. Position walk pad material so as to leave minimum 2 inch gaps between panels to allow for proper drainage.
4. Adhere walk pad panels to surface ply with roof cement applied to the back of the panels in spots approximately 5 inches square. Use a notched trowel to keep the cement 3/8-inch thick.
5. Walk-in each panel to ensure contact with the membrane surface.
6. Provide walk pads where indicated in Contract Drawings and at the following locations:

    a. Around roof hatches.
    b. At base and top of fixed wall access ladders.
    c. Around HVAC units.
    d. At door access to roof areas.

K. Ponding Water: The ponding of water on the roof surface after installation of the roofing system is not acceptable and is grounds for rejection of the roof. Ponding is herein defined as precipitation remaining in a four-square foot area or larger, 1/4 inch or deeper for a period of 24 hours from the termination of precipitation. Do not install surface ply until verification of proper drainage has been determined. Provide modifications to roof system to ensure proper drainage including but not limited to reinstallation of roof system, installation of additional tapered insulation and/or installation of additional base plies.

3.4 CLEANING

A. Remove debris and excess material from the roof area. Pick-up loose fasteners and sheet metal scraps.

B. Clean off/remove excess adhesive, sealant, stains and residue on the membrane and flashing surfaces.

END OF SECTION