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HARRIS COUNTY APPRAISAL DISTRICT OFFICE BUILDING
ROOF REPLACEMENT
HOUSTON, TEXAS
PCI PROJECT NO. 11416.17

ADDENDUM NO. 1
APRIL 16, 2018

CONTRACTOR SHALL INCORPORATE ALL CHANGES, REVISIONS, CORRECTIONS AND MODIFICATIONS INCLUDED IN THIS ADDENDUM INTO THE PROPOSAL FOR THIS PROJECT. CONTRACTOR SHALL ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON PROPOSAL FORM.

Item No. 1: Point of Clarification: The existing U-shaped roof-top tie-backs are to be replaced with new tie-back anchors and certified after installation and costs to be included in Alternate Bid No. 2.

Item No. 2: Point of Clarification: The existing deck on the main roof (Area “A”) is sloped from perimeter to the roof drains; specified flat stock insulation to be installed over entire area and tapered insulation crickets are to be installed between the roof drains. Flat stock and tapered insulation to be installed on the Penthouse (Area “B”) and tapered insulation to be installed on Canopy (Area “C”).

Item No. 3: Sheet R2.00 Existing Roof Plan – change designation of the main roof area from “C” to “A”.

Item No. 4: Attached is the specification section 07 54 00 Thermoplastic Single Ply Roof Membrane for Alternate Bid No. 1.

END OF ADDENDUM NO. 1

4/16/18

SECTION 07 54 00

THERMOPLASTIC SINGLE-PLY ROOF MEMBRANE

PART ONE - GENERAL

1.01 SECTION INCLUDES:

A. Installation of fully-adhered reinforced thermoplastic single-ply membrane roofing system and related flashings and accessories (Alternate Bid No. 1).

1.02 RELATED SECTIONS:

A. 07 22 00 - Roof Board Insulation.
B. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:

A. American Society for Testing and Materials (ASTM).
B. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual, latest Edition.
C. ASCE-7: “Minimum Design Loads for Buildings and Other Structures”.
D. ANSI/SPRI WD-1 "Wind Design Standard Practice" for Roofing Assemblies".
E. Single Ply Roofing Industry (SPRI); "Application Guidelines for Thermoplastic Roofing Systems," and "Guidelines for the Fabrication of Heat Welded Seams."

1.04 QUALITY ASSURANCE:

A. Applicator:
   1. Approved by manufacturer of accepted roofing system.
   2. A single applicator with a minimum of five years previous successful experience in installations of similar systems.
   3. Minimum five years experience in single-ply roofing with two years experience seaming system same as one currently being proposed.
   4. Be present at job site at all times when work is being performed. Supervise workers as required to ascertain workmanship, progress, and adherence to details.
   5. Report to Owner's Representative.
   6. Be responsible for schedule and coordination.
   7. Have authority to make binding commitments upon Contractor in the field.
B. Regulatory Requirements: Classified by Underwriters' Laboratories, Inc. as a UL 790 Class A roof covering.
C. Notify Owner's Representative a minimum of forty-eight hours in advance of start of field work.
D. Schedule manufacturer's technical representative to be on site during membrane installation periodically during project duration. Contractor shall provide a written report from Manufacturer’s representative site visit to Owner’s Representative after each inspection outlining observations and any corrective procedures.

E. Install roof system in manner to resist minimum wind uplift pressures as determined by ASCE 7-2010 as follows: 90psf for the field of the roof and 120psf in 12-feet wide perimeter zones; and 180psf in 12-feet X 12-feet size corners of roof in accordance with approved tested assembly requirements. Pressures are based on the following criteria: 150 mph wind speed; Enclosed Building; Exposure B; Risk Category III-IV; Safety Factor of 1.2.
F. Submit proposed fastening details and product data for all conditions.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
B. Store materials in accordance with manufacturer's recommendations. Store rolled goods on clean raised platforms. Store other materials in dry area, protected from water and direct sunlight, and maintain at a temperature of 50 to 90 degrees Fahrenheit (10 to 32 degrees Celsius).
C. Deliver materials in sufficient quantities to allow continuity of work without delay.
D. Store materials in weather protected environment, clear of ground, and free from moisture. Protect materials against damage. Keep all materials used in construction of the roofing free from moisture prior to and during application. Do not store in plastic bags or other protective coating which may create condensation within bags.
E. Store roof insulation and membrane on pallets or dunnage elevated at least 4-inches (100mm) above the ground, roof, or deck and protect as necessary to keep dry.
F. Handle materials so as to prevent damage to roofing system components and completed roof system.
G. Proper storage of materials is the sole responsibility of Contractor. Protect materials susceptible to moisture including, but not limited to, all roll goods, insulation, wood, and plywood in dry, above ground, watertight storage. Keep labels intact and legible, clearly showing the product, manufacturer, and other pertinent information.
H. Any materials becoming wet or damaged will be rejected and shall be removed from job site immediately. Any materials found to be improperly stored at jobsite shall be considered wet at the discretion of Owner's Representative and removed from jobsite.
I. Store products in temperature-controlled environment to prevent detrimental affects from low or elevated temperatures.

1.06 PROJECT CONDITIONS:

A. Substrate Conditions: Examine substrates to determine physical conditions that may affect installation of new roofing.
B. Environmental Requirements:
    1. Apply roofing in dry weather.
    2. Do not install roofing and flashing in inclement weather or when rain is predicted (30 percent or more possibility).

3. When ambient temperature is below 60 degrees Fahrenheit (16 degrees Celsius), expose only enough sensitive cements, sealants, and adhesives as required within a four hour period.
4. Do not expose membrane and accessories to a constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).

C. Protection:
1. Provide special protection and avoid traffic on completed areas of membrane installation.
2. Restore to original condition or replace work or materials damaged during handling of roof materials.
3. Take precautions as required to protect adjacent work and structures.

D. Emergency Equipment: Maintain on site equipment necessary to apply emergency temporary protection to existing roof, newly installed roof, and building in event of sudden storms or inclement weather.

1.07 SEQUENCING/SCHEDULING:

A. Do not remove existing roofing in one day than can be replaced and made watertight in same day.
B. Install new roof membrane system immediately after completion of insulation/separation layer installation.
C. Schedule work as required to prevent traffic and material handling over completed work.

1.08 WARRANTY:

A. Contractor: Provide Owner a written warranty for a period of two years after Owner's final acceptance covering all repairs required to correct all defects due to faulty materials or workmanship and to otherwise maintain the roof in a watertight condition and to correct all other defects without regard to watertightness. Make repairs promptly on notification and at no expense to Owner.
B. Roof System Manufacturer: Manufacturer of the single-ply membrane roof system shall furnish a full system (including insulation layers, fasteners/adhesives, membrane, and flashings), no dollar limitation, written guarantee to cover labor and materials for faulty installation or defective materials thereof for a period of twenty years from date of Owner's final acceptance

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

A. Acceptable TPO Manufacturers:
1. Johns Manville.
2. GAF Materials Corp.
3. Carlisle, Inc.
4. Firestone.

2.02 SINGLE-PLY ROOFING MEMBRANE:

A. TPO Single Ply Membrane (Alternate Bid): Polyester-reinforced thermoplastic polyolefin single ply membrane, complying with ASTM D 6878, minimum 0.080-inch thickness, white in color, with enhanced weathering package, and reflectivity, complying with initial solar reflectance of 0.80 and initial thermal emittance of 0.75; such as "EverGuard TPO" by GAF; "SureWeld TPO" by Carlisle; “UltraPly” by Firestone; or "JM TPO" by Johns Manville.

2.03 RELATED MATERIAL:

A. Flashing: Minimum 60-mil, reinforced or unreinforced, flashing membrane as required and furnished by membrane manufacturer, white in color.
B. Bonding Adhesive: Low-solvent or water-based VOC compliant bonding adhesive furnished by membrane manufacturer for adhering flashing membrane or roof membrane to substrates such as “Sure-Weld Low VOC Bonding Adhesive” by Carlisle. Bonding Adhesive; "JM TPO Membrane Adhesive (Low VOC)" by Johns Manville, "EverGuard H20 Bonding Adhesive" by GAF, or other manufacturer’s approved adhesive for membrane and substrate.
C. Sealants: Membrane manufacturer's approved sealant to seal penetrations through the membrane system or miscellaneous caulking applications that come in contact with roof system components.
D. Lap/Seam Sealant: Liquid formulation sealant. As furnished by membrane manufacturer for sealing cut edges of reinforced membrane and flashing sheets.
E. Water Cut-off Mastic: As furnished by membrane manufacturer for this system.
F. Inside Corners and Outside Corners and Molded Pipe Flashings: White molded pipe flashings as furnished by membrane manufacturer for this system.
G. Walkway Pads: Thermoplastic polyester-reinforced flexible walkpads with diamond-tread textured surface on other approved non-slip surface, as approved by membrane manufacturer.
H. Sponge Tubing: 2-inch diameter compressible foam rubber tubing for use at expansion joints.
I. Protection Sheet: Cut sections of membrane with rounded corners, extending a minimum of 2-inches beyond edges of overlying item.
J. Other miscellaneous materials shall be of the best grade available and approved in writing by roof system manufacturer for the specific application.

PART THREE - EXECUTION

3.00 GENERAL:

A. Perform entire work of this Section in accordance with the best standards of practice relating to trades involved.
B. Follow local, state, and federal regulations, safety standards, and codes. When conflict exists, the more restrictive document shall govern.
C. Consider roof system manufacturer's current technical specifications a part of this Specification and use as a reference for specific application procedures and recommendations.

3.01 EXAMINATION OF SURFACES:

A. Verify that all components of the existing roofing system have been removed and other preparatory work has been completed.
B. Examine roof areas for conditions that would prevent proper application of new roofing.
C. Verify that all demolition, renovation, and substrate replacement work has been completed and cured.
D. Verify that new wood nailers are properly installed to receive new roofing system.
E. Examine substrate, roof deck, and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, or other conditions which would prevent the satisfactory installation of the roofing system.
F. Correct or complete any conditions requiring correction or completion prior to installation of roofing system. Notify Owner's Representative in writing of unacceptable conditions.
G. Verify location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. Perform all work in such a manner as to avoid contact with the above-mentioned items.
H. Start of work under this Section constitutes acceptance of substrate and site conditions.
I. Verify:
    1. Deck and substrates are clean, smooth, and free from depressions, waves, projections, defects, and damage.
    2. Surfaces in contact with any single-ply material are free from bitumen, grease, oil, or other foreign material.
    3. Surfaces in contact with roofing membrane are free from sharp edges, fins, or projections.
    4. All materials are completely dry and free from ice and snow, including substrate, deck, insulation, and roofing membrane as applicable. Confirm dryness by moisture meter and demonstrate to Owner's Representative.
    5. All roof equipment, openings, curbs, pipes, sleeves, ducts, vents, and blocking members are solidly and properly set.
    6. All mechanical/electrical work to be covered has been installed, tested, and approved.
    7. Work has been completed where possible for all other trades that require work or traffic on the roofing area.

3.02 PREPARATION:

A. Verify that debris has been completely removed.
B. Broom clean roof insulation immediately prior to roof membrane application. Debris under roof membrane is unacceptable.

3.03 APPLICATION:

A. Roofing Membrane - General:
   1. Install roof membrane in accordance with roofing manufacturer's specification and installation instructions and as supplemented herein. Cut sheets to maximum size possible in order to minimize seams.
   2. Position membrane over substrate without stretching membrane. Allow membrane to relax for one-half hour before bonding, fastening, welding, and flashing.
   3. Begin installation of new roofing system at the lowest point of the project area and work to the highest point to prevent backwater laps. This will include completion of all flashings, terminations, and seals on a daily basis.
   4. Execute work so membrane can be temporarily sealed on a down slope surface at the end of each day with nite-seal in accordance with the detail drawings.
   5. Remove and discard portions of the roof membrane that have permanent creases and/or wrinkles prior to installation.

B. Adhered System:
   1. Position membrane over substrate and fold membrane back so half the underside is exposed.
   2. Apply bonding adhesive to exposed underside of membrane and the corresponding substrate area with a plastic core medium nap paint roller at a coverage rate of approximately 60 square feet per gallon or as recommended by membrane manufacturer for respective adhesive per finished surface (includes coverage on both membrane and substrate).
   3. Allow adhesive to dry until tacky and roll the coated membrane into the coated substrate while avoiding wrinkles.
   4. Brush down the installed membrane immediately with a soft bristle push broom.
   5. Fold back the unbonded half of the sheet and repeat the bonding procedures.
   6. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2-inches (50mm) to provide for a minimum of 1-1/2-inch (38mm) hot air weld achieved with robotic welder.
   7. Roll adhered membrane with cushioned weighted roller to eliminate air pockets, wrinkles, voids, and other potential non-adhered portions of the membrane.
   8. Secure membrane at perimeter of each roof level, roof section, curb, interior wall, etc., and at all other penetrations in accordance with manufacturer’s published details.

C. Membrane Splicing:
   1. Membrane lap splices for membrane overlaps along the length of the membrane shall be as necessary to achieve proper weld; 1-1/2-inches wide for robotic welder and 2-inches wide for hand-held welder. Splices at end roll overlaps (width of the membrane) shall be 6-inches (150mm) wide, minimum.
   2. Allow top sheet to fall freely into place over bottom ply without wrinkling or stretching.
   3. Surfaces to be welded must be cleaned, primed and dirt-free. Remove excessive dirt by washing with a detergent. Rinse thoroughly, allow to dry, and then wipe surface with manufacturer's solvent/cleaner.

4. Use automatic hot-air welding equipment approved by roof system manufacturer for all field seams. Perform small work and repairs using hand-held welders.
5. Probe all laps each day to verify that welder set-up is effective. Allow membrane to cool prior to probing seams. In addition, perform random pull tests of welded lap seam samples (including tests at start of each day and start-up of equipment) to verify peel strength. Apply lap seam sealant along cut edges of the membrane and reinforced flashing material.
6. Apply a pre-formed membrane patch over T-joints of overlapping flashing and membrane lap seams.

D. Flashing:
   1. General:
      a. Install flashing at roof penetrations, interruptions, and any roof intersection including roof edges with vertical or sloped surfaces in accordance with manufacturer's recommended procedures and the detail drawings.
      b. Raise/modify curbs, projections, and risewall conditions as required to accommodate new roofing.
      c. Apply manufacturer's bonding adhesive to both underside of flashing and surface to which it is to be bonded, at a rate of approximately one gallon (3.8 liter) per 50 square feet ($4.6m^2$) of surface coverage or as recommended by manufacturer for respective adhesive.
      d. Do not apply bonding adhesive to that portion of flashing that overlaps onto itself. Use hot-air welding throughout the system where membrane overlaps itself.
      e. Allow bonding adhesive to dry to finger touch until it does not string or stick to a dry finger. Roll the flashing into adhesive. Take care to assure that flashing does not bridge where there is any change of direction.
      f. Mechanically fasten top edges of flashing through appropriate termination bar with approved fasteners apply water-block behind top edge of flashing prior to installation of termination bar.
      g. Install flashings for vents, pipe, conduits, and other round projections in accordance with manufacturer's recommendations and the detail drawings.
      h. Install preformed flashing membrane as required to form a continuous membrane seal in each corner or change in plane.
      i. Install pre-molded outside and inside corner pieces at appropriate locations along walls and around curbs.
      j. Apply cut-edge sealant along seams of strip-ins, T-joint patches, miscellaneous membrane patches, and other flashings terminated on the roof membrane.
   2. Penetrations:
      a. Flash penetrations with pre-formed, field-formed flashings, or polymer-coated metal as indicated on drawings.
      b. Apply sealant or water cut-off mastic at top of flashing between flashing and penetration.

c. After flashing is installed, secure with steel draw band and seal top edge with sealant.
d. Install grout and pourable sealer in sheet metal pan. Install sheet metal bonnet or hood/cover over sheet metal flashing pan at penetrations.

3. Curbs:
   a. Extend flashing membrane to designated height on curbs.
   b. At curbs with removable cover/hood, wrap flashing over top of curb and secure with angle termination bar.
   c. At curbs with non-removable cover/hood, extend flashing to maximum height and secure with termination bar with fasteners at 6-inches on-center. Apply water block behind top edge of flashing and apply sealant along top edge of termination bar.
   d. Extend flashings at corners of curbs to form rounded outer corners at horizontal tie-ins. Apply pre-molded outside corner pieces at corners.
4. Polymer-coated Metal:
   a. Install polymer-coated metal flashings at curbs, penetrations, and perimeters as designated.
   b. Hot-air weld flashing membrane to coated metal and field membrane to provide monolithic seal, extending a minimum of 4-inches (100mm) beyond end of flange.
   c. Apply sealants at fastening points under flanges.

E. Walk Pads/Protection Pads:
1. Install walk pads at roof access points and around rooftop equipment in accordance with manufacturer’s installation guidelines.
2. Install protection pads under equipment and piping supports and other items installed on top of the roof surface.
3. Do not install walkpads over seams of field membrane for flashings. Fully weld perimeters of walk pads to field membrane. Remove air or water entrapped under walk pads and wrinkles protruding upward from surface of walk pad.

F. Daily Seal:
1. Ensure that water does not flow beneath any completed sections of membrane system. This will include completion of all flashings, terminations, and daily seals.
2. Seal new membrane at the deck level and on top of existing roof surface.
3. Temporarily seal any loose membrane edge with manufacturer's water cut-off sealant. Exercise caution to ensure that membrane is not temporarily sealed in such a manner as to promote water migration below the membrane or impede drainage.
4. Install daily night seals by extending the roof membrane beyond the insulation and sealing to existing roof surface.
5. When work is resumed, remove and dispose of membrane where sealants or other materials were previously applied before resuming installation.

3.04 CLEANING:

A. Upon completion of installation of roof system, flashings, and sheet metal, clean surfaces of roof membrane and membrane flashings by power washing methods. Remove debris, dirt, adhesives, sealants, surface contaminants, or materials that cause surface discoloration from surfaces.
B. Remove all work related dirt, debris, drippage, spills, etc. from finishes of roof surface, building, or building grounds.

END OF SECTION 07 54 00