Part 1 General

1.1 RELATED WORK

.1 Section 07 21 13 - Board Insulation

1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM D41, Asphalt Primer Used in Roofing, Damp-proofing, and Waterproofing.
- .2 ASTM D1227, Emulsified Asphalt Used as a Protective Coating for Roofing.
- .3 ASTM D4479, Asphalt Roof Coatings - Asbestos-Free.
- .4 ASTM D4586, Asphalt Roof Cement, Asbestos Free.

.2 Canadian General Standards Board (CGSB)

- .1 CGSB 37-GP-9, Primer, Asphalt, Unfilled, for Asphalt Roofing, Damp-proofing and Waterproofing.

1.3 SUBMITTALS

.1 Submit accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit WHMIS MSDS - Material Safety Data Sheets WHMIS acceptable to Labour Canada, and Health and Welfare Canada.

.3 Product data: submit product data sheets for bituminous damp-proofing products. Include manufacturer and product name, product characteristics, performance criteria, application methods, product limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with manufacturer's instructions.

1.5 PROJECT SITE/ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content:

- .1 Apply damp-proofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
- .2 Do not proceed with work when wind chill effect would tend to set bitumen before proper curing takes place.
- .3 Maintain air temperature and substrate temperature at damp-proofing installation area above 5 °C for 24 hours before, during and 24 hours after installation.
- .4 Do not apply damp-proofing in wet weather.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.3 Provide continuous ventilation of enclosed spaces buy use of portable supply and exhaust fans during and after damp-proofing application.

Part 2 Products

2.1 ASPHALTIC MATERIALS

.1 Bituminous damp-proofing for application temperatures above 5ºC:

.1 To ASTM D1227 Type II, cold applied, asbestos free, clay emulsified asphalt compound, fibred.

.2 Acceptable material: WR Meadows Sealmastic Emulsion; Bakor 700-01; Henry HE789.

.2 Bituminous damp-proofing for application temperatures below 5ºC:

.1 To ASTM D4479 Type I, cold-applied, asbestos-free, solvent-based asphalt compound, brush on grade fibred.

.2 Acceptable material: WR Meadows Sealmastic Solvent; Bakor 710-11; Henry HE794.

.3 Asphalt primer: to ASTM D41 Type I; CGSB 37-GP-9.

.4 Sealing Mastic: ASTM 4586 Type I.

Part 3 Execution

3.1 EXAMINATION

.1 Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of damp-proofing system.

.2 Ensure concrete and masonry surfaces are fully cured and dry, clean and free from scale, frost, dirt, dust, oil, grease and other foreign matter.

.3 Verify items which penetrate surfaces to receive damp-proofing are securely installed.

3.2 PREPARATION

.1 Protect adjacent surfaces not designated to receive damp-proofing.

.2 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation, and around penetrations through damp-proofing with sealing compound. Make watertight.

3.3 APPLICATION

.1 Prime surfaces and apply bituminous damp-proofing in accordance with manufacturer's instructions, in one coat, continuous and uniform, at manufacturer's recommended rate of application as applicable for porous or dense substrates.

.2 Apply additional coats of damp-proofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Section 07 11 13 – Bituminous Damp-Proofing.

1.2 REFERENCE STANDARDS

.1 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S701, Thermal Insulation, Polystrene, Boards and Pipe Coverings.

Part 2 Products

2.1 MATERIALS

.1 Board insulation: extruded polystyrene (XPS): to CAN/ULC-S701, Type 4, compressive strength ≥ 210 kPa (30 psi), board size 610 x 2438 mm x thickness indicated, shiplapped edge.

.2 Protection board: insulating fibreboard to CAN/ULC-S706, Type II, Grade 4, board size 1219 x 2438 mm x thickness indicated.

.3 Concrete/masonry anchors: purpose made plastic anchors with integral large head for attaching insulation boards.

.1 Acceptable material: Hilti IDP Insulation Anchor System.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrates and immediately inform Contract Administrator in writing of defects.

.2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust, debris, oil, grease, or foreign materials.

3.2 INSTALLATION

.1 Install insulation after building substrate materials are cured and dry.

.2 Install insulation to maintain continuity of thermal protection to structure elements and spaces.

.3 Coordinate installation with work of other trades.

.4 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures.

.6 Cut and trim insulation neatly to fit spaces.

.7 Install insulation boards in parallel rows. Butt joints tightly, offset vertical joints.

.8 Offset both vertical and horizontal joints in multiple layer applications.

.9 Interlock boards at corners.

.10 Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.11 Fasteners application:

.1 Install fasteners in accordance with manufacturer's instructions.

.2 Provide a minimum of four anchors per 600 x 1200 mm of insulation board.

.3 Provide additional anchors spaced at 300 mm on centre around perimeter of openings, corners and abutments.

.4 Ensure fasteners are solidly set with discs and washer heads flush with insulation.

.5 Replace loose or improperly seated anchors.

.6 Concrete/masonry anchors:

.1 Position insulation and drill pilot hole through insulation into substrate using properly sized drill bits.

.2 Insert anchor through insulation and into pilot hole and tap with hammer until securely seated with washer head flush with insulation.

3.3 FROST BARRIER

.1 Install frost barrier where indicated using same insulation as applied to foundation. Set on leveling bed of sand or find gravel, straight and aligned with tight joints.

.2 Install protection board over board insulation.

3.4 PROTECTION BOARD

.1 Install protection board over board insulation where indicated.

.2 Provide tight butt joints.

.3 Install boards above grade using fasteners.

.4 Install protection board below grade without fasteners or adhesives. Install protection board during backfilling operations to allow backfill to hold boards tight against insulation.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies the requirements for supply and installation of inverted roofing system on top of the new concrete roof at Digester No. 11.

.2 Incorporate the concrete pavers on site for roofing work and provide additional concrete pavers as required for a complete installation.

1.2 REFERENCES

.1 ASTM A167-88 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

.2 ASTM B209-M-90 Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.3 CGSB-37GP-9 Ma Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.4 CAN/CGSB-51.31-M84 Thermal Insulation, Mineral Fibre Board for Above Roof Decks.

.5 CSA HA Series-M1980 CSA Standards for Aluminum and Aluminum Alloys.

.6 CSA A123.4-M1979 Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.

1.3 SUBMITTALS

.1 Submit three (3) copies of the roofing material manufacturer's preparation application and maintenance instructions.

1.4 QUALITY ASSURANCE

.1 Qualification: Membership in good standing of Canadian Roofing Contractor's Association and approved by membrane manufacturer.

.2 Perform work of this Section by a roofing applicator of recognized standing approved by membrane manufacturer, having not less than five years proven experience on work of similar size and scope.

.3 Present Certificates by each manufacturer of materials in roof construction, flashings, and roof deck, attesting to the compatibility with other materials specified or intended to be used. Under no circumstances shall materials be permitted except where the manufacturer of such materials states that he is aware of the nature of the application and that the adjoining materials are not deleterious in any manner to his product and that the product will, in fact, perform as specified in the particular circumstance.

.4 All materials, methods and procedures shall be as approved by Underwriters Laboratories Canada and Factory Mutual Engineering Division for loose-laid and ballasted single-ply roofing system and evidence of such approval shall be presented both with respect to each particular material and with respect to its use in combination with the other materials specified in this division of the specifications.

.5 Arrange for membrane manufacturer's technical representative to review preparation and application of roofing system and inspect completed application to verify compliance

with all specifications and details. Submit an inspection report to Contract Administrator for records.

.6 Pre-Installation Meeting:

.1 Contractor is to arrange for a site visit prior to commencement of roofing to review with installer, supplier and Contract Administrator, installation procedures to be adopted, conditions under which work will be carried out, and inspect surfaces requiring roofing.

.2 Review weather conditions under which work will be done, substrate conditions, preparation of existing surfaces, applicable procedures, protection of completed work, and sample of sealed seam to determine acceptable workmanship.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials in their original packaging and bearing the manufacturer's name and product.

.2 Store and protect materials in a dry, well ventilated and weatherproof location. Store materials in heated location to minimum 10ºC during winter.

.3 Store material rolls on end with selvage edges up.

.4 Avoid stockpiling of materials on roof.

1.6 SITE CONDITIONS

.1 Protect adjacent surfaces which are not to be roofed from soiling in connection with the work of this Section.

.2 Protect roofed areas.

.3 Do not expose insulation longer than recommended by manufacturer.

.4 Ambient and surface temperatures: at least 10ºC for a period of 48 hours before, during and after membrane application.

1.7 WARRANTY

.1 Where a manufacturers warranty is requested by the City of Winnipeg, the roofing contractor will supply all materials as required by the manufacturer and install such materials to the acceptance of the manufacturer in order to qualify for the specified warranty.

.2 Provide standard CRCA or local roofing association warranty.

.1 Correct at Contractor's expense any defects in the Work due to workmanship or material defects occurring within a period of 5 years for the roofing system and 2 years for the metal flashing from the date of completion of the total Work.

.2 Upon meeting the following:

.1 Project completion

.2 Manufacturer acceptance

.3 Manufacturer shall deliver to City of Winnipeg a warranty against defective workmanship and materials for a period of 15 years. During years 2, 5, 10 and 15 of the warranty period, the manufacturer shall visually inspect the roof at no cost to the City of Winnipeg noting any deficiencies and arranging for their proper repair.

.4 Warranty period: Commencing with date of Substantial Performance

Part 2 Products

2.1 MATERIALS

.1 Securement bar: ASTM B209-M aluminum or ASTM A167, 304 alloy stainless steel 3 mm thick x 25 mm wide, galvanized concrete fasteners, 25 mm diameter galvanized washers.

.2 Joint backing: Closed cell, heat resistant, crosslinked polyolefin foam filler as recommended by manufacturer of sealant. Minimum 25% oversized. Bond breaker strip as recommended by manufacturer.

.3 Roof Membrane: SBR-modified EPDM, polyester reinforced, conforming to the following criteria:

.4 If product criteria is required to supplement the paragraph above or a proprietary statement in the Manufacturers - Membrane Material article is utilized, edit the following text and add or delete "properties" as required.

.1 Breaking Strength, minimum, ASTM D 751: machine direction 1.46 kN (325 lbf); cross machine direction 1.29 kN (290 lbf).

.2 Tear Strength, minimum, ASTM D 751: machine direction 311 N (70 lbf); cross machine direction 348 N (78 lbf).

.3 Elongation at Failure: ASTM D 751: 25 percent minimum.

.4 Low Temperature Flexibility, minimum, ASTM D 2136: -40 deg. C (-40 deg. F).

.5 Thickness, minimum, ASTM D 751: 1.14 mm (0.045 inch).

.6 Weight: ASTM D228: 1.3 kg/sq. m. (4.5 oz/sq. ft.).

.5 Flashing Membrane: Elastomeric membrane of same material as roof membrane.

.6 Seam Reinforcing Membrane: As recommended by roofing manufacturer and compatible to other products.

.7 Perimeter membrane may be used to strip beneath upstands and parapets and at wall junctions to ensure vapour barrier continuity. Membrane is usually supplied by roofer and installed by carpenter. Coordinate installation with appropriate carpentry section.

.8 Perimeter Strip Membrane: Elastomeric membrane of same material as roof membrane.

.9 Asphalt Primer: [CGSB 37-GP-9Ma] [ASTM D 41].

.10 Lap, and Flashing Adhesive: Single component, bitumen-modified polyurethane adhesive.

.11 Insulation Adhesive: As recommended by insulation manufacturer, compatible with system components.

.12 Modified Roofing Asphalt: ASTM D 6152, SEBS-modified, elastomeric hot-melt asphalt adhesive, with the following physical properties:

.1 Softening Point, min/max, ASTM D 36: 90-96 deg. C (195-205 deg. F).

.2 Flash point, minimum, ASTM D 92: 274 deg. C (524 deg. F).

.3 Low Temperature Flexibility, maximum, ASTM D 3111: -10 deg. C (14 deg. F).

.4 Elongation at 25 deg. C (77 deg. F), minimum, ASTM D 412: 750 percent.

.5 Elastic Recovery, minimum, ASTM D 412: 95 percent.

.13 Vapour Barrier: Fiberglas Permstop Vapour Retardent or approved equal in accordance with B7 set in adhesive compatible with selected product.

.14 Roof Insulation:

.1 Polyisocyanurate Foam Board: ASTM C1289, Type II, with Factory Mutual Class I approval, minimum size 600 mm by 1200 mm, as manufactured by:

.1 Atlas Roofing Corp.; AC Foam II.

.2 Celotex; Hy-Therm AP.

.3 GAF; GAFTEMP Isotherm.

.4 Johns Manville; E'NRG'Y 2.

.5 Dow Chemical – Styrofoam SM

.2 Rigid insulation on roof shall provide a minimum R-value of 30.

.15 Metal Flashing: As specified in Specification Section 07 60 00 – Flashing and Sheet Metal.

.16 Sealant: As recommended by membrane manufacturer.

.17 Ballast Slabs – Precast concrete pavers to match existing pavers on site. Install on Fabrene Scrim on rigid insulation.

2.2 ACCEPTABLE MANUFACTURERS

.1 Tremco Ltd., Toronto, Ontario.

.2 Lexcan Industrial Supply Limited, Rexdale, Ontario.

.3 Carlisle Syn Tec Systems Canada, Mississauga, Ontario.

Part 3 Execution

3.1 EXAMINATION

.1 Examine surfaces to receive membrane roofing. Report defects which would impair performance of roofing. Do not proceed until substrate is acceptable. Check that concrete moisture content is less than 15%.

.2 Ensure that concrete substrates have cured at least 28 days.

.3 Verify elevation of roof drains; do not commence work until unacceptable conditions have been corrected. Make insulation thickness at drain 25 mm minimum. Slope insulation uniformly to drain.

.4 Ensure that all protrusions through membrane roofing are installed prior to commencement of work.

3.2 PREPARATION

.1 Check that completed roof deck for proper levels and slope before roofing is commended.

.2 Do not apply membrane in inclement weather.

.3 Free surfaces from materials detrimental to the bond of the membrane materials. Employ light sand blasting or steam cleaning where necessary to remove form oil.

.4 Grind edges and corners bullnose with minimum radius of 38 mm. Fill inside corners with fillets or cants compatible with membrane.

3.3 INSTALLATION – VAPOUR RETARDANT INSTALLATION

.1 Prime the concrete substrate at rate recommended by membrane manufacturer for particular surface porosity.

.2 Install vapour retardant in a mopping of asphalt applied at the rate as recommended by manufacturer. Install insulation in parallel course. Stagger joints between pieces. Trim insulation to provide plain butt joints. Level the edges of the insulation at fillets and cants.

.3 Install tapered insulation at designated locations and adhering it to the substrate below.

.4 Install fibre board in designed sequence adhering it to the substrate below.

3.4 INSTALLATION MEMBRANE

.1 Primer: Apply primer to substrate in accordance with manufacturer's written instructions for system specified. Allow to dry.

.2 Apply membrane to manufacturer's written instructions.

.3 Roll out membrane, free from air pockets, wrinkles, or tears. Firmly press sheet into place without stretching.

.4 Adhere membrane to substrate in a uniform mopping of hot-applied modified asphalt applied at a rate of 1.2 L/ sq. m.

.5 Maintain equiviscous Temperature (EVT) at Point of Application: In accordance with NRCA.

.6 Overlap edges and ends and seal by membrane lap adhesive, minimum [75] mm ([3] inches). Seal permanently waterproof.

.7 Leave seams exposed until inspected. Seams shall be inspected by manufacturers technical rep.

.8 Reinforce membrane seams. Apply seam reinforcing membrane overlay in membrane lap adhesive, minimum [200] mm ([8] inches) wide over seam.

.9 Extend membrane up cant strips a minimum of [300] mm ([12] inches) onto vertical surfaces.

.10 Seal membrane around roof penetrations.

3.5 INSTALLATION – ROOF DRAINS

.1 Inspect existing roof drain setting and ensure that drain outlet will not be above the general level of completed roof membrane.

.2 Extend roof drain height to allow for new slab installation. Replace roof drains if necessary.

.3 Cut back insulation at drains to form drain well.

.4 Extend membrane into the upper surface of the drain base and ensure a watertight seal between membrane and drain and seal with clamping ring.

3.6 INSTALLATION – MISCELLANEOUS ROOF OPENINGS

.1 Supply and install flashings and sleeves around mechanical and electrical openings, ducts, pipes and other projections through roofs. Seal flexible flashing with adhesive and stainless steel clamps.

.2 Fabricate metal sleeves around vent pipes and other similar items from 0.95 mm stainless steel.

.3 Dress down metal counter flashings supplied by the Section providing the item passing through the roof and seal and make good the completed installation with sealant.

3.7 APPLICATION - SEALING

.1 General:

.1 Apply sealant into reglets upon completion of flashing.

.2 Ensure that surfaces to be sealed are free from contaminants which may adversely affect the performance of the sealing materials.

.3 Clean joint surfaces and mask adjacent areas. Remove masking promptly after sealing is completed.

.4 Prime joints immediately before installation of sealant.

.5 Mix sealants to a uniform colour and free from unmixed material.

.6 Before commencing sealing, test the materials for indications of staining or proof adhesion.

.7 Maintain correct sealant depth. Make installation free from air pockets and embedded impurities and having smooth surfaces, free from ridges, wrinkles, sags, air pockets and imbedded impurities.

.8 Immediately clean adjacent surfaces.

3.8 FLOOD TESTING

.1 Plug roof drains and flood membrane with a minimum of 50 mm of water for 24 hours under clear conditions. Repair noted leaks and retest.

3.9 CLEANING

.1 Clean and make good to the Contract Administrator's acceptance surfaces soiled or otherwise damaged in connection with the work of this Section. Pay the cost of replacing any finishes or materials that cannot be cleaned.

.2 On completion of the work, check roof drains and ensure their cleanliness and proper function.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Requirements for supply and installation of flashing and sheet metal for roofing work.

.2 Include all materials, labour, appliances, scaffolds, equipment plant and tools necessary for proper completion of work.

.3 Supply and install additional flashings indicated on Drawings and as required to make watertight installation. Include all drip flashings for exterior cover.

Part 2 Products

2.1 MATERIALS

.1 Sheet Metal: 20 Gauge thick prefinished sheet aluminum or 24 gauge thick prefinished galvalume sheet with 8000+ series coating. Texture shall be “smooth” and colour shall match existing installations for the digesters. Submit samples for approval.

.2 Flexible Flashing: Lexsuco FR40 or approved equal in accordance with B7.

.3 Pitch Pockets: formed of 1.47 mm galvanized steel sheet.

.4 Accessories: include nails, screws, bolts, expansion bolts, toggle bolts, cleats, metal discs and similar items whether specifically mentioned herein or not. Use same metal as materials with which they are used.

.5 Screw heads which are exposed shall have integral plastic hex cap same colour as flashing.

.6 Vent Flashing: galvanized sheet metal.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Accurately form all flashings to required dimensions in sections of maximum lengths.

.2 Make ample provisions for expansion of metal both vertically and horizontally.

.3 Hem all horizontal edges 13 mm for stiffness. Hook lower front edge to continuous lock strip of same material. Seal continuously under edge of roof side.

.4 Install all flashings without buckles or irregularities.

.5 Install an underlay of No. 15 roofing felt under all sheet metal installed directly over masonry, concrete or wood.

.6 In general, use "S" lock joints that permit thermal movement while tightly sealed.

.7 Make joints square, plumb, straight, true and watertight.

.8 Form and install counter-flashings where indicated on Drawings with horizontal hemmed 13 mm minimum and lock seams at joints.

.9 Fasten counter-flashing to nailing blocks with roofing nails set in plastic cement and seal with neoprene washers.

END OF SECTION