

BIDDING INSTRUCTIONS

BIDDER NAME/ADDRESS:

PRE-BID MEETING:
TIME:

BID DUE DATE:
TIME:

DIRECT BIDS TO:
COMPANY:
ADDRESS:
CITY, STATE:
ZIP:
EMAIL:

BASE BID – Replacement of Bldg. 23 Roof \$ _____

QUOTE UNIT PRICES FOR THE FOLLOWING: *(Not included in Base Bid)*

Roof Drain Replacement \$ _____ Each

Concrete Deck Repair \$ _____ Per Sq. Ft. /In. of Depth

Please enclose all signed addendums and a list of subcontractors with your bid.

Contractor: _____

Estimator: _____

Date: _____

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. The attached are components of this section:
 - 1. General Conditions.

1.02 SCOPE OF WORK

- A. Furnish and install specified roofing and related components for Lebanon VA Medical Center- Building 23 Roof.
- B. Base Bid Work includes:
 - 1. Tear-off all existing roofing and insulation down to concrete deck.
 - 2. Sweep clean the concrete deck and adhere 3" polyisocyanurate insulation and tapered polyisocyanurate crickets in low rise foam insulation adhesive.
 - 3. Install 1/4" fiberglass faced gypsum cover board in low rise foam insulation adhesive.
 - 4. Install 3 plies of trillaminate reinforced ply sheets in cold process adhesive.
 - 5. Install elastomeric membrane flashings in solvent free elastomeric adhesive. Secure with termination bar and sealant tape. Coat with reflective coating.
 - 6. Replace any defective roof drains on a unit cost basis.
 - 7. Install 4 lb lead drain and soil stack flashings.
 - 8. Install new metal flashings and trims including new metal coping caps and expansion joint caps with standing seams.
 - 9. Install a cold process flood coat and pea gravel surface.

1.03 QUALITY CONTROL

- A. Contractor shall:
 - 1. Be experienced in cold process built-up roofing and restoration, 5 years minimum.
 - 2. Be acceptable by Owner.
 - 3. Be a manufacturer approved/certified contractor.
 - 4. Provide two days of technical inspection per every 5 contractor working days by a technical representative, with a minimum history of one year inspecting the specified system.
 - 5. The manufacturer's on-site technical inspector shall:
 - a Not be a salesperson or have any sales responsibilities
 - b Must have a minimum of 10 years of experience as a roofing foreman on a roofing crew that installed the manufacturer's roof systems.
 - c Must be an employee of the manufacturer for a minimum of three (3) years.

- d Must have been formally trained by the roofing manufacturer with documentation to prove training.
- e Must have received the OSHA 10 Hour Safety Training Class within the past 12 months.
- 6. If the technical inspector is not provided by the roofing system manufacturer, an outside qualified inspector can be employed along with a letter from the roof system manufacturer that they will comply with all decisions from the technical inspector and compliance with outside technical inspector will not affect roof system manufacturer's warranty. Technical Inspector shall have a minimum history of one year inspecting the specified roof system. The technical inspector shall:
 - a Must be a RRO (Registered Roof Observer) in good standing with the Roofing Consulting Institute (RCI).
 - b Not be a salesperson or have any sales responsibilities.
 - c Must have a minimum of 10 years of experience as a roofing foreman on a roofing crew that installed the manufacturer's roof systems.
 - d Must have a minimum of three (3) years of experience inspecting the manufacturer's roof systems.
 - e Must have been formally trained by the roofing manufacturer with documentation to prove training.
 - f Must have received the OSHA 10 Hour Safety Training Class within the past 12 months.
- 7. Provide list of at least 5 projects available for inspection employing same system within 50 mile radius of Owner.

B. Roofing material supplier shall:

- 1. Provide a Project Closeout Report upon delivery of the project warranty. This report shall include the following sections:
 - a. Project Specifications.
 - b. Project Summary.
 - c. Progress reports as a result of roof inspections.
 - d. Job progress photos.
 - e. Warranty document.
 - f. Owner's Manual describing maintenance and emergency repair.
- 2. Provide Owner names of at least 5 qualified applicators.
- 3. Employ full-time Field Technical Services Representative available for final roof inspection.
- 4. Provide local Field Representative to make periodic site visits, report work quality and job progress.
- 5. Provide list of at least 5 projects available for inspection employing same roofing system within 50 mile radius of Owner.
- 6. The presence and activity of the manufacturer's/ specifier's representative and/or owner's representative shall in no way relieve the contractor of contractual responsibilities or duties.

- C. Regulatory requirements:
1. IBC International Building Code.
 2. UL 790.
 3. ASTM E 108.
 - a. Class A.
 4. FM 4470.
 - b. Class I, IA-60 Windstorm.
- D. Plans and specifications:
1. Contractor must notify owner and specifier of any omissions, contradictions or conflicts seven (7) days before bid date. Owner and specifier will provide necessary corrections or additions to plans and specifications by addendum. If contractor does not so notify owner and specifier of any such condition, it will be assumed that the contractor has included the necessary items in the bid to complete this specification.
 2. It is the intent that this be a completed project as far as the contract documents set forth. It is not the intent that different phases of work on this project be delegated to various trades and subcontractors by the contract documents. Contractor must make own contracts with various subcontractors, setting forth the work these subcontractors will be held responsible for. Contractor alone will be held responsible by the owner for the completed project.
 3. If the contractor feels a conflict exists between what is considered good roofing practice and these specifications contractor shall state in writing all objections prior to submitting quotations.
 4. It is the contractor's responsibility during the course of the work, to bring to the attention of the owner's representative any defective membrane, insulation or deck discovered where not previously identified.

1.04 REFERENCES

- A. ASTM - American Society for Testing and Materials, Philadelphia, PA.
- B. FM - Factory Mutual System, Norwood, MA.
- C. NRCA - National Roofing Contractors Association, Chicago, IL.
- D. RIC/TIMA Technical Bulletin 281-1 - Roof Insulation Specimen Conditioning Procedure, The Roof Insulation Committee of the Thermal Insulation Manufacturers Association, Mt. Kisco, NY.
- E. SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Vienna, VA.
- F. UL - Underwriters Laboratories, Northbrook, IL.

1.05 SUBMITTALS

- A. Submit at Pre-Construction Conference:
 - 1. Product data:
 - a. Material safety data sheets.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery of materials:
 - 1. Deliver materials to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
 - 2. Deliver materials in sufficient quantity to allow continuity of work.
 - 3. Coordinate delivery with Owner.
- B. Do not order project materials or start work before receiving Owner's written approval.
- C. Storage of materials:
 - 1. Store roll goods on ends only. Discard rolls which have been flattened, creased, or otherwise damaged. Place materials on pallets. Do not stack pallets.
 - 2. Stack insulation on pallets.
 - 3. Store materials marked "keep from freezing" in areas where temperatures will remain above 40°F (5°C).
 - 4. For insulation, remove plastic packaging shrouds. For felt rolls, slit the top of the plastic shrink wrap only. Cover top and sides of all stored materials with tarpaulin (not polyethylene). Secure tarpaulin.
 - 5. Rooftop storage: Disperse material to avoid concentrated loading.
 - 6. No materials may be stored in open or in contact with ground or roof surface.
 - 7. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin (not polyethylene), top to bottom.
 - 8. Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.
 - 9. Contractor to store materials on roof being replaced not surrounding roofs.
- D. Material handling:
 - 1. Handle materials to avoid bending, tearing, or other damage during transportation and installation.
 - 2. Material handling equipment shall be selected and operated so as not to damage existing construction or applied roofing. Do not operate or situate material handling equipment in locations that will hinder smooth flow of vehicular or pedestrian traffic.

1.07 SITE CONDITIONS

- A. Field measurements and material quantities:
 - 1. Applicator shall have SOLE responsibility for accuracy of all measurements, estimates of material quantities and sizes, and site conditions that will affect work.
- B. Existing conditions:
 - 1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Owner operations unless prior written approval is received from Owner.
 - 2. Access to roof shall be from exterior only.
 - 3. Air-conditioning units and other equipment shall be moved as required to install roofing materials complete and in accordance with plans and specifications. When units and equipment are to be moved, they shall be carefully disconnected and removed to a protected area so as not to damage any part or component thereof, and shall be reconnected in such a way that they are restored to a prior work operating condition. Appropriate measures shall be taken to prevent dust, vapors, gases or odors from entering the building during roof removal, replacement or repair.
 - 4. All electrical disconnection and re-connection shall be performed by a licensed Electrical contractor.
- C. Safety requirements:
 - 1. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
 - 2. Comply with federal, state, local and Owner fire and safety requirements.
 - 3. Advise Owner whenever work is expected to be hazardous to Owner, employees, and/or operators.
 - 4. Maintain a crewman as a floor area guard whenever roof decking is being repaired or replaced.
 - 5. Maintain fire extinguisher within easy access whenever power tools, roofing kettles, and torches are being used.
- D. Waste Disposal:
 - 1. Do not re-use, re-cycle or dispose of material manufacturers product containers except in accordance with all applicable regulations. The user of manufactured products is responsible for proper use and disposal of product containers.
 - 2. Supply a dumpster for all waste. Locate adjacent to building in a location approved by owner. Contractor is responsible for all waste disposal.
- E. Environmental requirements:
 - 1. Do not work in rain, snow, or in presence of water.
 - 2. Do not work in temperatures below 40°F (4.44°C).
 - 3. Do not install materials marked "keep from freezing" when daily temperatures are

- scheduled to fall below 40°F (4.44°C).
4. Do not perform masonry work below 40°F (4.44°C).
 5. Remove any work exposed to freezing.
 6. Advise Owner when volatile materials are to be used near air ventilation intakes so that they can be shut down or blocked as owner requires.

F. Security requirements:

1. Comply with Owner security requirements.
2. Provide Owner with current list of accredited persons.
3. Require identification be displayed by all persons employed on this project.

G. Temporary sanitary facilities:

1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove on project completion.
2. Place portable toilets in conformance with applicable laws, codes, and regulations.

1.09 WARRANTY/GUARANTEE

A. Warranty and Service Agreement:

1. Upon project completion, manufacturer acceptance, and once complete payment has been received by both Contractor and manufacturer, manufacturer shall deliver to Owner a twenty (20) year Roofing System Warranty and Service Agreement. The manufacturer shall, during the second, fifth, tenth, and fifteenth year of this warranty service agreement, provide the following for the Roof System:
 - 1) Inspection by a Technical Service Representative and delivery of an internet based inspection report documenting roof conditions.
 - 2) Preventive maintenance and necessary repairs, including splits, tears, or breaks in the roof membrane system and flashings which threaten the integrity of the roof system and are not exempt due to neglect, negligence, vandalism, or some other exclusion.
 - 3) General rooftop housekeeping and cleanup, subject to limits, but generally including removal of incidental debris.

PART II - PRODUCTS

2.01 GENERAL

- A. Comply with quality control, references, specifications, and manufacturer's data. Products containing asbestos are prohibited on this project. Use only asbestos-free products.
- B. Use products with personal protection. User must read container label and material safety data sheets prior to use.

2.02 ROOF DECKING

- A. Concrete deck repair materials:
 - 1. ASTM C 928, rapid cure concrete repair material.
 - a. Below 85°F (29°C): Euco-Speed MP (magnesium phosphate) by The Euclid Chemical Company, Cleveland, OH.
 - b. Above 85°F (29°C): Euco-Speed MP Hot Weather (magnesium phosphate) by The Euclid Chemical Company, Cleveland, OH.

2.03 WOOD BLOCKING & CURBS

- A. Lumber:
 - 1. Southern Pine; No. 2 grade; free from warping and visible decay; pressure-treated with chromated copper arsenate (CCA) to meet AWPB, LP-22, 0.40 retention, and marked.
 - a. Wood blocking: 2" x 6" (50 mm x 150 mm) minimum.
- B. Wood cant: 4" x 4" (100 mm x 100 mm) cut on bias.

2.04 INSULATION

- A. Bottom layer:
 - 1. Polyisocyanurate roof insulation board, meeting ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
 - 2. Dimensions: 3" x 4' x 4'
- B. Crickets:
 - 1. Polyisocyanurate roof insulation board, meeting ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.

2. Double roof slope, 1/2" minimum.
- C. Cover board:
1. Fiberglass faced gypsum board, meeting ASTM C 1177/C 1177M-99
 2. Dimensions: 1/4" x 4' x 4'.
- D. Insulation and Cricket Adhesive:
1. Low rise urethane foam insulation adhesive, meeting or exceeding the following physical properties:
 - a. Tensile strength (ASTM D 412): Min. 250 psi
 - b. Density (ASTM D 1875): 8.5 lbs / gal
 - c. Peel adhesion (ASTM D 903): 17 lbf./in.
 - d. Flexibility (ASTM D 816): Pass @ 70 °F.
 - e. Flame Spread Index (ASTM E 84): 10.

2.05 MECHANICAL FASTENERS

- A. Wood to wood:
1. Galvanized, common, annular ring nail.
 2. Length: Sufficient to penetrate underlay blocking 1-1/4 inches (32 mm).
- B. Copper sheet metal to wood blocking:
1. Copper Wire Slating Nails, round shank, not smaller than twelve (12) gage by Clendenin Bros., Inc., Baltimore, MD.
 2. Length: Sufficient to penetrate wood blocking 1-1/4 inches (32 mm) minimum.
- C. Termination bar to masonry/concrete:
1. Lead masonry anchors.
 2. Length: Sufficient to provide 1-1/4 inches (32 mm) embedment minimum.
- D. Drawband:
1. Gold Seal stainless steel worm gear clamp by Murray Corporation, Cockeysville, MD.
 2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Company, Saltsburg, PA.
- E. Wood and sheet steel to concrete:
1. Tapcon 1/4 inch (6.35 mm) diameter, Phillips flat head anchor by Buildex Div. of ITW, Itasca, IL.
 2. Length: Sufficient to provide minimum 1-1/2 inches (38 mm) embedment.

2.06 ROOFING MATERIALS

- A. Cold-Applied Interply and Flood Coat Adhesive: One-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with specified roofing membranes and flashings, with the following physical properties:
1. Asbestos Content, EPA 600 R-93/116: None.
 2. Volatile Organic Compounds (VOC), maximum, ASTM D 6511-00: 270 g/L.
 3. Nonvolatile Content, minimum, ASTM D 6511: 72 percent.
 4. Flash Point, minimum, ASTM D 93: >100 deg. F.
 5. Density at 77 deg. F, minimum, ASTM D 6511-00: 8.6 lb/gal.
 6. Uniformity and Consistency, ASTM D 6511-00: Pass.
 7. Asphalt Content, minimum, ASTM D 6511-00: 50 percent.
- B. Roofing Membrane Plies: Asphalt-coated polyester/glass fiber/polyester laminated ply sheet, complying with ASTM D 4601, with the following minimum properties:
1. Breaking Strength, ASTM D 5147-07B: machine direction 145 lbf/in; cross direction 135 lbf/in, minimum @ 77 deg F.
 2. Tear Strength, ASTM D 5147-07B: machine direction, 225 lbf/in; cross direction 190 lbf/in, minimum @ 77 deg F.
 3. Pliability, 1/2 inch radius bend, ASTM D146-90: No failures.
 4. Weight: ASTM D 5147-07B: 38.0 lb/100 sq.ft., minimum.
 5. Mass of desaturated polyester/glass/polyester mat, minimum: ASTM D228-90a 3.0 lb/ 100 sq. ft.
 6. Thickness: Minimum .055 inch, or thicker as required to meet minimum Breaking Strength and Tear Strength properties indicated.
- C. Related materials:
1. Asphalt mastic:
 - a. ASTM D 4586, Type II, Class 1, one-part, asbestos-free, cold-applied mastic specially formulated for compatibility and use with specified roofing membranes and flashings.
 2. Water based primer: Water-based, polymer modified, asphalt primer with the following physical properties:
 - a. Asbestos Content, EPA 600/R13/116: None.
 - b. Non-Volatile Content, minimum, ASTM D 2823: 30 percent.
 - c. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 65 g/L.
 3. Compressible insulation:
 - a. Mineral wool or fiberglass batt insulation.
 4. Base Flashing Adhesive: One-part, asbestos-free, cold-applied, butyl rubber-based, elastomeric trowel-grade adhesive specially formulated for compatibility and use with specified roofing membranes and flashings, with the following properties:
 - a. Adhesion in Peel, minimum, ASTM D 1876: 3 lbf/in.
 - b. Lap Shear Adhesion, minimum, ASTM D 816: 18 psi.
 - c. Asbestos Content: ASTM D 276: None.

- d. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 250 g/L.
- 5. Flashing surfacing:
 - a. ASTM D 2824, Type I, nonfibered aluminum-pigmented asphaltic coating.
- 6. Flashing sheet: Reinforced elastomeric single ply flashing membrane, compatible with cold applied built-up roofing and with the following physical properties:
 - a. Breaking Strength, minimum, ASTM D 751-89: 150 lbf (1288 N).
 - b. Tear Resistance, minimum: ASTM D 751-89: 59 lbf (348 N).
 - c. Low Temperature Flexibility: ASTM D 2136-84: -40 deg. F (-50 deg. C).
 - d. Thickness, minimum, ASTM D 751: 0.045 inch (1.1 mm).
 - e. Color: Black or White
- 3. Roofing aggregate:
 - a. Bidsboro yellow, hard, durable, opaque; double washed free of clay, loam, sand or other foreign substances.
 - b. Do not use: Crushed gravel, white dolomite (marble chips), Joplin chats, scoria, limestone, volcanic rock, crushed oyster and clam shells, crushed brick tile, or cinders.
 - c. ASTM D 1863-93, size six (6), yellow.
- 4. Sealants:
 - a. Drawband and coping joint sealant:
 - 1) Roof membrane manufacturer's single component polyurethane sealant.
- 5. Stripping adhesive for metal flanges:
 - a. Interply Adhesive.
- 6. Stripping ply:
 - a. Roof membrane plies.
- 7. Walkway panels: Mineral-granule-surfaced, reinforced asphaltic composition, slip-resisting pads, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 1/2 inch thick, minimum.
- 8. Drains (unit cost basis):
 - a. Cast iron body with outlet size to match existing piping, cast iron clamping ring, and cast iron strainer.

2.07 METAL

- A. Termination bar:
 - 1. Aluminum bar. 1" x 1/8"
- B. Slip Counterflashing on Mechanical Units:
 - 1. Aluminum Sheet
 - a. Thickness: 0.040".
 - b. Color: Mill finish.

- C. Metal Coping Caps:
 - 1. Galvanized Steel Sheet (G-90 Coating):
 - a. Thickness: 24 gauge, minimum.
 - b. Finish: 70% Kynar 500 / Hylar 5000 Finish.
 - c. Color: To be selected by Owner from standard colors.
- D. Expansion Joint Covers, Scuppers, Pitch Pockets and Hoods:
 - 1. Copper Sheet: ASTM B 370-88, Cold rolled copper.
 - a. Thickness: 16 oz, minimum.
 - b. Solder: ASTM B32-89, alloy grade 50A. Neutralize flux after soldering.
- E. Lead Flashings (Drains and Plumbing Vents):
 - 1. ASTM B 29-79(1984), 4 lb. (1.82 kg) sheet lead.
- F. Details not addressed in specification shall be in accordance with Architectural Sheet Metal Manual, as issued by Sheet Metal and Air Conditioning Contractors' National Association, Inc., (SMACNA).

PART III - EXECUTION

3.01 EXAMINATION

- A. Verify conditions as satisfactory to receive work.
- B. Do not begin roofing until all unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions.
- C. Verify that work of other trades penetrating roof deck or requiring men and equipment to traverse roof deck has been approved by Owner, manufacturer, and roofing contractor.
- D. Check projections, curbs, and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system.

3.02 GENERAL WORKMANSHIP

- A. All work performed by Contractor shall conform to this specification.
- B. The presence and activity of the manufacturer's representative, architect's representative, and/or Owner's representative shall in no way relieve Contractor of contract responsibilities or duties.
- C. Substrate: Free of foreign particles prior to laying roof membrane.
- D. Provide additional fastening of mechanically attached base sheets in roof perimeter and corner areas.
- E. Phased application: Not permitted. All plies shall be completed each day.
- F. Traffic and equipment: Kept off completed plies until adhesive has set.
- G. Wrapper and packaging materials: Not to be included in roofing system.
- H. Entrapped aggregate: Not permitted within new membrane. Its discovery is sufficient cause for rejection.
- I. Ply shall never touch ply, even at roof edges, laps, tapered edge strips, and cants.
- J. Fit plies into roof drain rims; install lead flashing and finishing plies; secure clamping collars; install domes.

- K. Extend roofing membrane to top edge of cant at wall and projection bases.
- L. Cut out fishmouths/side laps which are not completely sealed; patch. Replace all sheets which are not fully and continuously bonded.
- M. Cold process adhesive heating:
 - 1. An in-line heat exchange unit may be used to facilitate application.
 - a. Maximum adhesive temperature: 100°F (38°C). Do not exceed the flash point of the adhesive.
 - 2. Heat exchange unit: Filled with heat transfer oil approved by equipment manufacturer.
 - 3. Follow operation procedures as recommended by equipment manufacturer.

3.03 PREPARATION

- A. Protection:
 - 1. Contractor shall be responsible for protection of property during course of work. Lawns, shrubbery, paved areas, and building shall be protected from damage. Repair damage at no extra cost to Owner.
 - 2. Provide at site prior to commencing removal of debris, a dumpster or dump truck to be located adjacent to building where directed by Owner.
 - 3. Roofing, flashings, membrane repairs, and insulation shall be installed and sealed in a watertight manner on same day of installation or before arrival of inclement weather.
 - 4. At start of each work day drains within daily work area shall be plugged. Plugs to be removed at end of each work day or before arrival of inclement weather.
 - 5. Preparation work shall be limited to those areas that can be covered with installed roofing material on same day and before arrival of inclement weather.
 - 6. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.
 - 7. Protect building surfaces at set-up areas with tarpaulin. Secure tarpaulin. Contractor to schedule delivery of empty dumpster and removal of full dumpster to suite work schedule. Upon job completion, dumpster shall be removed from premises. Spilled or scattered debris shall be cleaned-up immediately. Removed material to be disposed from roof as it accumulates.
 - 8. At end of each working day, seal removal areas with water stops along edges to prevent water entry.
 - 9. Provide clean plywood walkways and take other precautions required to prevent tracking of aggregate/debris from existing membrane into new work area where aggregate/debris pieces can be trapped within new roofing membrane. Contractor shall instruct and police workmen to ensure that aggregate/debris is not tracked into new work areas on workmen's shoes or equipment wheels. Discovery of entrapped

- aggregate/debris within new membrane is sufficient cause for its rejection.
10. Utilize a closed chute for removal of all built-up roofing systems.

B. Surface preparation:

1. Remove: Existing roofing, insulation to the concrete deck.
2. Remove: Remove any equipment and curbs marked with permanent paint.
3. Sweep clean deck.

3.04 CARPENTRY

A. Wall flashings: (Where built-in lightweight concrete cant exists, overlay with 1/2" pressure-treated plywood in lieu of horizontal blocking and wood cant)

1. Mechanically attach wood blocking to flashing base.
2. Fasteners shall be installed in two (2) rows staggered. Spacing in any one (1) row shall not exceed 24 inches (610 mm). Within 8 feet (2.4 meter) of outside corners, spacing shall not exceed 12 inches (300 mm) in any one (1) row.
3. Offset blocking layers 12 inches (300 mm); weave corners.
 - a. Blocking thickness: Equal to final insulation thickness.
4. Install 45 degrees and continuous wood cants (4 x 4's) at intersections of horizontal wood blocking and vertical flashing surfaces. Nail two (2) rows staggered. Spacing in any one (1) row shall not exceed 24 inches (610 mm). Within 8 feet (2.4 meter) of outside corners, spacing shall not exceed 12 inches (300 mm) in any one (1) row. Miter corners.

B. Wood blocking fastening pattern:

X	X	X	X	X	X	
X	X	X	X	X	X	X

3.05 ROOF DECK REPAIRS

A. Concrete deck repairs:

1. Remove spalled/deteriorated deck areas until sound base is reached.
2. Fill prepared area flush with one-component, chemical action concrete according to manufacture's directions. Allow to set.

3.06 THERMAL INSULATION

- A. Prime substrate with water based primer at a rate of 150-250 sq. ft. per gallon (3.7 - 6.1 m²/L).

- B. Adhere insulation layers with a ribbon coverage of low rise foam insulation adhesive at the manufacturers specified rate and bead spacing. Immediately after placement, walk insulation boards into adhesive to achieve solid contact.

3.07 ROOF SYSTEM APPLICATION

- A. Install three (3) plies of ply sheet, shingle fashion. Overlap starter strips 26 inches (660 mm) with first ply, then overlap each succeeding ply 24-2/3 inches (630 mm). Place ply sheets to ensure water will flow over or parallel to, but never against exposed edges.
- B. Use 12, 24, 36 inch (305, 610, 910 mm) wide plies to start and finish roof membrane along roof edges and terminations.
- C. Immediately after installation, broom and/or roll ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fish mouths, or blisters. Broom/roller width: 34 inches (860 mm) minimum.
- D. Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.
- E. Avoid walking on plies until adhesive has set.
- F. Overlap previous day's work 24 inches (610 mm).
- G. Lap ply membrane ends 4 inches (100 mm). Stagger end laps 3 feet (910 mm) minimum.
- H. Embed each ply in a uniform and continuous application of cold process interply adhesive. Interply application rate: 2-1/2 gallons per 100 sq. ft. (1.0 L/m²).

3.08 DAILY WATERSTOP/TIE-INS

- A. Remove embedded gravel/debris from top ply of felt along termination.
- B. Width: 460 mm (18 inches).
- C. Adhere 305 mm and 460 mm (12 and 18 inch) wide ply sheets from exposed deck to existing roofing with a continuous 1.6 mm (1/16 inch) thick application of tie-off mastic. Glaze cut-off with interply adhesive or tie-off mastic. Extend 460 mm (18 inch) wide felt 80 mm (3 inches) either side 305 mm (12 inch) felt.
- D. Install "deadman" insulation filler at insulation staggers.

- E. Extend roofing system at least 305 mm (12 inches) onto prepared area of adjacent roofing. Seal edge with 150 mm (6 inch) wide reinforcing membrane embedded between alternate courses of tie-off mastic.

3.09 FLASHINGS

A. General flashing requirements:

- 1. Elastomeric Flashing:
 - a. Adhere elastomeric sheeting completely to flashing surface, cant, and roofing with Flashing Adhesive. After application of flashing adhesive, immediately set elastomeric sheeting into the flashing adhesive.
 - b. Apply consistent pressure to entire surface of elastomeric sheeting using a steel hand roller to achieve full adhesion of the sheeting to the flashing substrate. Ensure complete bond and continuity without wrinkles or voids. Lap sheeting ends 4 inches (100 mm). Adhere laps with flashing adhesive.
 - c. Elastomeric sheeting width: Sufficient to extend at least 6 inches (150 mm) beyond toe of cant onto new roof.
 - d. Seal vertical and horizontal edges of sheeting with reinforcing membrane embedded in a base course of Flashing Adhesive and a top course of Asphalt Mastic.
- 2. Two-Ply Stripping for metal flanges:
 - a. Set flange in asphalt mastic. Seal flange with two (2) stripping plies embedded between alternate applications of stripping adhesive/bitumen. Extend first ply 4 inches (100 mm) beyond flange; second ply 2 inches (50 mm) beyond first ply.

B. At copings:

- 1. Install wood blocking
- 2. Install elastomeric base flashing described in general flashing requirements section.
- 3. Secure top edge of flashing to wall with termination bar fastened 8" o. c.
- 4. Cover top of wall with single ply membrane
- 5. Install continuous bent cleat on outside edge of wood blocking. Cleat shall be 1 gage heavier than coping cover. Lap ends 1 inch (25 mm). Nail 16 inches (400 mm).
- 6. Install shims or beveled wood strips to provide inward slope to finished coping cap.
- 7. Fabricate and install coping cover. Connect coping sections with 1-1/4 inch (32 mm) high standing seam. Extend front and rear sides of cover 2 inches (50 mm) beyond wood blocking. Bend lower edges out 30 degrees maximum to form drip edge. Attach outside edge to continuous cleat with 3/4 inch (19 mm) lock. Attach inside edge to wood blocking 24 inches (610 mm) o.c. At corners, form standing seam and miter.

C. At roof drains:

1. Remove existing roof drain. Install new cast iron roof drain and under-deck clamps. New roof drain rim elevation shall be 1" maximum above the deck surface. Complete plumbing connection to existing piping utilizing a no-hub coupler.
2. Install tapered edge strip around drain to create approximate 48 x 48 inch (1220 x 1220 mm) sump. Miter corners. Seal toe of tapered edge to drain rim with reinforcing membrane embedded between alternate courses of asphalt mastic.
3. Install roofing system into sump and onto drain rim.
4. Plug drain to prevent water entry until service connection is completed.
5. Prime the bottom side of the lead flashing.
6. Apply 1/16 inch (1.6 mm) uniformly thick layer of asphalt mastic to surface receiving lead flashing.
7. Set single piece lead flashing in mastic centered over drain; extend lead 6 inches (150 mm) beyond drain rim. Neatly dress lead with wood block.
8. Clamp flashing collar to drain in bed of mastic.
9. Neatly cut lead/felts within drain at rim. Lead to extend 1 inch (25 mm) into bowl.
10. Prime lead with asphalt primer.
11. Install two (2) ply stripping described in general flashing requirements section. Stripping shall not extend under clamping ring.
12. For working drains, remove drain plug upon completion of work each day.
13. All existing plastic drain components shall be replaced with new cast iron components as part of the base bid.

D. At expansion joint(s):

1. Extend new roofing to top edge of cant. Nail 8 inches (200 mm) o.c. with spiral or annular shank nails, with 1 inch (25 mm) cap.
2. Install vinyl water barrier over joint opening. Allow barrier to drape 4 inches (100 mm) within joint opening. Nail both sides of barrier 4 inches (100 mm) o.c.
3. Insert fiberglass batt insulation into expansion joint opening; fill entire opening.
4. Secure top edge of flashing membrane to substrate with spiral or annular shank nails, with 1 inch (25 mm) cap, 8 inches (200 mm) o.c.
5. Fabricate and install expansion joint cover to curb.
6. Bevel curb top for drainage:
 - a. Mechanically fasten to vertical portion of curb with neoprene-grommets screws 12 inches (300 mm) o.c.
 - b. Overlap sections 1 inch (25 mm)

E. At wood curb flashings:

3. Remove mechanical equipment from curb.
4. Install new roofing to top edge of cant. Nail 8 inches (200 mm) o.c. with spiral or annular nails, with a 1 inch (25 mm) cap.
5. Install elastomeric base flashing described in general flashing requirements section.
6. Secure top edge of flashing to substrate with termination bar; mechanically fasten 8 inches (20.3 cm) o.c. maximum.

7. Wipe top of bar clean with metal cleaner. Prime metal surface to receive sealant with metal primer. Allow to dry.
 8. Caulk top of bar. Provide watershed. Tool neatly.
 - a. Fabricate and install counterflashing.
 9. Reinstall mechanical equipment onto curb. Refasten.
- F. At plumbing vents:
10. Wedge plumbing vent tight against deck.
 11. Apply 1/16 inch (1.6 mm) uniformly thick layer of asphalt mastic to surface receiving metal flange.
 12. Fabricate and install plumbing vent flashing from lead. Flange: 4 inches (100 mm) wide minimum; extend completely around periphery of vent flashing. Set flange into mastic. Neatly dress flange with wood block.
 13. Prime metal flange with asphalt primer.
 - b. Pipe outside diameter greater than 2 inches (50 mm): Bend lead inside pipe 1 inch (25 mm) minimum with pliers or rubber/plastic mallet; replace cracked lead.
 - c. Pipe outside diameter 2 inches (50 mm) or less: Cut lead at vent top; fabricate and install integral lead cap.
 - d. Mechanically fasten plumbing vent to substrate, 3 inch (75 mm) o.c. staggered.
 14. Install two (2) ply stripping for metal flanges as described in general flashing requirements section.
- G. At pitch pans:
15. Fabricate pitch pans. Sides: 4 inches (100 mm) high, hemmed to outside at top edge. Flange: 4 inches (100 mm) wide, completely around periphery. Clearance between projection and pitch pan: 2 inches (50 mm). Set flange in mastic.
 16. Pack gap between roof-penetrating element and deck with compressible insulation. Seal with reinforcing membrane embedded between alternate courses of asphalt mastic.
 17. Nail flange to wood blocking 3 inches (75 mm) o.c., staggered.
 18. Prime metal flange, projection, and pitch pan interior with asphalt primer.
 19. Install two (2) ply stripping described in general flashing requirements section.
 20. Fill pitch pan to within 1 inch (25 mm) from top with non shrink grout. Allow to set firm.
 21. Fill pitch pan with asphalt mastic. Double fill if necessary.
 22. Fabricate and install umbrella with drawband over pitch pan. Tighten drawband.
 23. Wipe clean top of umbrella and projection with metal cleaner. Prime surface with metal primer.
 24. Caulk stack/sheet metal interface. Provide watershed. Tool neatly.
- H. At scuppers
1. Install wood blocking and wood cants, cut on a bias.
 2. Extend new roofing to top edge of cant. Nail 8 inches (200 mm) o.c. with spiral or annular shank nails, with 1 inch (25 mm) cap.

3. Install elastomeric flashing, trimmed around scupper opening.
4. Fabricate and install copper scupper, with flat folded and soldered seams.
5. Install two ply stripping including vertical flashing stripping described in general flashing requirements.

3.10 SURFACING TREATMENT ON FLASHINGS

- A. Coat elastomeric flashing with 2 coats of VOC compliant aluminized heat reflective coating applied at an approximate rate of 130 sq. ft. per gallon (3.2 m²/L) per coat.

3.11 SURFACING APPLICATION

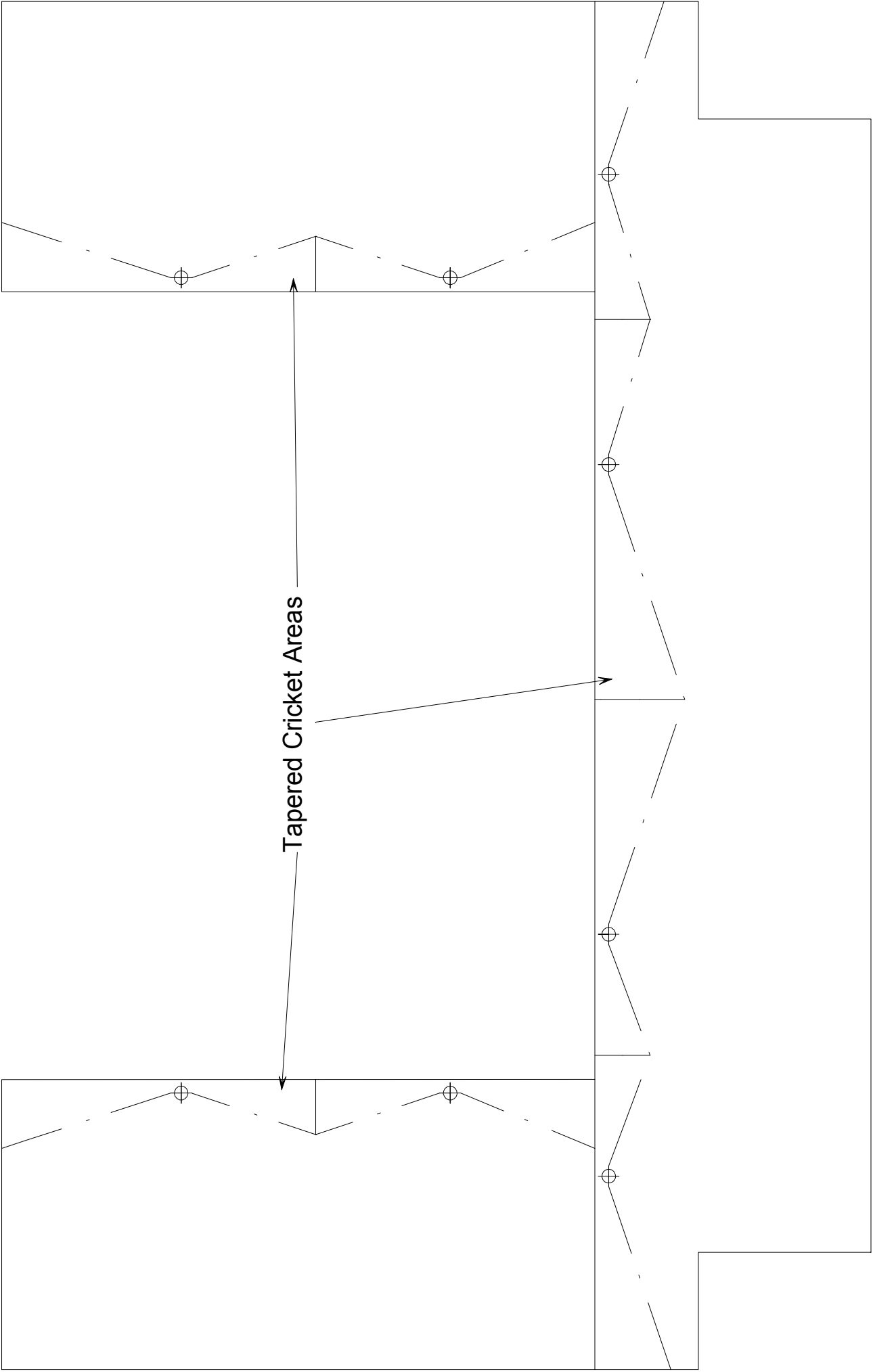
- A. Flood coat:
 1. Prior to application of surface treatment system, contractor shall inspect roof with manufacturer's representative.
 2. Sweep/blow clean roof surface and prime any soiled or contaminated areas with water based primer at a rate of 150-250 sq. ft. per gallon.
 3. Over entire roof surface spray apply uniform and continuous flood coat of surfacing adhesive.
 - a. Coverage rate: 5 gallons per 100 sq. ft. \pm 1/2 gallon per 100 sq. ft.
 4. Immediately broadcast minimum 500 lbs./100 sq. ft. (24.5 kg/m²) of new, clean roofing gravel. Cover flood coat material completely.

3.12 WALKWAYS

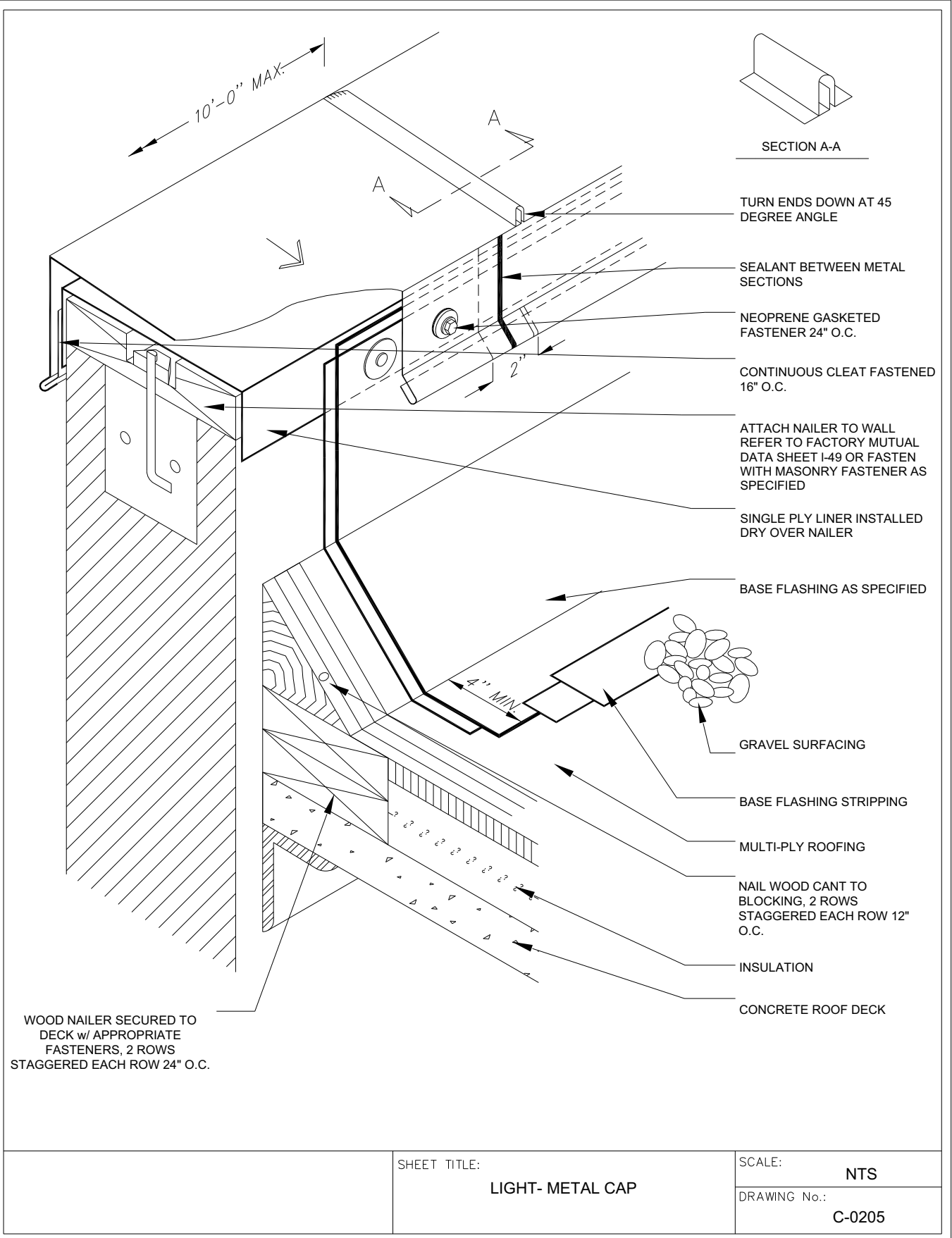
- A. Install walkway panel at all doors, ladders, and any other roof access points.
 1. Adhere walkway panels to roofing in a spot application of asphalt mastic.

3.13 ADJUSTING AND CLEANING

- A. Repair of deficiencies:
 1. Installations of details noted as deficient during final inspection must be repaired and corrected by applicator, and made ready for reinspection, within five (5) working days.
- B. Clean-up:
 1. Immediately upon job completion, roof membrane and flashing surfaces shall be cleaned of debris.
 2. Clean gutters and downspouts of debris.



Tapered Cricket Areas



SHEET TITLE:

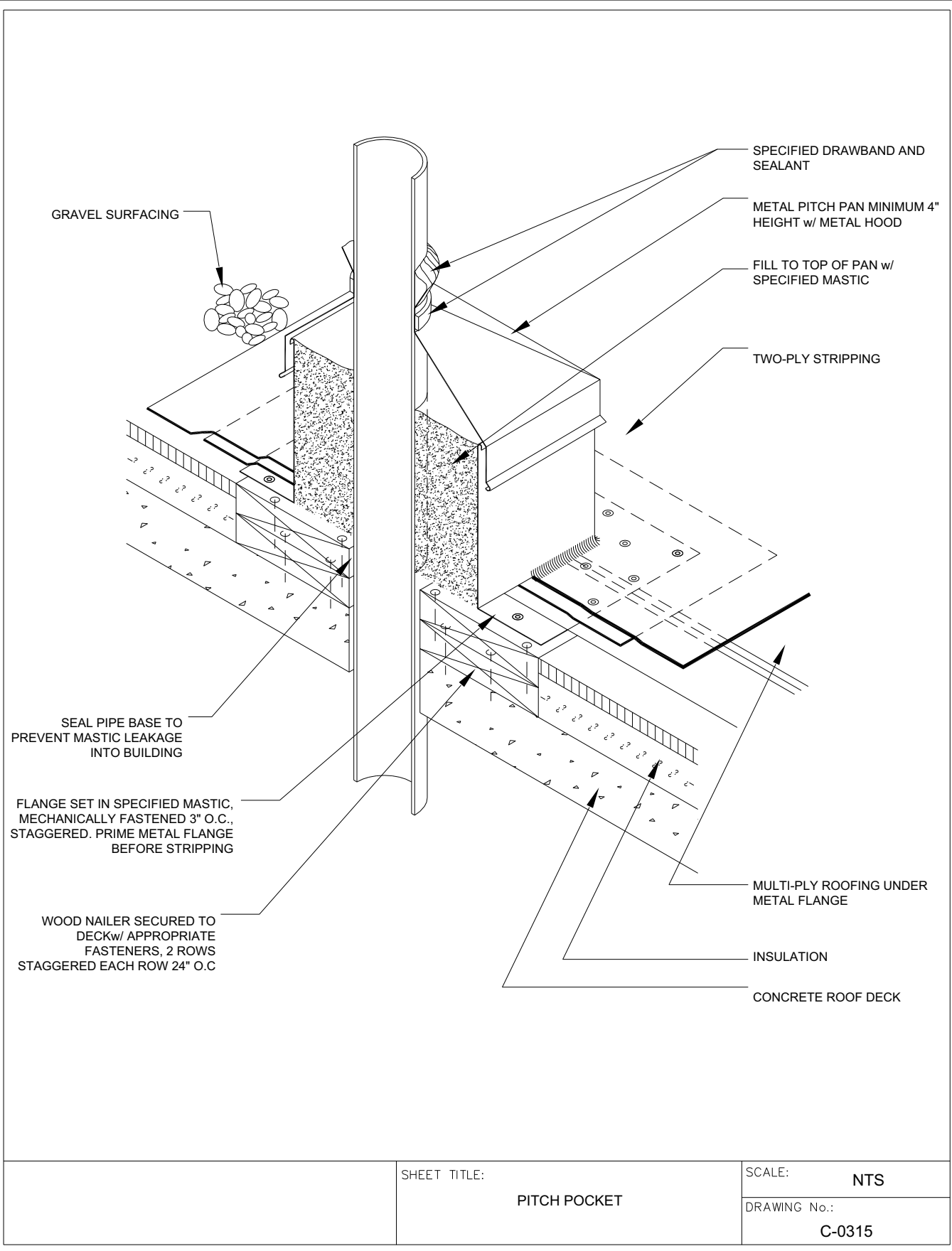
LIGHT- METAL CAP

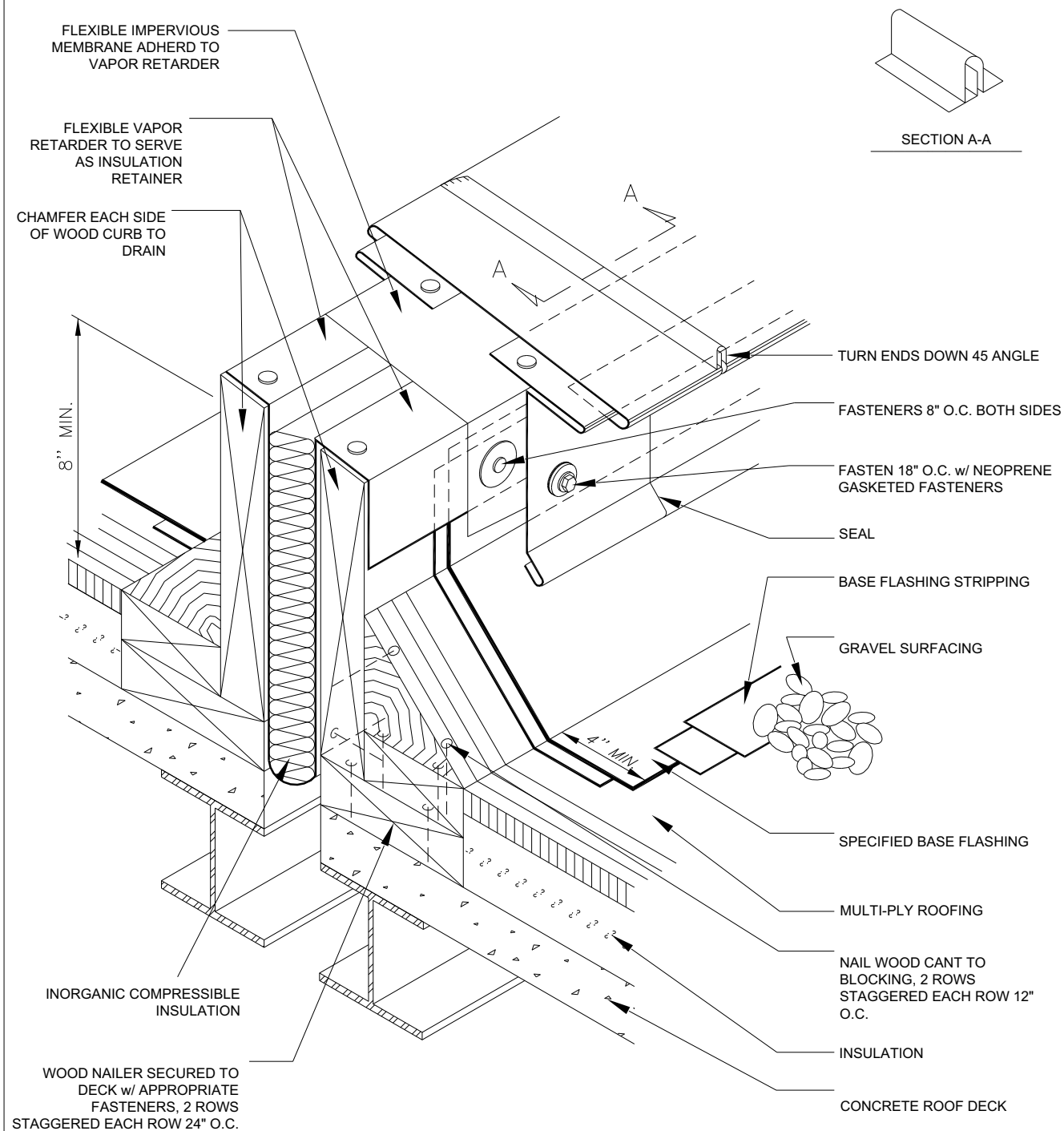
SCALE:

NTS

DRAWING No.:

C-0205





SHEET TITLE:
STANDING SEAM EXPANSION JOINT

SCALE: NTS

DRAWING No.:
C-0301