INVITATION FOR BIDS
for
Water Treatment Facility Roofs

Prepared by

CITY OF BILLINGS
Public Works Department
2251 Belknap Avenue
Billings, MT 59101

October 2012

INVITATION FOR BID (IFB)

Name of Good or Service Requested: **Water Treatment Facility Roofs**

Contents:

A. Summary of Invitation for Bid

This bid is for the purpose of entering into a contract (or contracts) to re-roof the High Service Pump Station (Attachment A) and/or the Chemical Feed Building (Attachment B) for the City of Billings. The successful bidder(s) agrees to provide the City of Billings with an acceptable quality of equipment/service, performance and workmanship as determined by the City of Billings.

It is the purpose of this bid to obtain the best quality of equipment/service at the most favorable price to the City of Billings. Consideration will be given for the level of service offered and ability to meet stated specifications as outlined in the contract documents.

The lowest bid need not be accepted if it is documented that a specific supplier in the past has been a poor performer or has provided poor goods. The bidder will be selected based upon their skill sets, ability and integrity to fulfill the contract obligations.

B. Instructions to Bidders

Sealed bids entitled **Water Treatment Facility Roofs** for the City of Billings Public Works Department, Billings, Montana, must be sent and addressed to the City Clerk of Billings, Montana, at the office of the City Clerk, 210 N. 27th Street, Billings, Montana 59101, up until 2:00 PM on Tuesday, October 23, 2012.

This project generally consists of, but is not limited to: Installation of new PVC membrane roofing over existing roofs on the High Service Pump Station and/or the Chemical Feed Building at 2251 Belknap Avenue, Billings, MT in accordance with the attached specifications (Attachment A and Attachment B).

More specific additional information regarding this project may be obtained by contacting Michael Rubich by telephone at 406-657-8349, in person at 2251 Belknap Ave.; Billings, MT 59101, or via email at rubichm@ci.billings.mt.us.

A non-mandatory, pre-bid, walk-through will be held on October 17, 2012, at 1:00 p.m. – Water Treatment Facility Conference Room at 2251 Belknap Avenue, Billings, MT. Interested Contractors are encouraged to attend.

Each bid must be accompanied by a Certified Check, Cashier's Check, or Bid Bond payable to the City of Billings, Montana, in the amount not less than ten percent (10%) of the total amount of the bid. The bid security will be retained by the City Clerk until the successful bidder enters into a contract with the City of Billings. If no contract is entered into, by the successful bidder, within sixty (60) days the bond will be forfeited to the City of Billings. Successful bidders will also be required to furnish separate approved Performance Bonds for each contract in the amount of one hundred percent (100%) of the contract amount.

No bids may be withdrawn after the scheduled time for the public opening of bids, which is 2:00 PM on Tuesday, October 23, 2012.

The right is reserved to reject any or all bids received, to waive irregularities, to postpone the award of the contract for a period of not to exceed sixty (60) days, and to accept that bid which is in the best interests of the City of Billings, Montana.

The City of Billings is an Equal Opportunity Employer.

EXAMINATION OF DOCUMENTS

Before submitting a bid, the bidder shall:

a. Carefully examine the Standards and Specifications as well as all other attached documents;
b. Fully inform themselves of the existing conditions and limitations;
c. Include with the bid sufficient information to cover all items required in the specifications.

BID COMPLIANCE

It shall be the responsibility of the bidder to see that all bids are sealed and submitted to the office of the City Clerk at City Hall, 210 North 27th Street, Billings, Montana 59101 (P.O. Box 1178, Billings, MT 59103), before 2:00 PM on Tuesday, October 23, 2012.

BID MODIFICATIONS

Bids shall be made on the forms provided herein; they shall not contain any recapitulation of the work to be done. Modifications, additions or changes to the terms and conditions of this Invitation for Bid may be cause for rejection of the bid. Bids submitted on other forms may be rejected. No oral, telephone, email, fax or telegraphic bids or modifications will be considered.

CERTIFICATION OF ALTERATION OR ERASURE

A bid shall be rejected should it contain any material alteration or erasure, unless, before the bid is submitted, each such alteration or erasure has been initialed in INK by the authorized agent signing the bid.

INTERPRETATION PRIORITY

Should a bidder find discrepancies in, or omissions from, the specifications, or be in doubt as to their meaning, bidder shall notify Michael Rubich by telephone at 406-657-8349, in person at 2251 Belknap Ave., Billings, MT 59101 or via email at rubichm@ci.billings.mt.us, who will send written instructions or addenda to all bidders. The City will not be responsible for oral interpretation. All addenda issued prior to bid opening shall be incorporated into and become a portion and part of the contract/agreement upon award. Questions received less than ninety-six (96) hours before the bid opening cannot be answered.

SIGNATURE

All bids shall be typewritten or prepared in ink and must be signed in longhand by the bidder or bidder's agent or designee, with his/her usual signature. A bid submitted by a partnership must be signed with the partnership name to be followed by the signature and designation of the partner signing. Bids by corporations must be signed with the legal name of the corporation, followed by the name and signature of an authorized agent or officer of the corporation. Bids submitted by a proprietorship must be signed by the owner; the name of each person signing shall be typed or printed legibly below the signature.

WITHDRAWAL OF BIDS

Bidders may withdraw their bid either personally or by written request at any time prior to the time set for bid opening. No bid may be withdrawn or modified after the time set for opening, unless and until the award of the contract is delayed for a period exceeding sixty (60) days.

BID PRICE VALID

Bidders must honor their bid price for sixty (60) days from the date of sealed bid opening.

CERTIFICATION

The bidder certifies that the bid has been arrived at by the bidder independently and has been submitted without any collusion designed to limit independent bidding or competition. The bidder further certifies that the materials, products, services and/or goods offered herein meet all requirements of the stated specifications and are equal in quality, value and performance with highest quality, nationally advertised brand and/or trade names.

INSURANCE

The bidder certifies that they can provide a statement and meet the City of Billings minimum Commercial General Liability and Automobile insurance requirements of $750,000 per claim and $1,500,000 per occurrence, and the City being named as an additional insured. The certificate will be provided to the City prior to contract execution.

EVIDENCE OF QUALIFICATION

Upon request of the City of Billings, a bidder whose bid is under consideration for award may be required to manifest satisfactory evidence of his financial resources, experience, the organization and equipment as well as service provisions bidder has available or will make available. In determining the lowest responsible bidder, in addition to price, the following considerations may be addressed:

(a) The ability, capacity and skill of the bidder to perform the contract or provide the service required.
(b) The character, integrity, reputation, judgment, experience and efficiency of the bidder.
(c) Whether the bidder can perform the contract within time specified.
(d) The quality of performance of previous contracts, agreements and/or performance.
(e) Previous and/or existing compliance by the bidder with laws relating to the contract or services.
(f) Such other information which may be secured having a bearing on the decision to award the contract.

CONTRACTORS' GROSS RECEIPTS TAX

The bidder understands that, if applicable, all contractors or subcontractors working on a publicly funded construction project are required to pay or have withheld from earnings one percent (1%) of the gross contract price if the gross contract price is Five Thousand Dollars ($5,000) or more.

PREVAILING WAGE REQUIREMENTS – MONTANA

Unless superseded by federal law, Montana law requires that contractors and subcontractors give preference to the employment of Montana residents for any public works contract in excess of $25,000 for construction or nonconstruction services in accordance with sections 18-2-401 through 18-2-432, MCA, and all administrative rules adopted pursuant thereto. Unless superseded by federal law, each contractor shall ensure that at least 50% of the contractor's workers performing labor on a construction project are bona fide Montana residents. The Commissioner of the Montana Department of Labor and Industry has established the resident requirements in accordance with sections 18-2-403 and 18-2-409, MCA. Any and all questions concerning prevailing wage and Montana resident issues should be directed to the Montana Department of Labor and Industry.

In addition, unless superseded by federal law, all employees working on a public works contract shall be paid prevailing wage rates in accordance with sections 18-2-401 through 18-2-432, MCA, and all administrative rules adopted pursuant thereto. Montana law requires that all public works contracts, as defined in section 18-2-401, MCA, in which the total cost of the contract is in excess of $25,000, contain a provision stating for each job classification the standard prevailing wage rate, including fringe benefits, travel, per diem, and zone pay that the contractors, subcontractors, and employers shall pay during the public works contract.

Furthermore, section 18-2-406, MCA, requires that all contractors, subcontractors, and employers who are performing work or providing services under a public works contract post in a prominent and accessible site on the project staging area or work area, no later than the first day of work and continuing for the entire duration of the contract, a legible statement of all wages and fringe benefits to be paid to the employees in compliance with section 18-2-423, MCA. Section 18-2-423, MCA, requires that employees receiving an hourly wage must be paid on a weekly basis.

Each contractor, subcontractor, and employer must maintain payroll records in a manner readily capable of being certified for submission under section 18-2-423, MCA, for not less than three years after the contractor's, subcontractor's, or employer's completion of work on the public works contract.

The nature of the work performed or services provided under this contract meets the statutory definition of a "public works contract" under section 18-2-401(11)(a), MCA, and falls under the category of Building Construction services. The booklet containing Montana's 2012 Rates for Building Construction Services may be found at http://erd.dli.mt.gov/laborstandard/prevwage/Current.asp.

C. Contract Requirements and Specifications

High Service Pump Station – Attachment A
Chemical Feed Building – Attachment B

Weather permitting, job is to be completed within 60 days of City's order.

D. Pricing

Please bid net prices at which you will agree to furnish required goods or services.

Bid Item 1 – High Service Pump Station Roof per specifications (Attachment A).

TOTAL BID PRICE - _____ dollars
(words)
and _____ cents ($_____)
(words) (figures)

Bid Item 2 – Chemical Feed Building Roof per specifications (Attachment B).

TOTAL BID PRICE - _____ dollars
(words)
and _____ cents ($_____)
(words) (figures)

Bid Item 3 – *Single award* of High Service Pump Station Roof *and* Chemical Feed Building Roof per specifications (Attachment A and Attachment B).

TOTAL BID PRICE - _____ dollars
(words)
and _____ cents ($_____)
(words) (figures)

The City reserves the right to award each roof separately (Bid Items 1 and 2) or to award to a single contractor (Bid Item 3), whichever is most advantageous to the City. The City also reserves the right not to award any bid item at its own discretion.

Addendum Acknowledgment:

Bidder has examined and carefully studied the bidding documents, other related data identified in the bidding documents and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

E. Standard Terms and Conditions

In case of default by the successful bidder or failure to deliver the goods or services within the time specified, the City Purchasing Agent, after written notice, may procure them from other sources and hold contractor responsible for excess costs occasioned thereby.

The specifications attached to the instructions to bidders establish a standard of quality desired by the City of Billings. Any bidder may submit quotations on any article which substantially complies with these specifications as to quality, workmanship and service. The City of Billings reserves the right to make its selections of materials or services purchased, based on its best judgment as to which articles substantially comply with the requirements of the specifications.

No alteration in any of the terms, conditions, delivery, quality, or specifications will be effective without prior written consent of the City of Billings.

No exception to delivery or service dates shall be allowed unless prior written approval is first obtained from the City of Billings.

The contractor warrants all articles supplied under this contract to conform to specifications, herein. The contractor will deliver a warranty stating that all articles supplied under the contract are fit and sufficient for the purpose manufactured, merchantable, and free from defects.

In the event the City is entitled to a prompt payment or cash discount, the period of computation shall commence on the date of delivery, or receipt of correctly completed invoices, whichever is later. If an adjustment of payment is necessary, the discount period shall commence on the date final approval for payment is authorized.

The contractor agrees not to discriminate against any client, employee or applicant for employment or for services, because of race, creed, color, national origin, sex or age with regard to, but not limited to, the following: employment upgrading; demotion or transfer; recruitment or recruitment advertising; layoffs and termination; rates of pay or other forms of compensation; selection for training; rendition of services. It is further understood that any contractor who is in violation of this shall be barred forthwith from receiving awards of any purchase order for the City unless a satisfactory showing is made that discriminatory practices have terminated and that a reoccurrence of such acts are unlikely.

The City reserves the right to cancel and terminate this contract forthwith upon giving 30 days written notice to the contractor. (This provision does not apply to the purchase of materials and equipment. A purchase order for materials and equipment is a binding contract.)

Should either party employ an attorney or attorneys or utilize the services of in-house attorneys to enforce any of the provisions hereof or to protect its interest in any manner arising under this contract, the non-prevailing party in any action pursued in a court of competent jurisdiction agrees to pay to the prevailing party all reasonable costs, damages, expenses, and attorneys' fees, including fees for in-house attorneys, expended or incurred in connection therewith.

Where applicable, possible or required, bidder is required to submit descriptive literature, sample material, design sketches and detailed shop drawings. Failure to submit required items may result in rejection of the bid or termination of contract.

The successful bidder may not make any advertising or sale use of the fact that contract items are being used by purchaser and other approved agencies, under penalty of contract termination.

This Agreement shall be construed and enforced in accordance with the laws of the State of Montana. Venue for any suit between the parties arising out of this Agreement shall be the State of Montana Thirteenth Judicial District Court, Yellowstone County.

The contractor may not assign or subcontract the agreement, or the right to receive reasonable performance of any act called for by the contract, shall be deemed waived by a waiver by City of a breach thereof as to any particular transaction or occurrence.

Regardless of FOB point, contractor agrees to bear all risks of loss, injury, or destruction of goods and materials ordered herein and such loss, injury, or destruction shall not release contractor from any obligation hereunder.

F. Conditions and Non-Collusion Agreement

To receive consideration, this form must be signed in full by a responsible, authorized agent, officer, employee or representative of your firm.

CONDITIONS AND NON-COLLUSION AGREEMENT

We have read and agree to the conditions and stipulations contained herein and to the Standard Terms and Conditions contained on the attached.

We further agree to furnish the product/services specified at the prices stated herein. We additionally agree to deliver the products/services to the location and by the date set forth herein, if applicable.

In signing this bid, you also certify that you have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a bid; that this bid has been independently arrived at without collusion with any other bidder, competitor or potential competitor; that this bid has not been knowingly disclosed prior to the opening of bids to any other bidder or competitor; that the above statement is accurate under penalty of perjury.

Legal Name of Firm/Corporation	Authorized Signature
Address	Printed Name
City/State/Zip	Title
Date	Telephone Number

G. Intent to Respond Form

Fax the following Intent to Respond form to Michael Rubich at least two (2) working days prior to the Bid Opening date of **Tuesday, October 23, 2012** *even if your company chooses NOT to participate*.

To: City of Billings – Public Works Department
Attn: Michael Rubich
Phone: 406-657-8349
Fax: 406-247-8580

From: _____ Contact Name
_____ Company Name
_____ Company Address
_____
_____ Email Address
_____ Phone Number
_____ Fax Number

Please indicate whether or not you intend to submit a bid on: **Tuesday, October 23, 2012** by checking Yes or No.

We intend to respond by the specified due date:

Yes _____ No _____

_____ _____
Company Name Date

_____ _____
Contact Name (please print) Title

_____
Signature of Contact Position

By signing the above, I certify that I am authorized by the Company named above to respond to this request.

ATTACHMENT A

CONTRACT REQUIREMENTS AND SPECIFICATIONS FOR HIGH SERVICE PUMP STATION ROOF

PART 1 - GENERAL

1.1 SUMMARY The High Service Pump Station will be re-roofed with a new PVC membrane system over the existing built up roofing (BUR) system. The roof will require approximately 9,100 square feet of membrane. Work elements will include but not be limited to preparation of the existing surface for overlay, installation of a mechanically fastened UL Class A 1/4" primed cover board followed installation of a white, fully adhered PVC membrane. Metal fasteners, plates, accessory components, and adhesives are to be appropriate to substrate and as recommended by manufacturer of membrane materials. For the purpose of this bid it is assumed that the sheet metal copings (metal wall caps on roof perimeter) may be salvaged and reused.

Measurements and quantities provided in these specifications are approximate and provided for general information only. Prospective contractors should use their own measurements in preparing their bid.

1.2 QUALITY ASSURANCE

A. Manufacturer Requirements: Company specializing in manufacturing the PVC membranes meeting the specifications listed with minimum 20 years documented experience.

B. Installer Requirements:

1. Company specializing in applying thermoplastic roofing with minimum 5 years documented experience.

2. Trained and certified by the manufacturer for installation of the roofing system proposed (Documentation required prior to contract approval).

C. Referenced Standards - Installation of the specified roofing system shall comply with applicable sections of the following references and the manufacturers installation instructions:

1. FM 4470- Corrosion Resistance Testing for Insulation Fasteners.

2. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.

3. ASTM C208-209 - Standard Specification for Cellulosic Fiber Insulating Board.

4. ASTM C165 - Test Method for Measuring Compressive Properties of Thermal Insulation.

5. ASTM C1289 -Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

6. ASTM D1079 - Standard Terminology Relating to Roofing, Waterproofing, and bituminous Materials.

7. ASTM E108 - Fire Resistance Testing.

8. Underwriters Laboratory (UL) - Roofing Systems and Materials Guide (TGFU-R15546).

9. CAN/CGSB 37.54-95.

10. ASTM E430-05 - Standard Specification for Expanded Polystyrene Insulation.

11. ASTM D4434 - Standard Specification for Poly-Vinyl-Chloride (PVC) Sheet Roofing.

12. Sheet Metal and Air Conditioning National Association, Inc. (SMACNA) - Architectural Sheet.

13. American Society of Civil Engineers (ASCE) - ASCE 7 - Minimum Design Loads for Building and Other Structures.

1.3 DESIGN RESPONSIBILITY AND CRITERIA

A. Installer shall comply with all applicable building codes.

B. Installer is responsible for obtaining all applicable permits.

C. Work shall conform to NRCA Roofing and Waterproofing Manual and manufacturer's instructions. It is the responsibility of the installer to address any conflicts or disparities between NRCA requirements and manufacturer's requirements.

D. All materials used shall be provided or approved by the membrane manufacturer and in compliance with applicable specifications in this attachment.

E. Wind Uplift resistance: UL Class 90.

1.4 SUBMITTALS

A. Documentation of manufacturer and installer qualifications per Section 1.2 A. and B.

B. Submit 8"x 11" samples of specified color of PVC membrane for approval.

C. Shop drawing showing cross section of proposed roof system.

D. Submit product data indicating membrane materials, base flashing materials, cover board, accessories and manufacturer's installation instructions and details as applicable to this installation.

1.5 WARRANTY

A. 20-year, No Dollar Limit, Full Systems Factory Warranty to include workmanship.

1. Warranty to include total system: membrane, flashings, adhesives, sealants, counter-flashings, cover board, fasteners, fastener plates and all other materials applicable this installation as authorized by the manufacturer.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture. Cover material so as to prevent condensation beneath covering.

C. Adhesives shall be stored at temperatures above 40 degrees F and restored to at least 60 degrees F prior to use.

D. Store materials and equipment in a manner to avoid significant and/or permanent deflection of deck. Spread loads of roofing materials on roof.

E. Lightweight materials shall be weighted down to prevent wind damage.

1.7 JOB CONDITIONS

A. Install roofing only when adequate application temperatures that result in a satisfactory roofing system application can be maintained; apply no insulation or membrane adhesives to the substrate or roofing membranes when deck surface temperatures are less than the recommended application temperature range stated on the products labels, or printed literature. Install no roofing material when water in any form is present on roof deck surface, or when materials are damp or wet. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

B. The surface to which the cover board or roofing membrane is to be applied shall be cleaned and free of any projections or contaminants that would prevent proper application or be incompatible with the new installation, such as, fins, sharp edges, foreign materials, oil and grease.

PART 2 – PRODUCTS

2.1 ROOF SYSTEM

A. Fully adhered PVC membrane over existing BUR Roofing system on top of a structural concrete deck.

1. Cover Board - Manufacturer approved, primed UL Class A cover board, Thickness: 1/4".

2. Membrane - 60 mil Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane, conforming to the following standards:

Minimum Physical Properties- 60 mil PVC Membrane		
Property	**Test Method**	**Required Value**
Color	N/A	White
Tolerance on Nominal Thickness (max)	ASTM D751	+/- 10%
Breaking Strength (lbf/in) (min)	ASTM D751 Grab Method	≥300 Lbs ≥340 Lbs
Tearing Strength(Lbf)	ASTM D751	≥55 Lbs
Change in Weight After Immersion in Water (%)	ASTM D750	<3%
Seam Strength	ASTM D751	>90%
Solar Reflectivity		≥0.85
Thermal Emittance		≥0.85

2.1 MISCELLANEOUS MATERIALS

A. Fasteners: Type, spacing and quantity as recommended by manufacturer.

B. Wood Nailers: Wood nailers are to be #2 or better, Creosote and asphalt free lumber with a maximum moisture content of 19% by weight on a dry weight basis.

C. All other required miscellaneous materials: As recommended by the manufacturer.

PART 3 – EXECUTION

3.1 INSPECTION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify that deck is supported and secured.

C. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set.

D. Verify that attachment capabilities of the roof deck and fasteners by conducting pull-out tests per ANSI-SPRI FX-1-2003.

E. Beginning of installation means installer accepts substrate.

3.2 PROTECTION

A. Protect building surfaces against damage from roofing work. Provide safety barriers and other protection devises as needed to protect property and people.

3.3 INSTALLATION

A. General:

1. All drains, projections and edges shall be installed in strict accordance with practices set forth in the NRCA Roofing Manual and/ or manufacturer's instructions. All mechanical equipment requiring fastening shall be fastened with hex head screws with neoprene washers.

2. Provide cut-offs at end of each day's work, to cover exposed partially installed membrane and insulation. Remove cut-offs before resuming work.

3. In finished areas, storing, walking, wheeling, or trucking will not be permitted. Provide smooth, clean boards or plank walkways, runways, and platforms near supports, as needed to distribute weight to conform to live load limits and transient loads imposed during roofing installation and construction.

4. Membrane overlaps shall be shingled with the flow of water whenever possible.

B. Cover Board

1. Primed cover board is to be attached to the roof deck per the fastening requirements needed to meet the design pressure, local building code and the recommendations of the cover board manufacturer.

2. Start by installing a cut layer of roof board, achieving a minimum end-lap and side-lap offset of the underlying courses by 12", at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the cover board per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Ensure that the fasteners engage the upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of cover board as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.

3. All courses shall be installed with side and end-laps of no more than 1/4" gaps.

4. Do not kick or damage cover board during installation. All damaged, severely cupped, or unusable pieces must be discarded.

5. Cover board must be installed with the correct face side up (as written on the face).

6. Cover board must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, etc.).

7. Completely cover with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. COVER BOARD MAY NOT BE LEFT UNCOVERED OVERNIGHT.

C. Membrane

1. Fully Adhered Field Membrane is to be attached to the roof deck per the fastening and fastener requirements for the design pressure listed in this document and in accordance with the local building code.

2. All Zones (1 field, 2 perimeter, & 3 corner): Start by installing a 72" (full rolls) wide sheets at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) so that the water flows over, but never against the side laps. Turn over the edge, below the nailer (roof edge applications) or at the base of the perimeter parapet or roof curbs. Apply adhesive to the top surface of the substrate and the bottom surface of the sheet at the nominal rate of 1 gallon per 120 square feet or as specified by the manufacturer. Allow the adhesive to dry to the touch. Carefully roll the sheets in and avoid wrinkles or buckles. Use a weighted roller and run over the entire surface of the adhered membrane to ensure a bond between the bottom surface of the membrane, and the adhesive applied to the surface of the substrate.

3. Welding Start-Up (start of every welding cycle: morning, after break, after lunch, etc.): Before starting any finish welding, operators are to conduct test welds using the same membrane at the same ambient temperature as the just installed courses. Cut 1” wide strips of the test membrane and pull apart (tear bond) to determine quality of the welds. A satisfactory weld is demonstrated when the weathering layer (membrane surface) is fully welded to the underside of the overlapping membrane, and when pulled is torn away exposing the reinforcement scrim of the underlying membrane. Minimum acceptable Automatic welds are 1" wide. Minimum acceptable hand welds shall be 1½” wide. Monitor and adjust automatic welder temperature and speed throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).

4. All courses shall be installed with 3" side-laps, and 4" end-laps.

5. Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, etc.).

D. Roof Flashings

1. Install the field, perimeter, and corners as described in sections above.

2. Cone Flashings: Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/penetrations. Penetrations greater than 6” in diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark 1/2" above height of penetrations and install a continuous 1/8" bead of manufacturer approved water stop around penetration. Slide cone flashing over penetration and center. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

3. Slit Cone Flashings: Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/penetrations. Penetrations greater than 6” in diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark 1/2" above height of penetrations and install a continuous 1/8" bead of manufacturer approved water stop around penetration. Wrap cone flashing around penetration and center. Tack weld in several spots to prevent flashing from becoming misaligned. Heat weld around the perimeter of the target sheet and up the vertical lap of the split cone. Probe and repair all non-welded areas.

4. Install stainless steel draw band 1/8" below the top of the cone to penetration connection and tool in a 1/4" continuous bead of manufacturer approved urethane sealant at the top of the flashing.

5. Base Flashings: Install manufacturer approved membrane plates and fasteners evenly distributed around the base of all roof to wall (curbs, parapet walls, roof top equipment, etc.) per manufacturer’s instructions. Cut base flashing membrane to size and either adhere using manufacturer approved adhesive applied to both the substrate and the back of the base flashing membrane, or loose laid per the manufacturer’s instructions. Heat weld around the perimeter of the base flashing sheet. Heat weld the appropriate inside or outside corner. Probe and repair all non-welded areas. Terminate the top of the membrane by installing a continuous bead of manufacturer approved water stop between the top of the sheet and the top edge of the vertical substrate and nail using the appropriate fastener spaced on 6” centers. Counter flash as specified.

E. Roof Edge

1. Lay the manufacturer approved Clad Metal tightly to the interior edge of the roof edge and secure to the wood nailer/blocking using approved fasteners that meet the withdrawal requirements for perimeter securement by the local building code.
2. Gap all end joints a minimum of 1/4" and install 2" wide manufacturer approved foil tape starting at the bottom edge of the crimp and to the interior outer edge of the deck flange.

3. Heat weld a 5” wide, non-reinforced patch centered over the metal joint.

4. Install a 6” metal cover strip by welding the cover strip to the membrane starting at the top edge of the deck flange. Over-lap all ends a minimum of 3” and heat weld the overlap.

F. Roof Drains

1. Install membrane plates and fasteners evenly around the base of the roof drain on 6" centers. Cut drain flashing membrane to size and heat weld around the perimeter. Probe and repair all non-welded areas. Make a small hole to allow water to enter drain. Using a sharp knife, cut small "x" where the drain bolt can be inserted to the drain bowls threaded hole. Lift target and apply a heavy bead of manufacturer approved water stop between the drain and the target sheet. Lay clamping ring and strainer basket over the target sheet, thread in the drain bolts, than tighten to provide compression seal at the drain.

G. Roof Scuppers

1. Install the perimeter and corner membranes, and the base flashings of the perimeter walls as described in previous sections.

2. Position scupper over the scupper opening. Fasten the scupper at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

H. Roof Vents

1. Install the perimeter and corner membranes, and the base flashings of the perimeter walls as described in previous sections.

2. Position vent over the opening. Fasten the vent at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

I. Clean Up

1. All debris must be cleaned up by the installer and disposed in a legally acceptable manner.

J. Manufactures Post Installation Inspection

1. A representative of the manufacturer shall make a post installation inspection and issue a written report to the owner.

ATTACHMENT B

CONTRACT REQUIREMENTS AND SPECIFICATIONS FOR CHEMICAL FEED BUILDING ROOF

PART 1 - GENERAL

1.1 SUMMARY The Chemical Feed Building will be re-roofed with a new white PVC membrane system over the existing EDPM roofing system. The roof will require approximately 5,220 square feet of membrane. Work elements will include but not be limited to preparation of the existing surface for overlay, installation of a mechanically fastened UL Class A 1/4" primed cover board followed by installation of a white, fully adhered PVC membrane. Metal fasteners, plates, accessory components, and adhesives are to be appropriate to substrate and as recommended by manufacturer of membrane materials. For the purpose of this bid it is assumed that the sheet metal copings (metal wall caps on roof perimeter) may be salvaged and reused.

Measurements and quantities provided in these specifications are approximate and provided for general information only. Prospective contractors should use their own measurements in preparing their bid.

1.2 QUALITY ASSURANCE

A. Manufacturer Requirements: Company specializing in manufacturing the PVC membranes meeting the specifications listed with minimum 20 years documented experience.

B. Installer Requirements:

1. Company specializing in applying thermoplastic roofing with minimum 5 years documented experience.

2. Trained and certified by the manufacturer for installation of the roofing system proposed (Documentation required prior to contract approval).

C. Referenced Standards - Installation of the specified roofing system shall comply with applicable sections of the following references and the manufacturers installation instructions:

1. FM 4470- Corrosion Resistance Testing for Insulation Fasteners.

2. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.

3. ASTM C208-209 - Standard Specification for Cellulosic Fiber Insulating Board.

4. ASTM C165 - Test Method for Measuring Compressive Properties of Thermal Insulation.

5. ASTM C1289 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

6. ASTM D1079- Standard Terminology Relating to Roofing, Waterproofing, and bituminous Materials.

7. ASTM E108 - Fire Resistance Testing.

8. Underwriters Laboratory (UL) - Roofing Systems and Materials Guide (TGFU-R15546).

9. CAN/CGSB 37.54-95.

10. ASTM E430-05 - Standard Specification for Expanded Polystyrene Insulation.

11. ASTM D4434 - Standard Specification for Poly-Vinyl-Chloride (PVC) Sheet Roofing.

12. Sheet Metal and Air Conditioning National Association, Inc. (SMACNA) - Architectural Sheet.

13. American Society of Civil Engineers (ASCE) - ASCE 7 - Minimum Design Loads for Building and Other Structures.

1.3 DESIGN RESPONSIBILITY AND CRITERIA

A. Installer shall comply with all applicable building codes.

B. Installer is responsible for obtaining all applicable permits.

C. Work shall conform to NRCA Roofing and Waterproofing Manual and manufacturer's instructions. It is the responsibility of the installer to address any conflicts or disparities between NRCA requirements and manufacturer's requirements.

D. All materials used shall be provided or approved by the membrane manufacturer and in compliance with applicable specifications in this attachment.

E. Wind Uplift resistance: UL Class 90.

1.4 SUBMITTALS

A. Documentation of manufacturer and installer qualifications per Section 1.2 A. and B.

B. Submit 8"x 11" samples of specified color of PVC membrane for approval.

C. Shop drawing showing cross section of proposed roof system.

D. Submit product data indicating membrane materials, base flashing materials, cover board, accessories and manufacturer's installation instructions and details as applicable to this installation.

1.5 WARRANTY

A. 20-year, No Dollar Limit, Full Systems Factory Warranty to include workmanship.

   1. Warranty to include total system: membrane, flashings, adhesives, sealants, counter-flashings, cover board, fasteners, fastener plates and all other materials applicable this installation as authorized by the manufacturer.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture. Cover material so as to prevent condensation beneath covering.

C. Adhesives shall be stored at temperatures above 40 degrees F and restored to at least 60 degrees F prior to use.

D. Store materials and equipment in a manner to avoid significant and/or permanent deflection of deck. Spread loads of roofing materials on roof.

E. Lightweight materials shall be weighted down to prevent wind damage.

1.7 JOB CONDITIONS

A. Install roofing only when adequate application temperatures that result in a satisfactory roofing system application can be maintained; apply no insulation or membrane adhesives to the substrate or roofing membranes when deck surface temperatures are less than the recommended application temperature range stated on the products labels, or printed literature. Install no roofing material when water in any form is present on roof deck surface, or when materials are damp or wet. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

B. The surface to which the cover board or roofing membrane is to be applied shall be cleaned and free of any projections or contaminants that would prevent proper application or be incompatible with the new installation, such as, fins, sharp edges, foreign materials, oil and grease.

PART 2 – PRODUCTS

2.1 ROOF SYSTEM

A. Fully adhered PVC membrane over existing EPDM Roofing system on top of a structural concrete deck.

1. Cover Board - Manufacturer approved, primed UL Class A cover board, Thickness: 1/4".

2. Membrane - 60 mil Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane, conforming to the following standards:

Minimum Physical Properties- 60 mil PVC Membrane		
Property	**Test Method**	**Required Value**
Color	N/A	White
Tolerance on Nominal Thickness (max)	ASTM D751	+/- 10%
Breaking Strength (lbf/in) (min)	ASTM D751 Grab Method	≥300 Lbs ≥340 Lbs
Tearing Strength(Lbf)	ASTM D751	≥55 Lbs
Change in Weight After Immersion in Water (%)	ASTM D750	<3%
Seam Strength	ASTM D751	>90%
Solar Reflectivity		≥0.85
Thermal Emittance		≥0.85

2.1 MISCELLANEOUS MATERIALS

A. Fasteners: Type, spacing and quantity as recommended by manufacturer.

B. Wood Nailers: Wood nailers are to be #2 or better, Creosote and asphalt free lumber with a maximum moisture content of 19% by weight on a dry weight basis.

C. All other required miscellaneous materials: As recommended by the manufacturer.

PART 3 – EXECUTION

3.1 INSPECTION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify that deck is supported and secured.

C. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set.

D. Verify that attachment capabilities of the roof deck and fasteners by conducting pull-out tests per ANSI-SPRI FX-1-2003.

E. Beginning of installation means installer accepts substrate.

3.2 PROTECTION

A. Protect building surfaces against damage from roofing work. Provide safety barriers and other protection devises as needed to protect property and people.

3.3 INSTALLATION

A. General:

1. All drains, projections and edges shall be installed in strict accordance with practices set forth in the NRCA Roofing Manual and/ or manufacturer's instructions. All mechanical equipment requiring fastening shall be fastened with hex head screws with neoprene washers.

2. Provide cut-offs at end of each day's work, to cover exposed partially installed membrane and insulation. Remove cut-offs before resuming work.

3. In finished areas, storing, walking, wheeling, or trucking will not be permitted. Provide smooth, clean boards or plank walkways, runways, and platforms near supports, as needed to distribute weight to conform to live load limits and transient loads imposed during roofing installation and construction.

4. Membrane overlaps shall be shingled with the flow of water whenever possible.

B. Cover Board

1. Primed cover board is to be attached to the roof deck per the fastening requirements needed to meet the design pressure, local building code and the recommendations of the cover board manufacturer.

2. Start by installing a cut layer of roof board, achieving a minimum end-lap and side-lap offset of the underlying courses by 12", at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the cover board per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Ensure that the fasteners engage the upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of cover board as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
3. All courses shall be installed with side and end-laps of no more than 1/4" gaps.

4. Do not kick or damage cover board during installation. All damaged, severely cupped, or unusable pieces must be discarded.

5. Cover board must be installed with the correct face side up (as written on the face).

6. Cover board must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, etc.).

7. Completely cover with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing

components are applied. COVER BOARD MAY NOT BE LEFT UNCOVERED OVERNIGHT.

C. Membrane

1. Fully Adhered Field Membrane is to be attached to the roof deck per the fastening and fastener requirements for the design pressure listed in this document and in accordance with the local building code.

2. All Zones (1 field, 2 perimeter, & 3 corner): Start by installing a 72" (full rolls) wide sheets at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) so that the water flows over, but never against the side laps. Turn over the edge, below the nailer (roof edge applications) or at the base of the perimeter parapet or roof curbs. Apply adhesive to the top surface of the substrate and the bottom surface of the sheet at the nominal rate of 1 gallon per 120 square feet or as specified by the manufacturer. Allow the adhesive to dry to the touch. Carefully roll the sheets in and avoid wrinkles or buckles. Use a weighted roller and run over the entire surface of the adhered membrane to ensure a bond between the bottom surface of the membrane, and the adhesive applied to the surface of the substrate.

3. Welding Start-Up (start of every welding cycle: morning, after break, after lunch, etc.): Before starting any finish welding, operators are to conduct test welds using the same membrane at the same ambient temperature as the just installed courses. Cut 1” wide strips of the test membrane and pull apart (tear bond) to determine quality of the welds. A satisfactory weld is demonstrated when the weathering layer (membrane surface) is fully welded to the underside of the overlapping membrane, and when pulled is torn away exposing the reinforcement scrim of the underlying membrane. Minimum acceptable Automatic welds are 1" wide. Minimum acceptable hand welds shall be 1½” wide. Monitor and adjust automatic welder temperature and speed throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).

4. All courses shall be installed with 3" side-laps, and 4" end-laps.

5. Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, etc.).

D. Roof Flashings

1. Install the field, perimeter, and corners as described in sections above.

2. Cone Flashings: Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/penetrations. Penetrations greater than 6” in diameter flashings require additional fasteners typically spaced 6" on center near the base of the

vertical pipe/ penetration. Measure the top height of the cone flashing and mark 1/2" above height of penetrations and install a continuous 1/8" bead of manufacturer approved water stop around penetration. Slide cone flashing over penetration and center. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

3. Slit Cone Flashings: Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/penetrations. Penetrations greater than 6" in diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark 1/2" above height of penetrations and install a continuous 1/8" bead of manufacturer approved water stop around penetration. Wrap cone flashing around penetration and center. Tack weld in several spots to prevent flashing from becoming misaligned. Heat weld around the perimeter of the target sheet and up the vertical lap of the split cone. Probe and repair all non-welded areas.

4. Install stainless steel draw band 1/8" below the top of the cone to penetration connection and tool in a 1/4" continuous bead of manufacturer approved urethane sealant at the top of the flashing.

5. Base Flashings: Install manufacturer approved membrane plates and fasteners evenly distributed around the base of all roof to wall (curbs, parapet walls, roof top equipment, etc.) per manufacturer's instructions. Cut base flashing membrane to size and either adhere using manufacturer approved adhesive applied to both the substrate and the back of the base flashing membrane, or loose laid per the manufacturer's instructions. Heat weld around the perimeter of the base flashing sheet. Heat weld the appropriate inside or outside corner. Probe and repair all non-welded areas. Terminate the top of the membrane by installing a continuous bead of manufacturer approved water stop between the top of the sheet and the top edge of the vertical substrate and nail using the appropriate fastener spaced on 6" centers. Counter flash as specified.

E. Roof Edge

1. Lay the manufacturer approved Clad Metal tightly to the interior edge of the roof edge and secure to the wood nailer/blocking using approved fasteners that meet the withdrawal requirements for perimeter securement by the local building code.

2. Gap all end joints a minimum of 1/4" and install 2" wide manufacturer approved foil tape starting at the bottom edge of the crimp and to the interior outer edge of the deck flange.

3. Heat weld a 5" wide, non-reinforced patch centered over the metal joint.

4. Install a 6" metal cover strip by welding the cover strip to the membrane starting at the top edge of the deck flange. Over-lap all ends a minimum of 3" and heat weld the overlap.

F. Roof Drains

1. Install membrane plates and fasteners evenly around the base of the roof drain on 6" centers. Cut drain flashing membrane to size and heat weld around the perimeter. Probe and repair all non-welded areas. Make a small hole to allow water to enter drain. Using a sharp knife, cut small "x" where the drain bolt can be inserted to the drain bowls threaded hole. Lift target and apply a heavy bead of manufacturer approved water stop between the drain and the target sheet. Lay clamping ring and strainer basket over the target sheet, thread in the drain bolts, than tighten to provide compression seal at the drain.

G. Roof Scuppers

1. Install the perimeter and corner membranes, and the base flashings of the perimeter walls as described in previous sections.

2. Position scupper over the scupper opening. Fasten the scupper at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

H. Roof Vents

1. Install the perimeter and corner membranes, and the base flashings of the perimeter walls as described in previous sections.

2. Position vent over the opening. Fasten the vent at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

I. Clean Up

1. All debris must be cleaned up by the installer and disposed in a legally acceptable manner.

J. Manufactures Post Installation Inspection

1. A representative of the manufacturer shall make a post installation inspection and issue a written report to the owner.