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VOLUME 2 – TECHNICAL SPECIFICATIONS

BID NO. 2015-172

**PROJECT MANUAL
FOR
LANCASTER ANNEX ROOF RETROFIT**

2700 BEN AVENUE
FORT WORTH, TEXAS 76103

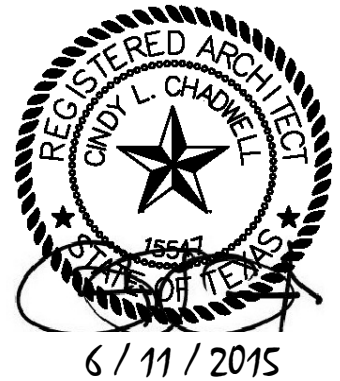
**BIDS DUE AUGUST 5, 2015
2:00 P.M.**

Technical Specifications Prepared by

Rooftech
1944 Handley Drive
Fort Worth, TX 76112

BID NO. 2015-172

TECHNICAL SPECIFICATIONS
for
LANCASTER ANNEX ROOF RETROFIT



1.0 GENERAL

All provisions of the Contract Documents, including any/all General Conditions and Supplementary Conditions shall govern work under this division.

2.0 SCOPE OF WORK

2.1 GENERAL: Work under this division of the specifications includes all labor, materials, equipment, and all necessary appurtenances and incidental work to provide a complete and serviceable reroofing project.

2.2 DESCRIPTION OF WORK:

BASE PROPOSAL: The Base Proposal includes all work necessary to provide a complete and serviceable retrofit roof system on all existing metal roofs including but not limited to:

- Properly preparing the roof deck and repairing or replacing damaged or deteriorated decking
- Installing hat channels between the standing seam metal ribs to support a plywood deck substrate
- Installing two (2) layers of rigid board insulation and a cover board
- Installing a new fully adhered felt back PVC roof membrane (Basis of Design is Sarnafil)
- Installing PVC profile ribs to replicate standing seams
- Installing all new gutters and downspouts
- Installing all new membrane and sheet metal flashings
- Providing a 20-Year NDL Warranty from the Primary Roofing Material Manufacturer
- Providing a 5 year contractors warranty
- Providing a 20 year warranty from the Primary Sheet Metal Manufacturer covering the finish on the prefinished metal

2.3 WORK INCLUDED (BUT NOT LIMITED TO):

SURFACE PREPARATION/TEAR OFF: Completely remove and lawfully dispose of all existing roofing materials, membrane flashings, and sheet metal flashings down to the structural deck. Clean, dry, and properly prepare the structural deck.

EXISTING ROOFING MATERIALS: The existing roofing materials located on the designed roof areas are as follows (from deck up): *(This information is provided for informational purposes only – Field verify all existing conditions prior to providing a proposal):*

- 24 gauge prefinished continuous length, single-lock, standing seam metal roof over open purlins

PERFORMANCE REQUIREMENTS FOR NEW ROOF SYSTEM (WIND UPLIFT): Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.

1. Field Uplift Pressure: - 60 PSF (FM 1-60).
"The uplift pressure includes a safety factor of two (2x)."

DECK REPAIRS: Repair any structural damage to the metal deck as necessary. Deck repairs shall be performed as a Change Order to the Contract and in accordance with the Change Order Provisions and Unit Price Provisions of the Contract Documents.

ROUGH CARPENTRY: Install all new wood blocking and/or wood nailers as shown in the drawings.

SHEET METAL: Install all new sheet metal accessories, vents, and flashings.

INSULATION: Install new rigid board insulation and gypsum cover board as specified.

CRICKETS: Install crickets where indicated on the drawings and as required to ensure positive drainage. Install crickets behind all roof mounted equipment curbs to ensure positive drainage.

MEMBRANE ROOFING: Install all fully adhered felt back PVC membrane roof with PVC profile ribs.

MEMBRANE FLASHINGS: Install all new membrane flashings. All membrane flashings shall be properly terminated and protected by a sheet metal counter flashing.

EQUIPMENT: Perform all mechanical, electrical, and other work as may be required to disconnect, remount, and reconnect all roof mounted equipment, ductwork, or piping as required to provide a minimum eight inch (8") curb height for the flashings and to comply with the drawings.

SPLASH BLOCKS: Install new concrete splash blocks at downspouts locations where downspout does not tie into the storm sewer. Verify locations in field.

CONTRACTOR'S WARRANTY: A 5-year Contractor's Warranty is required.

PREFINISHED METAL WARRANTY: Provide a 20-year Warranty on the sheet metal finish.

PRIMARY ROOFING MATERIAL MANUFACTURER'S NDL WARRANTY: Provide a 20-Year NDL (No Dollar Limit) Warranty from the Primary Roofing Material Manufacturer. The Warranty shall cover defects in both materials and workmanship for the membrane roofing, membrane flashings, and insulation (above top of structural deck), and shall have no limit to the penal sum for the coverage period. The warranty shall cover leaks as a result of defects in materials and workmanship.

2.4 APPLICABLE STANDARDS

National Roofing Contractors Association (NRCA).

Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

American Society of Testing and Materials (ASTM).

Factory Mutual (FM).

Underwriters Laboratory (UL), Class A.

3.0 GENERAL REQUIREMENTS:

- 3.1 **ROOFING CONTRACTOR'S QUALIFICATIONS:** The Roofing Contractor shall be approved by the Primary Roofing Material Manufacturer to apply the designated roofing system qualifying for the specified Primary Roofing Material Manufacturer's NDL Warranty. The Roofing Contractor shall have had at least 5-years experience as a Roofing Contractor for the Primary Roofing Material Manufacturer.
- 3.2 The Contractor shall provide complete submittals in accordance with Section 6.0. Submittals shall be provided to the Architect/Engineer a minimum of 5 working days prior to the Pre-Construction Conference.
- 3.3 **PRECONSTRUCTION CONFERENCE:** The contractor and job site superintendent shall attend a Pre-Construction Conference prior to the performance of any roofing work.
- 3.4 **SUBSTANTIAL COMPLETION OBSERVATION:** The Contractor shall notify the Architect/Engineer and the Primary Roofing Material Manufacturer, in writing, ten (10) days prior to the date of the Substantial Completion Observation. A punch list of items to be completed shall be developed during the Substantial Completion Observation.
- 3.5 **FINAL OBSERVATION:** The Contractor shall notify the Architect/Engineer and the Primary Roofing Material Manufacturer, in writing, ten (10) days prior to the date of the Final Observation. All items on the punch list (from the Substantial Completion Observation) shall be completed before final acceptance.

4.0 MATERIALS (**ALL MATERIALS SHALL BE ASBESTOS FREE**)

4.1 PRIMARY ROOFING MATERIAL MANUFACTURER "BASIS OF DESIGN" IS:

Sika Corporation
100 Dan Road, Canton, MA 02021
Phone: 828-781-5400 | 800-451-2504 | 781-828-5365
www.usa.sarnafil.sika.com

ACCEPTABLE MANUFACTURER SUBSTITUTION:

Fibertite, Seaman Corporation
1000 Venture Boulevard | Wooster, Ohio 44691
Phone 800-927-8578 | 330-262-1111 | Fax 330-263-6950

4.2 MEMBRANE ROOFING MATERIALS:

Sarnafil PVC Sheet: Uniform, flexible sheet formed from polyvinyl chloride, of the following polymer thickness, UL classification, felt backing, and exposed face color:

- a. PVC Thickness: 80 mil G410-20
- b. UL Class: A.

- c. Membrane felt backing: fiberglass with a weight content of a minimum of 9 ounces per square yard.
- d. Color: Heavenly Brown # 7810 (**This is not a standard color**)

Fibertite PVC Sheet: Uniform, flexible sheet formed from polyvinyl chloride, of the following polymer thickness, UL classification, felt backing, and exposed face color:

- a. PVC Thickness: 50 mil XT-FB.
- b. UL Class: A.
- c. Membrane felt backing: polyester with a weight content of a minimum of 4 ounces per square yard.
- d. Color: To Match Sarnafil Heavenly Brown # 7810. (**Substitution request must be submitted prior to bidding**)

PVC Profile Ribs: Uniform, vinyl profile formed from polyvinyl chloride to match roof membrane color.

Flashing and Flashing Accessories: As recommended by the thermoplastic sheet manufacturer's printed instructions for reinforced sheet flashing of same material, type, and color as sheet membrane.

Membrane Bonding Adhesive: A solvent-based adhesive used to attach the membrane to the approved horizontal substrate. Application rates are to be as recommended by thermoplastic sheet manufacturer's printed instructions.

Membrane Flashing Bonding Adhesive: A solvent-based reactivating-type adhesive used to attach the flashing membrane to the substrate, either horizontally or vertically. Application rates are to be as recommended by thermoplastic sheet manufacturer's printed instructions.

Metal Termination Bars: Manufacturer's standard aluminum bars, approximately 1-inch (25-mm) wide, roll formed and pre-punched every 8 inches on center.

Fire Rated Gypsum Board shall be a gypsum core with additives to enhance fire resistance and surfaced with paper on front, back, and along edges. Gypsum board shall meet the requirements of ASTM C 36, Type X.

Rigid Board Insulation shall be approved by the Primary Roofing Manufacturer and consist of 2 layers consisting of the following:

The first layer shall be **1 layer of 2.0" polyisocyanurate** meeting the physical property requirements of ASTM C 1289, Type II, Class I. The thickness of the polyisocyanurate shall be based on Long Term Thermal Resistance (LTTR). The polyisocyanurate foam core shall be bonded to universal fiberglass reinforced facers.

The second layer shall be **1 layer of 1.5" polyisocyanurate** meeting the physical property requirements of ASTM C 1289, Type II, Class I. The thickness of the polyisocyanurate shall be based on Long Term Thermal Resistance (LTTR). The polyisocyanurate foam core shall be bonded to universal fiberglass reinforced facers.

The third layer shall be **1 layer of 1/2" thick gypsum cover board** UL rated, Type "X" Securock, factory-primed or approved equal. Maximum board size of 48 inches x 96 inches.

4.3 SHEET METAL:

PVC Coated Metal: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. The PVC Coated metal shall be a minimum 24 gauge, G90 galvanized metal sheet with a 20 mil unsupported PVC membrane laminated on one side.

Galvanized Sheet Metal shall be 24-gauge (unless otherwise noted in the drawings) and shall be hot dipped galvanized, meeting ASTM A 653.

Prefinished Sheet Metal shall be 24-gauge (unless otherwise noted in the drawings) G-90 hot dipped galvanized metal (meeting ASTM A525 and ASTM A446) coated on one side with a Kynar 500 Fluoropolymer coating (.95 to 1.25 dry mil thickness including prime coat) and coated on the reverse side with a primer coating (.25 dry mil thickness). Color to be selected from Manufacturer's standard colors. A strippable film shall be applied to the top-side of the Prefinished Sheet Metal to protect the finish during fabrication. Acceptable manufacturers shall be Vincent Metals, Peterson Aluminum, and MBCI, or equal.

4.4 FASTENERS

Nails for attaching Galvanized Sheet Metal to Wood shall be large headed (3/8" - 7/16" diameter) hot dip galvanized roofing nails.

Nails for Wood Blocking and rough carpentry shall be galvanized 16d common nails.

Exposed Sheet Metal Screws (with Weatherproof Gaskets) shall be hex head self-tapping screws (galvanized for galvanized metal, stainless for stainless steel or copper metal, and color matching/coated for prefinished metal). The screws shall have EPDM sealing gaskets. The gaskets shall be protected with a metal jacket (weather guard).

Sheet Metal Screws (Not Exposed to Weathering) shall be hex head or pancake head self-tapping screws (galvanized for galvanized metal, stainless for stainless steel or copper metal).

Rivets for attaching galvanized sheet metal shall be hot dipped galvanized. Rivets for stainless steel sheet metal shall be stainless. Rivets for copper sheet metal shall be copper. Rivets for the Prefinished Sheet Metal shall be color matching.

Anchors for attaching sheet metal to masonry, concrete, stucco, or other non-wood substances shall be of similar metal and of sufficient strength to securely hold sheet metal. Anchors shall be Hilti "Metal Hit", or an approved equal. No plastic or nylon anchors shall be permitted.

Concrete Anchors for attaching structural steel supports to concrete shall be Hilti "Drop In" or Hilti "Self Drilling" anchors, or an approved equal.

Anchors for attaching Wood Blocking/Nailers to Metal Deck shall be minimum #12 screw type fastener (similar to insulation screw) with 5/8" o.d. galvanized steel washers under the screw head. The screw shall be coated for protection from corrosion.

Insulation Fasteners for Wood Decks shall be a screw type fastener of appropriate length, shall meet wind uplift performance requirements, be approved by the Primary Roofing Material Manufacturer, and shall be coated for protection from corrosion.

Nails for Plywood Decking shall be 8d common coated nails.

4.5 WOOD AND PLYWOOD

Lumber for Nailers, Curbing, and Blocking shall be fire-treated #2 yellow pine. Minimum width of 5-1/2" shall be provided.

Plywood shall be nominal 3/4" thick or as shown on the drawings, shall be exterior type with exterior glue grade C-D or better, shall be Fire-treated, and shall bear either APA or TECO trademarks.

4.6 ACCESSORIES

General Sealant for Sheet Metal shall be a one-component gun-grade, moisture-curing high performance polyurethane sealant, conforming to ASTM C 920, Type S.

Tape Sealant shall be gray pressure sensitive tape blended of butyl and EPDM rubbers with not less than 50% butyl.

New Splash Blocks: New splash blocks shall be pre-cast concrete (min 3000 PSI), sized per the project drawings and type as supplied by Stripe-A-Zone, Grand Prairie, Texas, (972) 647-2714 or approved equal.

5.0 QUALITY CONTROL

5.1 All shop drawings, product data, samples, and re-submittals (if necessary) shall be submitted to the Architect/Engineer in sufficient time (minimum 5-working days from receipt of submittal) for review.

5.2 OWNER may employ a testing laboratory as deemed necessary to perform specified services and testing. Employment of the laboratory shall in no way relieve the contractor's obligation to perform work and provide materials in accordance with the contract documents. The testing laboratory is not authorized to approve or accept any portion of the work, perform any of the contractor's duties, or alter the contract documents in any way.

5.3 Contractor shall cooperate with the laboratory, provide access to the work, secure and deliver samples, furnish copies of test reports, and provide incidental labor as required to secure samples and make repairs as required.

5.4 Should testing reveal any failure of the work performed to comply with the contract documents, the Contractor shall bear the cost of any additional testing required (as deemed necessary by the Architect/Engineer).

6.0 SUBMITTALS

6.1 All shop drawings, product data, samples, and re-submittals (if necessary) shall be submitted to the Architect/Engineer in sufficient time (minimum 5-working days from receipt of submittal) for review.

6.2 All submittal items shall be properly indexed and numbered. All submittals shall contain the date of submission, project title, name of contractor, and manufacturer, applicable specification section, identification of deviations from Contract Documents, and clearly identified field dimensions where applicable.

- 6.3 Shop Drawings shall be presented in a clear and thorough manner to clearly illustrate the work and that work to be performed will be in conformance to the Contract Documents. Please note that detailed shop drawings are only required if the contractor proposes a change to the Contract Documents.
- 6.4 Samples shall be submitted in sufficient size to clearly illustrate its function and utility.
- 6.5 Product Data shall clearly illustrate compliance with the Contract Documents.
- 6.6 The Submittals shall include, but not be limited to the following:
 - 6.6.1 **ROOFING CONTRACTOR'S QUALIFICATION LETTER:** Provide a letter from the Primary Roofing Material Manufacturer that states the Roofing Contractor is approved to apply the designated roofing system qualifying for the specified Primary Roofing Material Manufacturer's NDL Warranty. The Roofing Contractor shall have had at least 3-years experience as a Roofing Contractor for the Primary Roofing Material Manufacturer.
 - 6.6.2 **ROOFING MATERIAL/WARRANTY LETTER:** Provide a letter from the Primary Roofing Material Manufacturer approving the use of all roofing materials (regardless of manufacturer) used in conjunction with the roofing assembly (from deck up). The letter shall specifically approve the use of all materials that are not manufactured by the Primary Roofing Material Manufacturer and shall state that all materials shall be covered under the specified Primary Roofing Material Manufacturer's NDL Warranty.
 - 6.6.3 **ROOFING SYSTEM LETTER – TESTED ASSEMBLY:** Provide a letter from the Primary Roofing Material Manufacturer stating that the roofing system (from deck up) and (as submitted) is a tested roofing assembly meeting the specified Performance Requirements for Wind Uplift. The letter shall specifically include applicable fastener patterns and supporting data clearly illustrating conformance to Performance Requirements for Wind Uplift.
 - 6.6.4 Product Data Sheet for all materials listed in Section 4.0 of this Specification. If a Product Data Sheet is not available for a particular item, the Contractor shall list the item and state, in writing, that the item/material will meet the specifications.
 - 6.6.5 A Product Safety Data Bulletin on each applicable product.
 - 6.6.6 A sample copy of all warranties required on the project, including but not limited to the Primary Roofing Manufacturer NDL Warranty, the Contractor's Warranty, and the Sheet Metal Finish Warranty.
 - 6.6.7 Certificate of Insurance for all insurance listed in the Supplementary Conditions.
 - 6.6.8 Shop Drawings: Detailed shop drawings are only required if the contractor proposes a change to the details as shown in the Contract Documents.

7.0 PERFORMANCE

- 7.1 Contractor shall provide temporary interior protection of the building during reroofing operations as necessary to prevent damages to the interior as a result of moisture infiltration due to unforeseen inclement weather. There shall be sufficient materials to install temporary interior protection or conduct clean up operations in the event of a leak emergency.
- 7.2 Any damages resulting from failure of the contractor to maintain the work area, including areas under construction, areas of storage, and areas used for access, in a water tight condition shall be the full responsibility of the contractor. The costs resulting from damage (including the Owner's time/material loss), shall be charged to the Contractor. Contractor shall repair to Owner's satisfaction at Contractor's sole cost all damage to building site, interior and exterior of building, and any furnishings caused by the Contractor's operations.
- 7.3 Extreme care shall be taken when working over the existing roof surface. Consideration shall be made for the potential damage to the existing roof system and decking. Contractor shall use reasonable care in transporting materials across the existing roof surface. Extreme care shall be taken to prevent damage to the existing roof surface. Contractor shall minimize the use of any portion of the existing roof surface. Contractor shall protect all roof surfaces exposed to any more than casual foot traffic with no less than 1 layer of 1" thick polyisocyanurate insulation installed directly on the roof surface and an overlay of 3/4" plywood. Contractor shall make permanent repairs to the existing roof system, if damaged.
- 7.4 Contractor will become responsible for any leaks in the building upon starting work on the existing roof regardless of cause. There shall be sufficient material, labor, equipment, and any other items required to patch the existing roof in order to protect the interior of the building from moisture infiltration.
- 7.5 Contractor shall have sufficient material, labor, equipment, moisture coverings, and any other items required to provide quick and complete temporary protection to decking, unfinished roof, or the interior in the event of an emergency weather event.
- 7.6 Extreme care shall be taken to protect the new roofing and insulation. A watertight "Tie-In" shall be installed between the new roof and the existing roof, upon completion of each day's work. Completely remove the "Tie-In" before beginning the next day's work.
- 7.7 Roof Top Storage/Staging (if utilized): If roof top storage/staging is utilized, all material, debris, equipment must be distributed across the roof deck to avoid damage to the structural deck. Contractor assumes full responsibility for loading on the structural deck of roofing materials during the reroofing operations. Architect/Engineer reserves the right to reject any loadings deemed unacceptable.
- 7.8 Contractor shall use reasonable care in transporting materials across the new/finished roof surface. Extreme care shall be taken to prevent damage to the new/finished roof surface. Contractor shall minimize the use of any portion of the new/finished roof surface. Contractor shall protect all roof surfaces exposed to any more than casual foot traffic with no less than 1 layer of 1" thick polyisocyanurate insulation installed directly on the roof surface and an overlay of 3/4" plywood. Contractor shall make permanent repairs to the new/finished roof surface if damaged.
- 7.9 Contractor shall note the building will be occupied and operated as an on-going business

and will restrict his activities to the areas specified by the Owner.

- 7.10 Contractor shall maintain the job site in a safe, clean, and orderly fashion at all times. All doors and exits shall be made safe and secure from any possibility of falling debris or danger from any work associated with this project. PROPER AND ADEQUATE EGRESS TO AND FROM THE BUILDING SHALL BE MAINTAINED AT ALL TIMES.
- 7.11 Upon completion of the roofing work the contractor shall thoroughly clean the area of all trash, debris, dust, dirt, etc. resulting from the contractor's work.
- 7.12 Contractor shall provide latrines and other necessary facilities, as is required. Contractor's employees will not be allowed to use building facilities.
- 7.13 Except for modifications as called for in the details and specifications, the contractor shall return all items attached or affixed to the roof to their approximate original position, and said items shall be in the same condition as they were at commencement of work.
- 7.14 The Contractor shall install and maintain all required storage enclosures and safeguards. The Contractor shall comply with the Owner's safety standards. Storage areas, where hazardous or potentially hazardous products or equipment is stored, shall be restricted to general access. This requirement shall apply to all kettle staging areas, if kettles are to be utilized for the project.
- 7.15 Rooftop hoisting equipment shall be properly assembled and maintained. Only persons that are thoroughly familiar with hoisting equipment shall operate such equipment. All such equipment shall be erected and supported so that it will not damage the existing structural deck or roofing systems.
- 7.16 Debris shall be removed by appropriate means, and in a safe/orderly manner on a daily basis. All roof debris becomes the property of the Contractor. Contractor shall be responsible for the lawful removal and disposal of all trash and debris on a daily basis. The Owner's dumpster cannot be used.
- 7.17 Contractor shall maintain sufficient equipment, materials, and manpower on the job site so as to replace any rotted decking/curbing, or to make deck repairs as required.
- 7.18 Contractor shall employ only orderly and competent workers, skillful in the performance of the type work required.
- 7.19 Contractor shall erect all required roof barriers and safety lines as required by OSHA and comply with OSHA regulations for safety.
- 7.20 Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work included in the Construction Documents. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:
 - 7.20.1 Contractor's Employees and other persons who may be affected thereby;
 - 7.20.2 The Work and materials and equipment to be incorporated therein; and
 - 7.20.3 Other property at the site or adjacent thereto.
- 7.21 The Contractor shall give notices and comply with applicable laws, ordinances, rules,

regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury, or loss. The Contractor shall promptly remedy damage and loss to property at the site caused in whole or in part by the Contractor, any Subcontractor, or anyone directly or indirectly employed by them, or by anyone for whose acts they may be liable and for which the Contractor is responsible.

- 7.22 Contractor shall comply with the most current (Occupational Safety and Health Administration) OSHA requirements as to the proper implementation of safety equipment as deemed necessary by such requirements for all employees of the Contractor working on the Site, any Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible. In addition, the Contractor shall provide at all times a minimum of three (3) complete additional safety equipment units, i.e. harnesses, rigging gear, hardhats, etc., as deemed necessary by the OSHA requirements for all workers. The three- (3) additional units are for the use by the Owner, Owners' Representatives, Architect, Engineer, and A/E Roof Observers.
- 7.23 Contractor shall verify location of all roof-top fresh air intakes for the building. Contractor shall cover all fresh air intakes while roof replacement work is being performed in the area around the fresh air intakes. Coordinate this work with the Owner.
- 7.24 Fire Extinguishers – Contractor shall provide one (1) fire extinguisher for each kettle on the project plus one (1) additional fire extinguisher per every 100 squares of roofing area. All fire extinguishers shall be a minimum of 25 lbs.
- 7.25 Landscaping – Upon completion of the project, the Contractor shall repair all damage to the existing landscaping resulting from the Contractor's work. The repair shall include all damaged plants, trees, sod, sprinkler heads/lines, concrete sidewalks/curbs, asphalt pavement, etc. The repair shall restore the damaged area to match the existing condition prior to the commencement of the project.

8.0 ENVIRONMENTAL

- 8.1 No roofing work shall be performed below 40 degrees, when the wind chill factor is below 40 degrees, or when rain is eminent (30% chance or greater). No roofing shall be performed when the average wind is above 25 mph without written permission from the Architect/Engineer. No roofing work shall be performed 30 minutes prior to sundown. The roof deck shall be dry and free from any moisture, ice, or other deleterious materials prior to roofing.
- 8.2 All materials susceptible to moisture shall be protected in dry, above ground, watertight storage. ALL ROLL GOODS, INSULATION, CANT STRIP, AND TAPERED EDGE SHALL BE STORED IN WATER TIGHT, ENCLOSED TRAILERS, and these materials shall be loaded onto the roof on a daily basis. Exterior storage is also acceptable as long as the materials are properly palletted, tarped with breathable tarps, and properly secured against the wind. Plastic "shrink-wrapped" materials are not considered properly protected. All labels shall be intact and legible, clearly showing the product, manufacturer, and other pertinent information.
- 8.3 Any materials that are susceptible to moisture that become wet or damaged will be rejected and shall be immediately removed from the job site. Any materials found to be improperly stored shall be considered wet and removed from the job site.

9.0 WOOD DECK INSTALLATION:

- 9.1 General: Plywood deck shall be installed in strict accordance with the recommendations and requirements of the American Plywood Association and the Performance Requirements for Wind Uplift, and these Contract Documents, the most restrictive applying. All roofing materials shall be as described in Section 4.0 MATERIALS.
- 9.2 Plywood Deck: Mechanically attach full 4 foot x 8 foot plywood sheets to metal hat channels to meet wind uplift criteria (maximum of 18 inches on center).
- 9.3 All joints shall be staggered a minimum six inches (6"). All end joints shall be staggered a minimum six inches (6"). The pattern shall not vary once it has been established. All joints shall be tight, smooth, and flush, and there shall be no voids or gaps between the insulation boards.

10.0 INSULATION INSTALLATION:

- 10.1 General: Insulation shall be installed in strict accordance with the recommendations and requirements of the Primary Roofing Material Manufacturer, the recommendations of the National Roofing Contractor Association (NRCA), the Performance Requirements for Wind Uplift, and these Contract Documents, the most restrictive applying. All roofing materials shall be as described in Section 4.0 MATERIALS and shall be provided and/or approved by the Primary Roofing Material Manufacturer. Phased application is not acceptable. No more roofing, flashing, or insulation shall be removed than can be completely replaced within the same day.
- 10.2 Wood Deck: Insulation shall be installed in 2 layers of polyisocyanurate insulation and a top layer of 1/2" gypsum cover board.
 - 10.2.1 The first layer will be 2.0 inch thick polyisocyanurate insulation mechanically attached to the plywood deck.
 - 10.2.2 The second layer will be 1.5 inch thick polyisocyanurate insulation fully adhered to the first layer of insulation.
 - 10.2.3 The third layer will be 1/2 inch thick gypsum cover board fully adhered to the top layer of insulation.
 - 10.2.4 All joints between the each layer shall be staggered a minimum six inches (6"). All end joints shall be staggered a minimum six inches (6"). The insulation pattern shall not vary once it has been established. Tie-ins shall be continuously staggered so there are no continuous joints through the layers of insulation. All joints shall be tight, smooth, and flush, and there shall be no voids or gaps between the insulation boards.
- 10.3 Cricket Installation: Install crickets where noted on the drawings. Beginning at the low edge of the cricket, install tapered insulation on top of the second layer of insulation. Install 1/2" gypsum cover board and secure with screw and plate and required by the Primary Roofing Manufacturer. Stagger all joints, cut, and fit pieces tightly and neatly so as to provide a continuous, smooth, and even substrate for the roofing.

11.0 PVC SHEET INSTALLATION:

- 11.1 General: Membrane Roofing shall be installed in strict accordance with the

recommendations and requirements of the Primary Roofing Material Manufacturer, the recommendations of the National Roofing Contractor Association (NRCA), the Performance Requirements for Wind Uplift, and these Contract Documents, the most restrictive applying. All roofing materials shall be as described in Section 4.0 MATERIALS and shall be provided and/or approved by the Primary Roofing Material Manufacturer. Phased application is not acceptable. No more roofing, flashing, or insulation shall be removed than can be completely replaced within the same day.

- 11.1.1 Install sheet according to ASTM D 5082 and per ASCE-7 wind uplift pressure requirements for each referenced roof area.
- 11.1.2 Install PVC membrane sheet per manufacturer's requirements in order to obtain manufacturer Twenty (20)-year full system (NDL) warranty.
- 11.1.3 Fastener pull out test will be required for verification of condition of the substrate decking and suitability of manufacturer's metal fasteners for that substrate.
- 11.1.4 The surface of the substrate shall be inspected prior to installation of the PVC roof membrane. The substrate shall be clean, dry and smooth with no excessive surface roughness, contaminated surfaces or unsound surfaces such as broken, delaminated, or damaged boards. Any wet, broken, delaminated, or damaged boards shall be replaced with new.
- 11.1.5 Install in strict accordance with manufacturer's latest published requirements, instructions, specifications, details and approved shop drawings.
- 11.1.6 Start installation of sheet in presence of roofing system manufacturer's technical personnel.
- 11.1.7 The PVC membrane shall be adhered to the specified insulation/cover board with the PVC manufacturer's solvent-based adhesive. The adhesive shall be applied to the substrate at a rate according to the manufacturer's requirements. The adhesive shall be applied in smooth, even coating with no gaps, globs, puddles or similar inconsistencies. Only an area that can be completely covered in the same day's operations shall be coated with adhesive. Do not allow adhesive on the insulation board/cover board to dry completely. Ambient temperature, humidity and size of the roofing crew will determine the amount of membrane that can be installed with adhesive. The bonded sheet shall be pressed firmly in place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. Membrane overlaps shall be shingled with the flow of water where possible. Tack welding of the PVC membrane side laps for purposes of temporary restraint during installation is not permitted.
- 11.1.8 Elevation changes of parapet walls, firewalls, sloped roofs, adjacent roof areas, may affect wind conditions. All pertinent information shall be submitted to the PVC Manufacturer for review in order to meet the project's ASCE-7 wind uplift requirement.
- 11.1.9 All membrane fasteners must penetrate at least 1-inch through the steel deck.
- 11.1.10 Mechanically fasten sheet securely at terminations, and at the perimeter of roof to meet the ASCE-7 wind uplift requirements.

11.1.11 Spread sealant bed over deck drain flange at deck drains and securely seal roofing sheet in place with drain clamping ring.

11.1.12 Field-seam according to "Seam Installation" Article.

11.1.13 Securement Around Perimeter and Rooftop Penetrations

11.1.13.1 Around all perimeters, at the base of walls, drains, curbs, vent pipes, or any other roof penetrations, manufacturer's fasteners and metal bar shall be installed. Fasteners and securement bar shall be installed accord to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturers recommended fastening tools with depth locators.

11.1.13.2 PVC membrane flashings shall extend a minimum of 3 inches past the securement bar or plates and is hot air welded to the PVC deck sheet.

11.2 SEAM INSTALLATION

11.2.1 General

11.2.1.1 All seams shall be hot air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine welding and 4 inches (100 mm) wide when hand welding, except for certain details.

11.2.1.2 Welding equipment shall be provided by or approved by the roofing manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Manufacturer's Technical Representative prior to welding.

11.2.1.3 All membrane to be welded shall be clean and dry.

11.2.1.4 Tack welding of the membrane seams will not be allowed.

11.2.2 Repair tears, voids, and lapped seams in roofing that does not meet requirements.

11.2.3 All seams of the field membrane shall be hot air welded and probed on a daily basis. NO EXCEPTIONS.

11.3 FLASHING INSTALLATION

11.3.1 General: All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

11.3.2 Solvent based adhesive shall be used to adhere the PVC membrane flashing to acceptable wall and equipment curb substrates. No bitumen shall be in contact with the PVC membrane. If bitumen exists, then the manufacturer's asphalt resistant membrane shall be use for the membrane flashing.

- 11.3.3 All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and Manufacturer's Technical Department.
- 11.3.4 All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult PVC manufacturer for securement methods.
- 11.3.5 All PVC membrane flashings shall be mechanically fastened along the counter-flashed top edge with securement bar; fastened 6-8 inches on center. Seal the top edge and backside of the membrane flashing with Multi-Purpose Sealing Tape and approved sealant. Complete termination per manufacturer's requirements. Provide a metal counterflashing to protect the sealant and multi-purpose sealant tape.
- 11.3.6 Only an area, which can be completely covered in the same day's operations, shall be flashed.
- 11.3.7 Test lap edges with probe to verify seam weld continuity of all membrane flashings.
- 11.3.8 Complete all membrane flashing and metal details on a daily basis. No temporary flashings shall be allowed with the prior written approval of the Owner's Representative and PVC Manufacturer. If any water is allowed to enter under the completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

11.4 PROFILE RIB INSTALLATION

- 11.4.1 Profile Ribs: Install Profile Ribs in locations indicated on sloped roof areas and/or as indicated on the project roof plans.
- 11.4.2 The Profile Ribs shall be installed in rows with a minimum spacing of 23 inches from each row.
- 11.4.3 Place chalk line on PVC membrane to indicate location of Profiles Ribs.
- 11.4.4 The PVC membrane to receive Profile Ribs shall be clean and dry.
- 11.4.5 Using a PVC manufacturer's approved hot air welding machine to hot air weld the Profiles Ribs to the PVC membrane.
- 11.4.6 Important: Check all existing deck membrane seams that are to be covered by Profile Ribs with rounded screwdriver and re-weld any inconsistencies before Profile Rib installations.
- 11.4.7 Consult manufacturer for proper installation and application of PVC coated metal with the Profile Ribs.
- 11.4.8 Consult manufacturer on proper installation and application of the Profile Ribs.

11.5 PVC COATED CLAD PERIMETER AND METAL BASE FLASHINGS

- 11.5.1 General: All flashings shall be installed concurrently with the roofing membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.
- 11.5.2 PVC coated metal flashings, shall be formed to match existing conditions and installed per the Detail Drawings.
- 11.5.3 PVC coated metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- 11.5.4 Install Multi-purpose sealant tape and termination bar as indicated on project details. The Multi-purpose sealant tape must be applied to clean and dry surfaces.
- 11.5.5 Secure the PVC coated metal over the PVC field membrane and the multi-purpose sealant tape. Fastened the PVC coated metal with approved stainless steel nails or other acceptable fastener. Fasteners shall be fastened 4 inches on center and staggered 4 inches on center.
- 11.5.6 Adjacent sheets of PVC coated metal shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2-inch (50-mm) wide aluminum tape. A 4-inch minimum wide strip of PVC membrane flashing membrane shall be hot air welded over the joint. Check all cover strip welds with a rounded screwdriver prior to installation of eight-inch cover strip. Re-weld any inconsistencies before eight-inch cover strip installation.
- 11.5.7 An 8 inch minimum wide strip of the 80 mil PVC membrane flashing shall be hot air welded to the 4 inch wide flange of the PVC coated metal and to the field membrane. Check all cover strip welds with a rounded screwdriver. Re-weld any inconsistencies.

12.0 CORRECTIVE ACTION:

- 12.1 All corrective action shall be approved in writing from the Primary Roofing Material Manufacturer.
- 12.2 No phased application will be accepted and no roofing installed during inclement weather conditions will be accepted. This will constitute deficiencies, and all roofing will be removed down to the substrate and replaced.

13.0 SHEET METAL

- 13.1 General: All work shall be in accordance with SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.), NRCA (National Roofing Contractors Association), and these Contract Documents, the most restrictive standard applying.
- 13.2 Protection: Exercise extreme care when working on roof surfaces to avoid damaging or puncturing the roof membrane or membrane flashings.
- 13.3 Expansion & Contraction: Provide for expansion and contraction for all sheet metal components/accessories.
- 13.4 Seams & Joints - Sheet Metal Gravel Guards, Fascia, and Edge Metal: Sheet metal shall be installed in maximum 10'-0" sections/lengths with a 1/4" space between each section. The 1/4" space/joint shall be protected with a centered, 6" wide cover plate.
- 13.5 Seams & Joints – Sheet Metal Receivers and Counter Flashings: Sheet metal shall be installed in maximum 10'-0" sections/lengths with a 3" overlap provided at each joint.
- 13.6 Seams & Joints – Sheet Metal Gutters: Seams in gutters shall be overlapped 1", riveted 2" o.c., and sealed so as to form a watertight joint. Gutter Expansion Joints shall be installed as details with riveted and sealed joints.
- 13.7 Back Painting: Back paint flashings with bituminous paint where sheet metal is expected to be in contact with cementitious materials or dissimilar metals.
- 13.8 Fabrication: All sections shall be square, true, and accurate to size, and free from distortion. Lines shall be straight, true, and free from distortion. All edges shall be neatly hemmed.
- 13.9 Installation: Sheet metal shall fit tight in place with square corners, surfaces straight in planes, and lines accurate to profiles. Sheet metal shall be fabricated and installed so flashings will properly shed water and protect underlying membranes from physical damage and water penetration.
- 13.10 Sealant Installation: Continuously and uniformly apply sealant to all areas vulnerable to water entry.
- 13.11 Dissimilar Metals: No dissimilar metals shall come into contact with each other. Use only fasteners and other metal components that are compatible with the metal type being secured.
- 13.12 All sheet metal flashings shall be continuous at all corners and transitions. Counter flashings shall extended a minimum of 2" beyond the termination of the membrane flashing, and the exposed end shall be appropriately hemmed and sealed as required. Mitered terminations, transitions, and corners shall be used so as to provide a continuous flashing system including both the sheet metal counter flashing and membrane base flashing. All ends and junctures between flashings of different height, types, etc. shall be neatly finished so as no edges of roofing, insulation, cant strip, blocking, flashing, etc. are exposed.
- 13.13 Prefinished Sheet Metal: Remove all strippable film from the top surface of all prefinished sheet metal before installation. Prefinished metal shall not be soldered.

14.0 ROUGH CARPENTRY

- 14.1 Install miscellaneous blocking, cants, nailing strips, framing and sheathing members true, plumb, and level. Construct members of continuous pieces of longest possible lengths. Rough carpentry shall be securely anchored to the structure so as to resist a force of 100 lbs/LF in any direction. Fasteners shall be spaced no more than 4'-0" apart and not less than 2 fasteners per board shall be used. All nailers/blocking, for attachment of sheet metal flange-type flashings, shall be installed in conjunction with the insulation, prior to the installation of the roofing membrane.
- 14.2 Install plywood sheathing to existing wall construction by anchoring the plywood sheathing top and bottom with anchors 12" o.c. Intermediate rows of anchors shall be installed every 2'-0" horizontally with fasteners spaced 12" o.c.. Plywood should be installed in the longest possible lengths.
- 14.3 Wood Blocking/Nailers shall be anchored to the metal deck with two (2) rows of anchors staggered 24" o.c. Provide washers under the screw head and countersink anchors and washers. No less than two anchors shall be required per board.

15.0 MECHANICAL/ELECTRICAL

- 15.1 General: All work shall conform to the requirements of the Local Building Code, Uniform Mechanical Code, National Electric Code, and Underwriters Laboratory. All equipment shall be installed or reinstalled in accordance with the Manufacturer's Requirements and shall be fully operable and functional upon completion.
- 15.2 Raising Existing Roof Mounted/Supported Curbs/Vents: Existing roof mounted curbs/vents shall be raised as required to install roofing, flashings, and new curbs (if applicable) in accordance with the Contract Documents. Extreme care shall be taken to prevent damage to the units. All support lines/conduits (gas, electrical, steam, ammonia, Freon, etc.) servicing the units shall be properly disconnected in order to facilitate moving the unit.
- 15.3 Minimum Curb Height Requirements: Curb heights shall be a minimum of 8" unless indicated otherwise in the drawings.
- 15.4 Equipment Height Requirements: Any equipment that obstructs the reroofing, flashing installation, or future maintenance of areas in, under, and around equipment shall be raised to permit proper work.
- 15.5 Tolerances (Flashing Location) for Roof Penetrations: Flashings shall be located so as to provide access for maintenance. Flashings shall not be closer than 18 inches from other flashings and be situated so no flashing interferes with another. Any penetration that does not meet the spacing requirement of 18" for proper flashing separation shall be relocated to allow for proper flashing separation.

16.0 PLUMBING

- 16.1 General: all plumbing shall be in strict accordance with the requirements of the Local Building Code, and Uniform Plumbing Code.

17.0 ABANDONED EQUIPMENT:

17.1 General: All abandoned equipment, vents, stacks, or other penetrations no longer necessary as shown on the drawings or as determined by the Owner shall be removed. The roof deck shall be repaired, and the area reroofed in accordance with the Contract Documents.

18.0 CLEANING

18.1 Clean all soiled areas and remove markings from finished surfaces. Consult Manufacturers products and services for advice and conform to their instructions.

19.0 WARRANTY

19.1 Primary Roofing Material Manufacturer's Warranty: Upon completion of the roof, the contractor shall provide the Owner a 20-Year NDL Warranty for both Materials and Labor with no limit to the Penal Sum from the Primary Roofing Material Manufacturer as published in their latest literature.

19.2 Contractor's Warranty: In addition, the contractor shall provide a notarized document from an authorized agent on company letterhead stating the following:

The building, roofing membrane, metal panels, sealant work (if applicable) and flashings are in conformance with all the requirements of the primary roofing material manufacturer and qualify for the _____ guarantee (maximum guarantee available) from the _____ (Primary roofing material manufacturer selected).

In addition, should deficiencies (blisters, splits, etc.) and/or leaks occur within the first five years, the contractor shall make repairs as required to maintain the building in watertight condition, in conformance with the requirements in these contract documents, and the requirements of the primary roofing material manufacturer.

Repairs shall be made in a permanent manner in conformance with the standards provided in this document. Any defect causing a leak shall be corrected.

Damage resulting from hurricane force winds, hail, fire, unusual structural movement, structural failure, and abuse are excluded from this agreement.

This agreement in no way absolves the Contractor or Primary Roofing Material Manufacturer from any implied or expressed warranties or fitness for purpose.

19.3 Prefinished Metal: Upon completion the Contractor shall provide a 20-Year warranty from the Prefinished Sheet Metal Manufacturer covering the finish on the prefinished sheet metal.

20.0 SPECIFICATION FOR SIGNS

20.1 Contractor shall provide 10 inch x 12-inch (minimum) painted signs made of aluminum with a dark color background and letters of contrasting color. Use paints compatible with the aluminum. Permanently post signs at all access points leading to the roofs and prominent points on the roofs. Provide at least one sign on each major roof area with no more than four signs per building. Make the sign to read as follows:

DO NOT MAKE
REPAIRS OR ALTERATIONS
TO THIS ROOF
WITHOUT APPROVAL
FROM THE DIRECTOR OF
OPERATIONS AND MAINTENANCE OFFICE

This roof is guaranteed until (1) by:

PRIMARY ROOFING MATERIAL MANUFACTURER (2)

Address

City, State, Zip Code

Phone: Area Code/Number

Guarantee # (3)

The Roofing Contractor was:

ROOFING CONTRACTOR (4)

Address

City, State, Zip Code

Phone: Area Code/Number

SIGNS TO BE POSTED AS DESIGNATED BY OWNER

- (1) Insert month and year (___ years after final acceptance date)
- (2) Insert the Primary Roofing Material Manufacturer's name, address and phone number.
- (3) Insert the Primary Roofing Material Manufacturer's Guaranty Number
- (4) Insert the Contractor's name, address and phone number.

THIS CONCLUDES THIS SECTION