This master should be used by designers working on Port of Portland construction projects and by designers working for PDX tenants (“Tenants”), involving patch and repair of existing roofing. For Port construction projects with larger roofing scope, discuss with the Port engineer about the use of a Port-approved roofing consultant to provide professional services for design of roof repairs, rehabilitation, and/or replacement.

Usage notes highlight a few specific editing choices, however the entire section should be evaluated and edited to fit specific project needs.

SECTION 070153– BALLASTED elastomeric sheet ROOFING SYSTEM Modifications

1. GENERAL
	* + 1. DESCRIPTION
				1. This section describes the following:

Thermal Barrier.

Vapor Barrier.

Roof Insulation.

Elastomeric Sheet Membrane.

* + - 1. RELATED WORK SPECIFIED ELSEWHERE
				1. Section 061000, Rough Carpentry
				2. Section 076200, Sheet Metal Flashing and Trim
			2. DEFINITIONS
				1. Roofing Terminology: See ASTM D 1079 and glossary of NRCA’s “The NRCA Roofing and Waterproofing Manual” for definitions of terms related to roofing work in this section.
			3. REFERENCES
				1. ANSI: American National Standards Institute
				2. ASTM: American Society for Testing and Materials

ASTM D1056: Flexible Cellular Materials-Sponge or Expanded Rubber

ASTM E84: Test Method for Surface Burning Characteristics of Building Materials

ASTM E119: Test Method for Fire Tests of Building Construction and Materials

ASTM C578: Rigid, Cellular Polystyrene Thermal Insulation

* + - * 1. FM: FM Global

Factory Mutual Approval Guide

FMG Property Loss Prevention Data Sheets 1-28 – Wind Design

FMG Property Loss Prevention Data Sheets 1-29 – Roof Deck Securement and Above Deck Roof Components

FMG Property Loss Prevention Data Sheets 1-49 – Perimeter Flashing

FM Class 1 Insulated Steel Deck Roofs

* + - * 1. UL: Underwriters Laboratories Inc.

UL 723: Surface Burning Characteristics of Building Materials

* + - 1. SUBMITTALS
				1. Product Data: For each type of product indicated. Include data substantiating that materials comply with requirements.

Tenants: Delete the following paragraph.

* + - * 1. Qualification Data: For qualified installer and manufacturer.
			1. QUALITY ASSURANCE

Tenants: Delete the following paragraph.

* + - * 1. Manufacturer Qualifications: A qualified manufacturer that has FM Approvals for membrane roofing system identical to that used for this work.
				2. Obtain primary products (excluding vapor barrier, if any), including each type of roofing repair membrane and membrane flashings, from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified.
				3. Installer Qualifications: Engage an experienced installer (roofer) who is certified by elastomeric sheet roofing system manufacturer as qualified to install manufacturer’s roofing materials.

Installer’s Field Supervision: Require installer to maintain a full-time supervisor/foreman on job site during times that elastic sheet roofing work is in progress and who is experienced in installation of roofing systems similar to type and scope required for this work.

Retain only if required to comply with FM Approvals, UL, or another building code, or to comply with provisions of manufacturer's special warranty. Consult manufacturer's literature because requirements vary.

* + - * 1. Exterior Fire-Test Exposure: ASTM E 108, Class A for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Identify materials with appropriate markings of applicable testing agency.

Retain only if products specified in Part 2 are part of a fire-resistance-rated assembly. Indicate rating, testing agency, and testing agency's design designation on drawings.

* + - * 1. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
				2. Pre-Installation Roofing Meeting: Approximately 2 weeks before scheduled commencement of modifications requiring through-roof penetrations and associated work, meet at the site. Notify participants at least 5 working days before meeting.

Meet with the Port, roof consultant, roofing installer, and other installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

Review methods and procedures related to roofing installation, including manufacturer’s written instructions.

Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.

Review loading limitations of deck during and after roofing.

Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.

Review governing regulations and requirements for insurance, certifications, inspection, testing, and hot work, as applicable.

Review temporary protection requirements for roofing system during and after installation.

Review roof observation and repair procedures after roofing installation.

Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

Review warranty status of roof system and requirements for maintaining it, if applicable.

* + - 1. PERFORMANCE REQUIREMENTS
				1. General: Installed watertight elastomeric sheet roofing and base flashing system shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
				2. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
				3. Roofing System Design: Provide a roofing system that is nearly identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7-10 and Factory Mutual Global for wind speeds of 130 mph (at 3-second gusts) with Exposure Classification C and Risk Category III.

For projects involving significant areas of roof system installation or replacement, calculate and edit subparagraphs 1 and 2.

Uplift pressures determined by Modeling Building in “RoofNav.”

Field-of-Roof Uplift Pressure: No less than 57 lbs./sq.ft

Perimeter Uplift Pressure: No less than 96 lbs./sq.ft.

Corner Uplift Pressure: No less than 144 lbs./sq.ft.

Provide roof and ballast system matching existing or that is capable of resisting the uplift forces according to recommendations in FMG Loss Prevention Data Sheet 1-28 and with an FMG approved system per zone:

Zone 1: FM 1-60

Zone 2: FM 1-105

Zone 3: FM 1-150

* + - * 1. FM Approval Listing: Provide elastomeric sheet roofing system, base flashings, and component materials that have been evaluated by Factory Mutual System for fire spread, wind-uplift, and hail damage, that comply with requirements in FM Approval Standard 4450 and 4470 as part of a roofing system, and that are listed in FM Approvals' “RoofNav” for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals' markings.

Fire/Windstorm Classification: Class 1A-150.

Provide materials bearing FM Approval marking on bundle, package, or container, indicating that materials have been subjected to FM Global examination and follow-up inspection service.

* + - * 1. UL Listing: Provide elastomeric sheet roofing system and component materials that have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for Class A external fire exposure.

Provide roof-covering materials bearing UL classification marking on bundle, package, or container indicating that materials have been produced under UL’s classification and follow-up service.

Provide elastomeric sheet roofing system that can be installed to comply with UL requirements for Fire Classified and Class 90 wind-uplift requirements.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Do not store materials on the roof which have the potential to become foreign object debris.
				2. Obtain approval from the Port prior to storing materials on the roof overnight or storing them within rooftop mechanical penthouses.
				3. Do not leave unused roofing materials on the roof overnight or when roofing work is not in progress unless protected from weather or other moisture sources.
				4. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.
				5. Provide tarps or plastic sheeting, as required, to adequately protect opened roofs and flashings and to prevent entrance of moisture or rain water into the existing structure until new materials have been applied.
				6. Do not open up more roof surface at one time than can be adequately covered and protected in the event of sudden, unexpected rainfall.
				7. Have necessary waterproof canvas or plastic sheeting on hand in case of emergency. The Contractor will be held liable for any damage to building interior due to negligence.
				8. To the extent possible, deliver roofing materials to the work site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
				9. Store liquid materials within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. Discard and legally dispose of liquid materials that cannot be applied within their stated shelf life.
				10. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
			2. PROJECT CONDITIONS
				1. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed in accordance with manufacturer’s written recommendations and warranty requirements.
				2. Do not allow smoking or use of any open flame device around or near cements and bonding adhesive containing petroleum distillates.

Contact the Port to verify the warranty status of all roof areas where work will take place. Work on warranted roofs must meet the requirements of the warranty provider, be executed by a roofing contractor certified by the membrane manufacturer, and utilize materials manufactured by the warranty issuer, as required to maintain warranty.

* + - 1. WARRANTY
				1. Provide written warranty, signed by Contractor and installer, agreeing to replace/repair defective materials and workmanship (and work not in accordance with the contract documents) as required to maintain roofing system in watertight condition for two years after date of substantial completion.
				2. Special Warranty: Contractor to provide modifications to roof systems under manufacturer No Dollar Limit Warranty which complies with manufacturer’s requirements to ensure any current warranties are not invalidated.

Tenants: In Part 2, delete all references to “pre-bid approved equal.”

1. PRODUCTS

Delete the following article when repair activities are in conjunction with composite or concrete roof decks.

* + - 1. THERMAL BARRIER
				1. Gypsum Roof Board: Gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides.

Application: Mechanically Fastened.

Board size: Size to fit applications indicated.

Board thickness: 5/8-inch.

Acceptable products:

DensDeck Gypsum Roof Board, by Georgia Pacific Corp.

Securock Gypsum Roof Board, by USG

Or pre-bid approved equal

* + - 1. VAPOR BARRIER
				1. Field Sheet: Two plies of 52 mil thick, plus or minus 10%, chloroprene modified asphalt filmed onto a woven glass fabric, ASTM D1668 and ASTM D6769.

Grade: Spring/fall or winter.

Application: Fully adhered.

Manufacturer: Laurenco Waterproofing, or pre-bid approved equal.

* + - * 1. Flashing Plies: Two plies of 52 mil thick, plus or minus 10%, chloroprene modified asphalt filmed onto a woven glass fabric, ASTM D 1668 and ASTM D6769.

Grade: Spring/fall or winter.

Sheet Width: 9-inch

Application: Fully adhered.

Manufacturer: Laurenco Waterproofing, or pre-bid approved equal.

* + - * 1. Primer: Asphalt complying with ASTM D41, modified with synthetic rubbers in an aliphatic solvent, with no filer.

Grade: Spring/fall or winter.

Manufacturer: Laurenco Waterproofing, or pre-bid approved equal.

* + - * 1. Adhesive (Brush or Roller): Semi-viscous liquid composed of synthetic rubbers to modify the asphalt in cut-back form, ASTM 4479.

Grade: Spring/fall or winter.

Manufacturer: Laurenco Waterproofing, or pre-bid approved equal.

* + - * 1. Adhesive (Trowel): Aliphatic asphalt base mastic with modified synthetic rubbers, combined with Gilsonite, lampblack, and other stabilizers, compatible with asphaltic and coal tar roofing and waterproofing materials.

Manufacturer: Laurenco Waterproofing, or pre-bid approved equal.

* + - 1. ROOF INSULATION
				1. General:

Provide insulating materials to comply with requirements indicated for materials and referenced standards; in sizes to fit applications indicated, selected from manufacturer’s standard thicknesses, widths and lengths.

Minimum Thermal Resistance: Match existing.

Pitch top surface of insulation to drain, where tapered insulation is indicated.

* + - * 1. Replacement Insulation Units: Expanded polystyrene (EPS) which shall conform to ASTM C578 and meet UL Classification No. 723 with a density of 2.0 pounds per cubic foot. Overall thickness of insulation board shall be 1 1/2 inches, or as required to match the overall thickness of the existing insulation assembly.
				2. Tapered Board Roof Insulation: EPS which shall conform to ASTM C578 and meet UL Classification No. 723 with a density of 2.0 pounds per cubic foot.

Application: Loosely laid, tightly butted.

Board size: 4-foot x 4-foot maximum, thickness varies.

Products: Tapered InsulFoam by Carlisle, or pre-bid approved equal.

* + - 1. MANUFACTURERS
				1. Approved elastomeric sheet membrane manufacturers are:

Firestone Building Products.

Carlisle SynTec.

Or pre-bid approved equal.

* + - 1. ELASTOMERIC SHEET MEMBRANE
				1. Roof Repair Membrane: Ethylene Propylene Diene Monomer (EPDM) compounded elastomer, non-staining black fire retardant sheet; 0.060-inch thick.
			2. RELATED MATERIALS
				1. Perimeter Securement Strip: Manufacturer’s standard synthetic-rubber polymer primer and 3-inch wide minimum, butyl splice tape with release film, minimum 6-inches wide.
				2. Splice Materials:

Wash: Solvent based effacing solution, manufactured for the purpose of cleaning EPDM membrane surfaces prior to performing seaming activities, as manufactured and/or recommended by roof membrane materials manufacturer.

Primer: Synthetic polymer based, black adhesive, as recommended and approved by roof membrane materials manufacturer.

Adhesive: Synthetic polymer based, black adhesive, as recommended and approved by roof membrane materials manufacturer.

Tape: Cured EPDM based butyl adhesive tape, 30 mils minimum thickness, as approved by roof membrane materials manufacturer.

* + - * 1. Flashing Sheets:

Detailing and Corners: Uncured, un-reinforced EPDM laminated to a cured EPDM-based adhesive tape, minimum 75 mils thick, minimum 6 inches wide.

Cover Tape: Cured, unreinforced EPDM laminated to a cured EPDM-based adhesive tape, minimum 45 mils thick, minimum widths as required to perform the work indicated, as recommended by the roof membrane materials manufacturer.

* + - * 1. Bonding Adhesive: For use in fully adhered EPDM membrane application assemblies and in base flashing applications of ballasted EPDM assemblies. Synthetic polymer based contact adhesive designed for bonding EPDM membrane to wood, metal, masonry, and insulation materials, as manufactured by roof membrane materials manufacturer.
				2. Lap Sealant: Single-component sealant, colored to match membrane roofing as manufactured and/or recommended by the roof membrane materials manufacturer.
				3. Water Cut-off Mastic: Manufacturer’s standard butyl mastic sealant.
				4. Pre-Formed Pipe/Conduit Flashing: Pre-formed EPDM pipe/conduit flashing with storm collar and stainless steel clamping band, as manufactured or recommended by membrane manufacturer.
				5. Termination Bar: Manufacturer’s standard, pre-drilled aluminum bars, approximately 1-inch by 1/8-inch thick.
				6. Membrane Fasteners: Factory coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roof membrane materials manufacturer.
				7. Thermal Barrier Fasteners: Zinc/aluminum plates with corrosion resistant fluorocarbon coated screws of sufficient length to penetrate through steel decks minimum 3/4-inch.
				8. Filter Fabric / Protective Mat: UV resistant, polypropylene fabric designed for use as a protective barrier between single ply membranes and ballast systems; type shall match existing fabric currently in place.
				9. Precast Concrete Pavers: Salvage existing precast concrete pavers from roof areas scheduled for roof replacement. If salvaged paver supply is depleted, the Port will make available previously salvaged Roofblok Series 1200 precast concrete pavers, color: natural gray.
				10. Provide all required accessories including: splice materials, flashing sheets, bonding adhesive, sealants, mastics, pre-formed flashings, termination bars, fasteners, plates, and other materials required for a complete and proper installation and in accordance with the manufacturer’s published specifications and instructions.
1. EXECUTION
	* + 1. NOTIFICATION
				1. Notify the Port three days prior to installation of roofing repairs. Allow exposed membrane to be observed by the Port prior to application of materials. Materials applied without such prior observation shall be subject to removal at the Contractor's expense if so requested by the Port.
				2. Notify the Port when work will disrupt normal business activities.
			2. QUALITY OF WORK
				1. Experienced personnel in the type of roofing work specified shall perform the work.
				2. Supervision shall be maintained by the same person throughout the entire course of the installation of new materials.
				3. Finished work shall be free from wrinkles, creases, bubbles, fish mouths, and similar defects. Laps shall be fully sealed per manufacturer’s installation instructions, and entire surface shall be watertight.
				4. Use proper installation practices. An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this work, and shall be subject to approval by the Port.
				5. Make necessary preparations, utilize recommended application techniques, apply specified materials, and exercise care in ensuring that the finished application is acceptable to the Port.
				6. Cooperate with inspection and test agencies engaged or required to perform services in connection with installing elastomeric sheet membrane roofing system.
			3. EXAMINATION
				1. Examine substrate surfaces to receive elastomeric sheet membrane roofing system and associated work. Do not proceed with roofing until unsatisfactory conditions have been corrected.
				2. Verify existing roof membrane and deck surfaces are dry and free of snow or ice.

Tenants: Delete the following paragraph in its entirety.

* + - * 1. Verify that existing roof openings and penetrations are secure in place, curbs are set and braced, and that roof drain bodies are securely clamped in place.
				2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations.
				3. Steel Roof Deck: Verify that surface plane flatness and fastening of steel roof deck is acceptable to receive roof membrane.

Tenants: Delete the following paragraph.

* + - * 1. Verify that roof drain lines are functioning correctly before starting work of this section. Report such blockages in writing to the Port.
			1. GENERAL INSTALLATION REQUIREMENTS
				1. Provide 18–inch minimum clear distance between new roof penetrations and any new/existing adjacent penetrations or walls.
				2. All cuts in existing membrane shall be smooth and free of fins and over cuts or jagged edges. Terminate all cuts with a radius or “key hole” cutout to prevent cut from travelling out from beneath overlying repair materials.
				3. Where the existing roof is cut open, install and maintain suitable temporary felt and fabric flashing as required to keep water out from under the existing roofing during the construction period, as well as to prevent any water leaking into existing occupied spaces within.
				4. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecasted. Remove and discard temporary seals before beginning work on adjoining roofing.
				5. Prepare all surfaces and details in accordance with roofing materials manufacturer’s printed installation instructions and these contract documents.
				6. Remove existing concrete paver systems from work area and distribute stockpiles evenly over structural members.
				7. Clean existing substrates to receive repairs of all dust, dirt, contaminants, moss, and loose materials using a wash of environmentally neutral cleaner and clean water. Use scrub brushes or power washing equipment where required. Contain all used and unused portions of cleaning solutions and dispose of off-site. Do not allow solutions to enter roof drains. The resulting surface shall be clean and intact and suitable for adhering new flashing and repair materials.
				8. Inspect exposed roof area for punctures, tears, and other defects. Familiarize locations and mark each defect for repair.
				9. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

Delete when repair activities are in conjunction with composite or concrete decks.

* + - 1. THERMAL BARRIER INSTALLATION
				1. Thermal Barrier on Steel Decks:

Comply with manufacturers recommendations, UL requirements for “Roof Deck Constructions” which are fire rated “Fire Acceptable” or with FM requirements for “Class I” metal deck construction, whichever is the most stringent.

Mechanically fasten one course of thermal barrier material to steel roof deck using fasteners of length to penetrate top of roof deck flutes only. Comply with requirements of Factory Mutual Data Sheet 1-28 and with Part 1 of this specification section.

Thermal barrier joints shall be staggered between alternate courses and closely butted with board edges supported.

* + - * 1. Thermal Barrier Joint Penetrations: Prevent bitumen from penetrating thermal barrier joints, entering building, or damaging roofing system components or adjacent building construction. Tape thermal barrier joints.
			1. VAPOR BARRIER INSTALLATION
				1. Surface Preparation:

Over Concrete Deck:

Remove projections, such as fins, higher than 1/16-inch.

Remove deleterious materials such as laitance, spatters, dirt, and debris.

Remove any existing membrane materials and adhesive.

Scrape off knife-like edges of external corners.

Patch or otherwise repair all cracks in the concrete over 1/16-inch wide.

Patch all chips and voids in surfaces to be covered to provide a concrete surface profile of 4 or less according to the International Concrete Repair Institute.

Over Thermal Barrier:

Remove projections, such as fins, higher than 1/16-inch.

Remove deleterious materials such as dirt and debris.

Scrape off knife-like edges of external corners.

Tape joints between thermal barrier boards.

Over Existing Vapor Barrier:

Remove all loose and adhered debris and wipe surface clean.

* + - * 1. Vapor Barrier Installation

Install the vapor barrier in the following sequence:

Flashing plies.

Base ply field sheet.

Top ply field sheet.

Flashing Plies:

Using a brush or squeegee, apply 1 1/4 to 1 1/2 gallons per 100 sq. ft. of adhesive 6 inches up vertical surfaces and 5 -inches onto horizontal surfaces.

Embed 9-inch-wide pre-cut and pre-folded vapor barrier sheet 5 inches up the vertical surface and 4 inches onto horizontal surfaces.

Coat first ply with adhesive at the rate of 3/4 gallon per 100 sq. ft. 7 inches up vertical surfaces and 6 inches onto horizontal surfaces.

Embed 9-inch-wide pre-cut vapor barrier sheet 4 inches up vertical surfaces and 5 inches onto horizontal surfaces.

Seal all terminations and laps with waterproofing adhesive.

Field Sheet Plies – For large areas not effectively sealed with flashing plies:

Flash corners, edges, and joints prior to application of field sheet plies on horizontal areas.

Using a brush or squeegee, uniformly coat the horizontal surfaces with waterproofing adhesive at a rate of 1 1/4 to 1 1/2 gallons per 100 sq. ft. and allow tack to almost dry.

Smoothly embed base ply field sheet and seal all laps with adhesive. Continue all sheets to the vertical surface, or 6 inches onto adjacent existing vapor barrier, and terminate. Maintain total contact with the substrate. At turn down conditions, extend base ply field sheet 6 inches onto the vertical wall.

Allow base ply field sheet to cure for 1 hour prior to application of top ply field sheet.

Coat base ply field sheet with waterproofing adhesive at the rate of 3/4 gallon per 100 sq. ft. and allow “tack to almost dry.

Smoothly embed top ply field sheet; center laps over base ply field sheet; seal all laps uniformly with waterproofing adhesive. Continue all sheets to the vertical surface, or 2 inches beyond the edge of the base ply field sheet onto adjacent existing vapor barrier, and terminate. Maintain total contact with the substrate. At turn down conditions, extend top ply field sheet 8 inches onto the vertical wall.

Top coat all seams with 4-inch-wide application of adhesive, centered on each seam.

* + - 1. INSTALLATION – LARGE FIELD INFILL/ROOF CURB/INSULATION/EPDM MEMBRANE/BASE FLASHING
				1. See drawings for location of roof modifications.
				2. Cut back existing membrane, insulation, and related materials as required to properly install new roof modifications.
				3. Install new replacement insulation units where existing insulation units have been removed or found to contain moisture. Match height of insulation units where tapered insulation systems exist. Insulation units shall be butted tight together and loosely laid.
				4. Clean and prime the existing membrane along the leading edge where the new membrane shall be spliced, according to manufacturer’s installation instructions.
				5. Install new membrane and flashing sheets over new insulation assembly. Roll or broom the membrane over the new substrate to eliminate air pockets and wrinkles, and allow membrane to relax into position.
				6. Install new membrane so that it extends no less than 6 inches onto the surface of the existing membrane at all splice locations.
				7. Position new EPDM membrane or flashing sheets around entire perimeter of base of curb, allowing membrane to extend up curb to weather lap under counter-flashing, or as otherwise shown on the drawings. Fully adhere to all non-ballasted substrates.
				8. Splice all seams with tape. Prep and prime new and existing seams per manufacturer’s published installation instructions. After splicing, roll all new seams with silicone or neoprene rollers to assure no wrinkles or air pockets exist within the seam.
				9. Apply lap sealant at all exposed edges of new membrane splices.
			2. PIPE AND CONDUIT FLASHING INSTALLATION
				1. See the drawings for location of new pipe and conduit penetrations.
				2. Cut existing membrane, insulation, and related materials as required to properly install new pipe and conduit penetrations through the roof.
				3. All cuts in existing membrane shall be smooth and free of fins and over cuts or jagged edges. Terminate all cuts with a radius or “key hole” cut out to prevent cut from travelling out from beneath overlying repair materials.
				4. Clean, rinse, and dry existing membrane according to repair membrane manufacturer’s published installation instructions.
				5. Wipe down the existing membrane, where patching shall be performed, using a rag or brush saturated with cleaner, and allow to dry.
				6. Install primer over all locations to be repaired, extending a minimum of 4 inches to all sides of the area or defect to be repaired, allow to become tacky according to manufacturer’s installation instructions.
				7. Position pre-formed pipe/conduit flashing or provide new two-piece field wrap utilizing flashing sheets, around all pipes and conduits, and other round penetrations requiring repairs.
				8. Splice new materials to existing membrane with pressure-sensitive tape.
				9. Roll in new EPDM materials using silicone or neoprene rollers as required to eliminate all air pockets, blisters, and wrinkles, and to assure positive adhesion to existing membrane.
				10. Apply lap sealant at all exposed edges of new membrane.
				11. Install new stainless steel clamping band where membrane terminates at penetration and seal with polyurethane sealant.
			3. PATCHES AT DAMAGED MEMBRANE
				1. See the drawings for location and typical diagrammatic repair method.
				2. Clean, rinse, and dry existing membrane according to repair membrane manufacturer’s published installation instructions.
				3. All cuts in existing membrane shall be smooth and free of fins and over cuts or jagged edges. Terminate all cuts with a radius or “key hole” cut out to prevent cut from travelling out from beneath overlying repair materials.
				4. Wipe down the existing membrane where patching shall be performed, using a rag or brush saturated with cleaner, and allow to dry.
				5. Install primer over all locations to be repaired, extending minimum 4 inches to all sides of the area or defect to be repaired, allow to become tacky according to manufacturer’s installation instructions.
				6. Position new flashing tape membrane or flashing sheet membrane centered over repair location, verifying that new membrane extends minimum 3 inches beyond all sides of defect. Round all corners of new membrane patching materials.
				7. Splice all seams with tape and prep and prime new and existing seams according to manufacturer’s published installation instructions. After splicing, roll all new seams with silicone or neoprene rollers to assure no wrinkles or air pockets exist within the seam.
				8. Roll in new flashing tape and flashing sheets using silicone or neoprene rollers as required to eliminate all air pockets, blisters, and wrinkles, and to assure positive adhesion to existing membrane.
				9. Apply lap sealant at all exposed edges of new membrane patches.
			4. PRECAST CONCRETE PAVERS INSTALLATION
				1. Clean surface of roof membrane to remove all traces of concrete aggregate, sand, and other sharp objects which could potentially damage the roof membrane.
				2. Allow lap sealant to cure prior to installation of filter fabric.
				3. Install new filter fabric/protection mat over areas to receive new concrete paver system. Lap edges of filter fabric 6 inches minimum. Do not allow any EPDM to be covered without at least one layer of filter fabric/protection mat between the pavers and the membrane.
				4. Install salvaged and new precast concrete pavers, interlocked, uniform in elevation, and free of chips and cracks. Replace damaged pavers. Units shall fit snug against one another with no spaces within joints.
				5. Cut pavers as required to achieve adequate coverage. Make cuts clean and parallel with surfaces in which pavers are to be installed.
				6. Adhere cut sections to adjacent full sections using adhesive as recommended by paver manufacturer.

Coordinate with drawings the extent of pavers that fall within the requirements of Roofblok RBS-B. Reference www.roofblok.com/designcriteria/htm.

* + - * 1. Install adhesive along edges of pavers at roof perimeters where shown on the drawings, and as required to achieve FM system Class A wind rating. Install adhesive so that it is not visible after final paver installation.
				2. Install adhesive along edges of pavers where pavers are subject to migration.
				3. Remove all broken or unused existing pavers from the site.
			1. PROTECTION
				1. Protect adjacent roofing and flashing systems from damage during application until final acceptance by the Port. Repair damaged areas prior to final acceptance of the work.
			2. CLEANUP
				1. Remove masking, protection, equipment, tools, materials, and debris from the work and storage areas. Leave the work undamaged and clean.

END OF SECTION 070153