PART 1 - GENERAL

1.1 General Requirements

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 All materials and equipment must be set up in a position satisfactory to the Owner's representative.

.3 All materials shall be new and free from defects which may impair strength, durability, or appearance.

.4 Scheduling of the work shall be discussed with, and be subject to, the approval of the Owner.

1.2 References

.1 Comply with requirements of the following documents, latest edition:

.1 ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

.2 ASTM C578, Rigid, Cellular Polystyrene Thermal Insulation.

.3 ASTM C612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation

.4 ASTM C726, Standard Specification for Mineral Wool Roof Insulation Board

.5 ASTM C1396, Standard Specification for Gypsum Board

.6 ASTM D41, Asphalt Primer Used in Roofing, Damp-proofing, and Waterproofing.

.7 ASTM D312, Asphalt Used in Roofing.

.8 ASTM D2822, Asphalt Roof Cement.

.9 ASTM D4586, Standard Specification for Asphalt Roof Cement, Asbestos-Free

.10 ASTM D6162, SBS Mod. Bit. Sheets Using Polyester & Glass Fiber Reinforcements.

.11 ASTM D6163, SBS Mod. Bit. Sheets Using Glass Fiber Reinforcements.

.12 ASTM D6164, SBS Mod. Bit. Sheets Using Polyester Reinforcements.

.13 CAN/CGSB 1.181, Ready-Mixed Organic Zinc-Rich Coating

.14 CAN/CGSB 37.29M, Rubber-Asphalt Sealing Compound

.15 CAN/CGSB 37-GP-9M, Primer, Asphalt, unfilled, for Asphalt Roofing and Waterproofing.

.16 CAN/CGSB 37-GP-15M, Application of Asphalt Primer for Asphalt Roofing &

Waterproofing.

.17 CAN/CGSB 37-GP-29M (Withdrawn), Rubber-Asphalt Sealing Compound

.18 CAN/CGSB 37-GP-56M, Membrane, Bituminous, Prefabricated and Reinforced for Roofing.

.19 CAN/CGSB 51.26M, Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.

.20 CAN/CGSB 51.33M, Vapour Barrier Sheet, Excluding Polyethylene, for use in Construction.

.21 CAN/CSA 8.1, Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas

.22 CAN/CSA A231.1, Precast Concrete Paving Slabs.

.23 CAN/CSA 0121M, Douglas Fir Plywood.

.24 CAN/CSA 0151M, Canadian Softwood Plywood.

.25 CAN/CSA B111, Wire Nails, Spikes and Staples.

.26 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.27 CAN/ULC S126, Fire Spread Under Roof-Deck Assemblies.

.28 CAN/ULC S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.29 CAN/ULC S702, Standard for Mineral Fibre, Thermal Insulation for Buildings

.30 CAN/ULC S704, Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.

.31 CAN/ULC S705.1, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam

.32 CAN/ULC S705.2, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam Medium Density Application

.33 CAN/ULC S770, Standard Test Method Determination of Long-term Thermal Resistance (LTTR) of Closed-Cell Thermal Insulating Foams

.34 Ontario Roofing Contractors Association – Roofing Specifications Manual.

.35 NRCA (National Roofing Contractors Association) – Roofing and Waterproofing Manual.

.36 ULC (Underwriters Laboratories of Canada) – List of Equipment and Materials for Building Materials, Fire Resistance, and Fire-stop Systems and Components.

.37 Conform to National Plumbing Codes and requirements of Provincial and Municipal

Authorities. Most stringent requirements shall govern where in conflict.

.38 Ontario Building Code.

1.3 System Design

.1 See Section 01 11 00 – Scope of Work for proposed roof assemblies.

.2 Design roofing assembly, including fastener/adhesive spacing, to meet dynamic wind uplift requirements under CSA A123.21 for the following performance criteria as calculated using Wind-RCI - See General Notes S0.0

1.4 Quality Assurance

.1 Observation of roofing application will be carried out by Consultant. Contractor to make site available for inspection at Consultant's request. Any work not accepted by the Consultants shall be corrected by the Contractor to meet the requirements of the specifications, manufacturer's recommendations and/or good construction practices.

.2 The Contractor shall arrange for a technical representative of the manufacturer to review the installed roof system wherever a Standard or System Warranty has been specified.

.3 Maintain one copy of manufacturer's literature on site throughout the execution of the Work.

.4 Contractor Qualification:

.1 Contractor and his staff must be certified by the membrane manufacturer and pre-approved by the Owner and Consultant prior to tender.

.2 Contractor must be a member in good standing with the Ontario Roofing Contractors Association (OIRCA) and/or have a minimum ten (10) years relevant experience with similar roof materials.

1.5 Submittals

.1 Submittals shall be completed in accordance with Section 01 33 00.

.2 Submit to the Consultant a list of materials intended for use before they are ordered after award of contract.

.3 Provide initial schedule within five (5) working days after Contract award, showing anticipated progress stages and final completion of work. Work shall not commence before work schedule is provided.

.4 Prior to final completion, submit a letter from the Manufacturer stating that the Work has been inspected and installed in conformity to their requirements.

.5 Additional requirements may be specified in individual Sections of the Specifications.

.6 Submit Shop Drawings before proceeding with fabrication, including but not limited to the following:

.1 Tapered Insulation.

.7 All colours and profiles of metal counterflashing to be approved by the Owner from Manufacturer's standard colour charts. Use colours to match adjacent materials as close as possible where exposed.

.8 Provide a copy of the system manufacturer's warranty with the tender submission.

1.6 Delivery, Storage and Handling

.1 All materials shall be delivered and stored in their original packaging bearing the manufacturers label, grade, and product weight, including all other related standards, specifications, and the like.

.2 All materials shall be adequately protected from inclement weather conditions. Only materials to be installed on the same day shall be removed from the protected location to the work site.

.3 Protect moisture sensitive materials being stored outside from inclement weather using 8oz vinyl tarpaulins adequately secured to prevent blow off. Provide openings in manufacturer's packaging as recommend by manufacturer to prevent the formation of condensation prior to tarping.

.4 All temperature sensitive materials shall be stored in a heated location with a minimum temperature of 5°C (40°F) and removed only as needed. Under no circumstances shall temperature sensitive materials be allowed to freeze.

.5 Modified Bitumen materials shall be stored away from all flame, sparks or other excessive heat sources when not being applied directly to the roof structure.

.6 All materials in a rolled configuration shall be stored on end atop a skid to protect bottom surface from foreign debris and moisture.

.7 When possible, the Contractor should restrict stock piling of material in one location on the roof surface to prevent exceeding the specified deck live load capacity.

.8 Handle and store products in a manner to prevent damage and deterioration.

.9 Remove and replace damaged products at own expense and to the satisfaction of the Consultant.

.10 Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks, and excessive heat. Storage of flammable materials in interior occupied areas (stairwells, corridors, etc.) is not permitted.

1.7 Waste Management and Disposal

.1 All roofing, insulation, flashings, and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as

materials containing asbestos, are to be removed and disposed of in strict accordance with applicable Municipal, Provincial, and Federal requirements.

.2 All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Contractor and properly transported to a legal dumping area authorized to receive such material.

1.8 Environmental Requirements

.1 Weather, dry.

.2 Imminent weather forecast, dry.

.3 Install roofing on dry deck, free of water, moisture, snow, frost, and ice. Use only dry materials and apply only during weather that will not introduce moisture into roofing system.

.4 Only as much of the new roofing as can be made weather-tight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.

.5 Comply with manufacturer’s recommendations for minimum and maximum temperatures and humidity during application.

.6 Do not install roofing membrane when temperature remains below 5°C for self-adhered installations, or as stated in manufacturer’s written specifications. Apply materials in accordance with the manufacturers' written recommendations.

.7 All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

1.9 Safety and Protection

.1 General:

.1 The Contractor shall follow all safety regulations as required by OHS (Occupational Health and Safety) and any other applicable authority having jurisdiction.

.2 All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.

.3 The Contractor shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction at the Owner's expense.

.2 Solvents, Adhesives and Membranes:

.1 Store only enough solvents and adhesives on the roof for the same day's use, do not leave adhesives on roof overnight. Manufacturer supplied adhesives to be stored in their overnight containers. Minimum temperature for solvent-based adhesive and primers is -5°C.

.2 Do not install roofing membrane when temperature remains below -18▪C for torch application, or 5▪C for self-adhesive installations. Apply materials in accordance with the manufacturers recommendations and in accordance with the Canadian Modified Bitumen Manufacturer's Association.

.3 Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odours could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odour while ventilating the building. Keep lids on unused cans at all times.

.4 Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

.3 Torching Equipment:

.1 Fire Watch:

.1 If torching equipment is used, maintain fire watch for 2 hours after each days roofing operations cease and examine all flashings with a TK fire scanner as manufactured by Rayteck and supplied by Lexcan prior to departing the site.

.2 Preliminary Directions:

.1 Modified bitumen products must be applied by qualified and trained applicators. Training must include protection and prevention against accidents caused by use of combustible materials, liquid propane (L.P) gas and open flame.

.2 Before using liquid and adhesive products you must refer to special directions of use. READ ALL LABELS.

.3 Storage and Handling:

.1 Do not store propane tanks on roof.

.4 Verification of Torching Equipment

.1 Always use proper torching equipment in perfect working order. Never modify torching equipment.

.2 Before using torching equipment:

.1 Check and securely fasten all fittings.

.2 Do not light torch when odour of liquid propane (L.P.) gas is present.

.3 Never look for leaks with open flame. Use soapy water.

.5 Torching Precautions:

.1 The torch produces temperatures exceeding 2000°F. Avoid all contact with temperature sensitive materials: lead, plastic materials, wood, fibre cants, etc.

.2 All employees other than torch operators must be at least 10 feet from flame.

.3 Never use torch:

.1 when the substrate has been recently covered by a solvent base products.

.2 near combustible materials.

.3 directly on combustible substrate or insulation.

.4 Avoid presence of combustible materials near an open flame.

.5 Apply products only on a clean, dry surface, free of debris, grease, dust and solvents.

.6 Do not direct the torch through open roof penetrations.

.7 The torch flame can travel over long distances, through and beyond small openings. Take proper preventative safety measures.

.8 Extinguish torch when not in use.

.9 When torch is not in use, always place it on its support, with head aiming upwards.

.10 At all times and especially when leaving job site ensure that there are no smoke emissions which could be indicative of smouldering materials. Take appropriate safety measures.

.11 Job planning must allow for employee presence on the roof at least 1 hour after torch application.

.6 Liquid Propane (LP). Gas Special Precautions:

.1 Secure and fasten L.P. gas tanks in an upright position at minimum ten feet from open flame and in an accessible location in order to enable rapid shut off.

.2 Never attempt to defrost L.P. gas tanks (empty or full) with a flame.

.3 Handle L.P. gas tanks with care. Avoid shocks.

.4 After each use, tightly close L.P. gas tank valve, especially when tank is empty.

.7 Necessary Precautions:

.1 Always have a filled and in perfect working order an ABC fire extinguisher at hand during all work (one per torch minimum).

.2 L.P. gas is heavier than air. Check low areas for accumulation of gas.

.3 Maintain a hatchet in case of fire in substrate or structure.

.4 Ensure sufficient air exchange on job site. Never work in a non-ventilated enclosed area.

.5 A Safety barrier must be installed at the perimeter of the roof in accordance to the Occupational Health and Safety Act.

.8 Related Dangers:

.1 L.P. gas tanks are pressurized and contains a combustible gas. Do not store tanks in sunlight for extended periods or at temperatures exceeding 120°F. Use only in well ventilated areas.

.2 Never puncture, discard or incinerate empty tanks.

.3 Do not wear synthetic fabric. Remove all clothing that comes in contact with solvents.

.4 Should burns occur, flush with cold water and seek medical attention. Should molten bitumen contact eyes, skin or clothing, flush with cold water and seek medical attention. Do not attempt to remove molten bitumen from skin, nor to clean with a solvent.

1.10 Warranty

.1 Contractors Warranty:

.1 Contractor shall supply the Owner with a two (2) year Contractor Warranty for workmanship.

.2 In the event any work related to materials installed is found to be within the Contractor warranty term, defective or otherwise not in accordance with the Contract Documents, the Contractor shall repair that defect at no cost to the Owner within 48 hours of receipt of notification. The Contractor shall also pay for all damages resulting from the aforementioned defects.

.3 The Contractor’s warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

.4 Warranty shall be issued on the corporate letterhead and signed by an authorized signing officer.

.5 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.

.2 Manufacturer’s Warranty:

.1 Contractor shall provide the Owner with a twenty (20) year Manufacturer's Labour, Material and Workmanship System Warranty. The warranty shall include both labour and materials. Warranty shall be non pro-rated with no dollar limit.

.2 Warranty shall be issued on the corporate letterhead and signed by an authorized signing officer.

.3 The warranty shall be transferable.

.4 The Contractor shall notify the membrane manufacturer of any leak that occurs during the time period when both warranties are in effect.

.5 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Manufacturer.

PART 2 - PRODUCTS

2.1 General

.1 The use of materials other than those specified herein must be approved prior to award of the Contract. If substitute materials are proposed, then the list of materials must be included as part of the Tender Form. This submittal shall include product name, number and data sheets and manufacturer's specifications and installation instructions.

.2 Materials listed below are to be used on the project. Under no circumstances will substitute materials be used unless approval is first received from the Owner. Use of substitute materials without prior approval can result in the removal and replacement of these materials at no cost to the Owner.

.3 Note: all materials are to be supplied by one manufacturer meeting manufacturer's respective material compatibility requirements to achieve the required System Warranty. Acceptable membrane manufacturers for this project are:

.1 IKO
.2 Johns Manville
.3 Siplast
.4 Soprema
.5 Tremco

.4 Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the membrane manufacturer.

.5 The membrane manufacturer's acceptance of any other product is only for a determination of compatibility with the products and not for inclusion in the manufacturer's warranty.

.6 The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Owner's Representative for acceptability for the intended use with the membrane manufacturer's products.

2.2 Materials

.1 Primer:

.1 General Purpose: Solvent based primer composed of volatile solvents, synthetic polymers, and/or adhesive enhancing resins to prepare surfaces for membrane application as required by membrane manufacturer to achieve the specified warranty.

.1 Mod-Bit Primer (Black) by IKO
.2 Asphalt Primer (Black) by Johns Manville
.3 PA-917 LS Asphalt Primer by Siplast
.4 Elastocol 500 (Black) by Soprema
.5 TREMprime LV by Tremco

.2 High-tack for Self-Adhering Membranes: composed of volatile solvents, synthetic polymers, and/or adhesive enhancing resins to prepare surfaces for self-adhering membranes as required by membrane manufacturer to achieve the specified warranty.

.1 SAM Adhesive by IKO
.2 SA Primer by Johns Manville
.3 TA-325 Primer by Siplast
.4 Elastocol Stick by Soprema
.5 AVC Membrane Primer by Tremco

.2 Deck Overlay Board

.1 Thickness as specified in Scope of Work and/or shown on the Drawings, glass-mat faced gypsum roof boards specifically manufactured for use beneath roofing systems. Non-combustible moisture-resistant gypsum core with glass-mat facings. Provide in maximum lengths and widths available that will minimize short-edge-to-short-edge butt joints and to correspond to support system indicated.

.1 DensDeck Prime with EONIC Technology by Georgia Pacific
.2 Securock Glass-Mat Roof Board by United States Gypsum Company (USG)
.3 Dexcell FA Glass-Mat Roof Board by National Gypsum

.3 Air Seals

.1 26-gauge galvanized or pre-finished sheet metal to suit profile, or self-adhering modified bitumen base sheet, as shown on the Drawings.

.4 Vapour Retarder (Self- Adhered)

.1 Membrane: Self adhered SBS modified bitumen membrane 0.8mm (32 mil) thick with a tri-laminated woven polyethylene top surface and silicone release film bottom surface. Roll width to be 1.14m (45”).

.1 IKO MVP (Modified Vapour Protector) by IKO
.2 JM Vapour Barrier SA by Johns Manville
.3 V-Force Vapour Barrier Membrane by Firestone (Siplast Approved)
.4 Sopravap’r by Soprema
.5 AVC Membrane by Tremco.

.5 Insulation

.1 Insulation Boards: Closed-cell polyisocyanurate foam rigid insulation boards, Type II, Class 1, manufactured with HCFC-free blowing agent (Pentane) bonded to glass fibre reinforced facers on top and bottom surfaces during the manufacturing process, and meeting the following requirements: Approved and listed by Factory Mutual Global for Class 1-90 wind uplift classification and compressive strength of 20psi, and meeting FM4470 approval requirements for Class 1 fire as a component in roof deck construction; Meet the physical property requirements of ASTM C 1289 and CAN/ULC S-704; Dimensional stability change of less than 2% conforming to ASTM D 2126; Conformity to CAN/ULC S704 and Can/ULC S770 for Long Term Thermal Resistance in polyisocyanurate insulation.

.1 ACFoam III by Atlas Roofing Corp.
.2 H-Shield CG by Hunter Panels
.3 IKOTherm III by IKO
.4 ENRGY 3 CGF by Johns Manville
.5 Paratherm CG SA by Siplast
.6 Sopra-Iso Plus by Soprema

.2 Provide tapered insulation as shown on roof plan drawing(s) including sumps at drains. Contractor to verify all slopes and dimensions on site prior to completing shop drawings.

.1 All tapered insulation to be factory cut and mitred, and supplied by Accu-plane Enterprises Inc., Beacon Roofing Supply, Everest Supply Inc., or Posi-slope Enterprises Inc. Submit all shop drawings to the Consultant for review prior to fabrication.

.3 Spray-In-Place Urethane

.1 As shown on the Drawings, conforming to CAN/ULC-S705.1 and CAN/ULC-S705.2.

.4 Batt Insulation

.1 Mineral wool fibre, with density 32 kg/m^3 (2 lb/ft^3), to CAN/ULC-S702, "Roxul Flexibatt" or "Roxul Plus" or approved equal, thickness as specified in the Scope of Work and/or shown on the Drawings.

.5 Polystyrene Extruded Foam Board

.1 Thickness as specified in Scope of Work and/or shown on the Drawings, conforming to CAN/ULC-S701, Type IV, minimum compressive strength of 241 kPa (35 psi).

.1 Roofmate by Dupont
.2 Foamular by Owens Corning
.3 Sopra-XPS 35 by Soprema

.6 Cover Board

.1 Thickness as specified in Scope of Work and/or shown on the Drawings, glass-mat faced gypsum roof boards specifically manufactured for use beneath roofing systems. Non-combustible

moisture-resistant gypsum core with glass-mat facings. Provide in maximum lengths and widths available that will minimize short-edge-to-short-edge butt joints and to correspond to support system indicated.

.1 DensDeck Prime with EONIC Technology by Georgia Pacific
.2 Securock Glass-Mat Roof Board by United States Gypsum Company (USG)
.3 Dexcell FA Glass-Mat Roof Board by National Gypsum

.7 Insulation and Cover Board Adhesive: One or two part low rise polyurethane foam adhesive approved under ULI 1897 for Wind Uplift Resistance on Steel Decks.

.1 Insta-Stik Quikset Commercial Roofing Adhesive by The Dow Chemical Co.
.2 IKO Millennium Adhesive by IKO
.3 JM Two-Part Urethane Insulation Adhesive by Johns Manville
.4 Para-Stik Insulation Adhesive by Siplast
.5 Duotack by Soprema.

.8 Mechanical Fasteners (For Deck Overlay Board)

.1 Corrosion resistant self-tapping screw suitable for thicknesses of materials to be secured and existing steel deck to be fastened to, complete with plate.

.1 As recommended by by IKO
.2 UltraFast Fasteners and Plates by Johns Manville
.3 Soprafix Screws and Plates

.9 Modified Bituminous Membranes

.1 Flame Stop: Self adhering grade modified bitumen, minimum 1.6mm thick, with minimum 180g/m^2 non-woven polyester scrim, random glass fibre mat, or composite reinforcement, impregnated and coated with SBS modified bitumen, and conforming to CGSB 37-GP-56M. Self-adhering bitumen bottom surface covered with polyolefin or silicone release film and Torch grade bitumen or thermofusible film top surface

.1 Modiflex Tape by IKO
.2 Sopraguard Tape by Soprema
.3 PA approved equal

.2 Base Sheet: Torch grade modified bitumen minimum thickness 2.6mm with minimum180g/m^2 non-woven polyester scrim, random glass fibre mat, or composite reinforcement, impregnated and coated with SBS modified bitumen, and conforming to CGSB 37-GP-56M. Torch grade bitumen or thermofusible film bottom surface and thermofusible film or sanded top surface.

.1 Torchflex TP-180-FF Base by IKO
.2 JM DynaWeld 180 S by Johns Manville
.3 Paradiene 20 HV TG by Siplast
.4 Sopraply Base 520 by Soprema

.5 POWERply Standard Smooth HW by Tremco

.3 Base Sheet Flashing: Self adhering grade modified bitumen, minimum 2.5mm thick, with minimum 180g/m^2 non-woven polyester scrim, random glass fibre mat, or composite reinforcement, impregnated and coated with SBS modified bitumen, and conforming to CGSB 37-GP-56M. Self-adhering bitumen bottom surface covered with polyolefin or silicone release film and Torch grade bitumen or thermofusible film top surface

.1 Armourbond Flash by IKO
.2 DynaGrip Base P/SA by Johns Manville
.3 Paradiene 20 SA by Siplast
.4 Sopraply Flam Stick by Soprema
.5 POWERply SA Base Sheet by Tremco

.4 Cap Sheet: Torch grade modified bitumen, minimum thickness 3.3mm, with minimum 250g/m2 non-woven polyester scrim, random glass fibre mat, or composite reinforcement, impregnated and coated with SBS modified bitumen, and conforming to CGSB 37-GP-56M. Torch grade bitumen or thermofusible film bottom surface and No. 11 ceramic granules top surface. Colour of granules to be standard white or lite grey.

.1 Torchflex TP-250 Cap (5.0mm) by IKO
.2 DynaWeld Cap 250 by Johns Manville
.3 Paradiene 30 TG by Siplast
.4 Sopraply Traffic Cap 560 by Soprema
.5 POWERply Standard FR GT24 HW by Tremco

.5 Cap Sheet Flashing: Torch grade modified bitumen, minimum thickness 3.3mm, with minimum 250g/m^2 non-woven polyester scrim, random glass fibre mat, or composite reinforcement, impregnated and coated with SBS modified bitumen, and conforming to CGSB 37-GP-56M. Torch grade bitumen or thermofusible film bottom surface and No. 11 ceramic granules top surface. Colour of granules to be standard white or lite grey.

.1 Torchflex TP-250 Cap (5.0mm) by IKO
.2 DynaWeld Cap 250 by Johns Manville
.3 Parafor 30 TG by Siplast
.4 Sopraply Traffic Cap 560 by Soprema
.5 POWERply Standard FR GT24 HW by Tremco

.6 Liquid Applied Flashings: Flexible, polymethylmethacrylate (PMMA) based resin system; **or** polyurethane/bitumen resin system; **or** modified silicone-based system for use in combination with fleece fabric or mesh to form a monolithic, reinforced flashing membrane.

.1 IKO MS Detail by IKO
.2 PermaFlash System by Johnsmanville
.3 Parapro 123 Resin Flashing System by Siplast
.4 Alsan Flashing by Soprema
.5 AlphaGuard PUMA Quick Flash by Tremco

.10 Miscellaneous Membranes

.1 High Temperature Self-Adhered Membrane

.1 Blueskin PE200HT High Temperature Roof Underlayment or approved equal.

.11 Roof Drains

.1 Retro copper roof drain inserts to be complete with flat flange, brass stabilizing ring, cast aluminum strainer dome with integrated or separate clamping ring, stainless steel ballast guard (where detailed) and mechanical compression (U-Flow) seal.

.1 CBD-BR-CR-RR-X-FF by Altra Metal Specialties
.2 Retrofit Flash-Tite SuperDrain, copper w/integral deck clamp and securement ring by Lexcor.
.3 RD-4C-RR-FLAT by Thaler Metal Industries.

.12 Prefabricated Penetration Flashings

.1 Aluminum sleeves and collars fabricated from 0.051" pre-spun aluminum of size to suit supplied by:

.1 Altra Metal Specialties
.2 Lexcor Canada
.3 National Roofing Supply
.4 Thaler Metal Industries

.13 Roofing Accessories:

.1 Pourable Sealer: Elastomeric pourable sealer as supplied by membrane manufacturer.

.2 Sealing Tape: Emseal tape.

.3 Sheet Metal Flashings and Trim: As per Section 07 62 00.

.4 Sealants: As per Section 07 92 00.

.14 Fasteners and Plates:

.1 Wood to steel, wood to wood or steel to steel:

.1 Tru-Fast Ultra Solid Stainless Steel fastener to penetrate substrate by a minimum of 19mm (3/4").

.2 Wood/steel to concrete or concrete block:

.1 Perma-Grip Tap Grip H.D. Truss Head fastener with Perma-Coat Z3 corrosion protection to penetrate substrate by 32mm (1 1/4").

.2 Tru-Fast Tap Grip H.D. Truss Head fastener with Perma-Coat Z3 corrosion protection to penetrate substrate by 32mm (1 1/4").

.3 Tru-Fast DP with Trucote PC-3 corrosion protection fastener c/w EPDM galvanized steel sealing washers to penetrate substrate by 19mm (3/4").

.3 Termination bar for membrane:

.1 Extruded aluminum, 1.5mm thick x 25mm wide x 3m long (0.060" thick x 1" wide x 10' long) with 6mm x 9.5mm (1/4" x 3/8") slotted holes at 200mm (8") o/c. Acceptable material: TB-120 aluminum termination bar by Tru-Fast.

.4 Termination bar fastener for wood, steel or aluminum:

.1 Tru-Fast Ultra Solid Stainless Steel fastener to penetrate substrate by 19mm (3/4") c/w EPDM galvanized steel sealing washers or Construction Fasteners Inc. Woodgrip #14 screw complete with Sentri coating on threads, Chromagard colour match head and EPDM washer

.5 Termination bar fastener for concrete or masonry:

.1 Tru-Fast Tap Grip Truss Head fastener with Perma-Coat Z3 corrosion protection to penetrate substrate by 32mm (1 1/4") c/w EPDM galvanized steel sealing washers.

.6 Prepainted metal flashing to steel or wood:

.1 Construction Fasteners Inc. Woodgrip #14 screw complete with Sentri coating on threads, Chromagard colour match head and EPDM washer or approved equal. Fastener to penetrate substrate by minimum 19mm (3/4").

.7 Membrane to wood:

.1 Galvanized round top nails with minimum 25mm (1") diameter heads to penetrate the substrate a minimum 32mm (1 1/4").

.8 All fasteners and plates to meet the requirements of Factory Mutual 4470 Standard for wind uplift and corrosion resistance.

.9 All fasteners used with pressure treated lumber to be stainless steel or hot dipped galvanized, minimum G185 in accordance to ASTM A653-03.

.10 Steel Angle and Fasteners:

.1 Galvanized steel, thickness as specified, Z275 zinc coating designation, to ASTM A653M-00, prefinished to CGSB 93-GP-3M, Class F1S. All sections galvanized to CSA G164, minimum zinc coating of 600 g/m2.

.2 Angles to conform to CAN/CSA-G40.20 grade 300W. Size as shown on Drawings.

.3 Bolts: A304 stainless steel hex bolts length to suit application.

.15 Miscellaneous Accessories

.1 Compressible Filler

.1 Loose, non-combustible, water resistant, vapour permeable, semi rigid mineral wool batt insulation (as supplied by Roxul), in compliance with CAN/ULC S702, thickness to suit void with 25% compression allowance.

.2 Neoprene Foam Gasket Tapes

.1 13 mm (1/2") thick by 38 mm (1.5") wide single sided neoprene foam tape with aggressive acrylic adhesive.

PART 3 - EXECUTION

3.1 Examination

.1 Examine the drawings and specifications to determine the extent of the work involved, together with other data affecting the work, as in no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the extent of such work shown, herein described or implied.

.2 Inspect existing conditions and substrates upon which work of this section is dependent. Report to the Consultant in writing any defects or discrepancies. Commencement of work implies acceptance of existing conditions and assuming full responsibility for the finished condition of the work.

.3 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.

3.2 Workmanship

.1 Execute roofing work which is not specifically covered by these Specifications in accordance with applicable standards in Canadian Roofing Contractors Association (CRCA) and the National Roofing Contractors Association Roofing Specification Manual, in accordance with the Canadian Modified Bitumen Manufacturer's Association's recommendations, in accordance with the manufacturer's preprinted and published specifications and to ULC Design No. S-107, to FM 1-28 and 1.49 criteria, compliance with local fire insurance requirements and/or local building codes, except where specified otherwise.

.2 Do priming for asphalt roofing in accordance with CAN/CGSB 37-GP-15M and as recommended by membrane manufacturer.

.3 Procedures for application of materials should be in accordance with manufacturer's recommendations; otherwise the Consultant should be notified if any conflict with this Specification arises.

.4 All work shall be carried out in accordance with drawings, specifications and contract documents.

.5 Adhesives or sealants and liquid primers will not be applied until surfaces are dry.

.6 Inspect the underside of roof deck when installing fasteners, where possible, to avoid accidental damage.

.7 While work is in progress, all steps must be taken to safeguard the building from damage due to the elements.

.8 Perform Work in accordance with the printed requirements of the membrane manufacturer and this specification. Advise designer of any discrepancies prior to commencement of the Work.

.9 Advise the Consultant of adjustments to specified roofing procedures recommended by the Manufacturer or due to site conditions. Written approval is needed to make any adjustments to the specified procedures.

3.3 Preparation

.1 Use warning signs and barriers. Maintain in good order until completion of work.

.2 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

.3 Contractor is to take care to not damage any previously performed work, any closely located buildings and all grounds in the vicinity during roofing operations. Garbage chutes are to be located as to minimize their exposure to the building and its occupants. Protect walls by means of tarpaulins where garbage chutes and hoisting equipment is located. Cover dumpsters and bins so that debris does not blow away.

.4 Before work commences, ensure all air in-take air exchangers, drains, down venting and similar, are protected from the intrusion of dust and debris.

.5 Roof access is to be unobstructed. Doorways and fire routes are to be kept clear of any obstacles.

.6 Protect surrounding surfaces from work in progress by covering walls.

.7 Examine all roof decks and site conditions to ensure that they are in satisfactory condition for the commencement of the work of this section.

.8 Examine work of other trades for defects and discrepancies and report them to the owner/consultant in writing. Do not proceed with work until surfaces are satisfactory.

.9 Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

.10 The Contractor shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Contractor shall report any such blockages in writing to the Owner's Representative

for corrective action prior to the installation of the roof system.

.11 Prior to the removal of any roof components, all existing openings (drains, vents, air intakes, etc.) shall be covered or plugged to prevent any debris or contaminate from entering the building below. All such coverings are to be removed at the end of each working day and reinstalled prior to the next day's start up.

.12 The existing roof system shall be removed including all membranes, insulation, flashings and associated debris to expose the decking ensuring proper and adequate adhesion of the new roof assembly.

.13 Once the existing roofing systems are removed, the deck shall be reviewed by the Contractor and Consultant. The entire roof area is to be reviewed in order to satisfy warranty requirements of the manufacturer of the new roof system. The Consultant is to be notified 48 hours prior to testing.

.14 All unused and abandoned pitch pockets, vents, curbs, sleepers, projections, etc. are to be removed from the designated areas and disposed of. Obtain verification and authorization from the Owner before removing any suspected unused or abandoned projections. New decking is to be installed as required to close off any openings prior to the installation of the new roofing system.

.15 Ensure roof drains have been installed at proper elevations relative to finished roof surface in order to allow for sufficient drainage of the roof surface.

.16 Disconnect Electrical Services as required.

.17 Disconnect Mechanical Equipment as required.

.18 Ensure that projections and any equipment (electrical conduit, gas lines etc.) are correctly secured to the decking where applicable. If any inadequate securement is found, the Consultant is to be informed and work around that area is to be halted until the situation has been rectified.

.19 Any rooftop equipment requiring disconnection shall be the responsibility of the Contractor in consultation with the owner unless otherwise specified in this document.

.20 Prior to application of vapour retarder, examine deck and ensure any defect of level or construction is correct before proceeding with the work.

.21 Inspect wood blocking, cants and the like. Do not install roofing unless such items are adequately installed to withstand stresses imposed by thermal movement of the roof components.

.22 Apply each part of roofing system when surfaces are free of moisture for successful application. Consult with manufacture's printed instructions for successful application.

.23 All details supplied with this scope of work package are acceptable installations. Any deviance from these details must first approved by the Consultant prior to installation.

.24 Examine and repair or replace damage caused by work of this Contract with materials and finish to match original, to Consultant's approval.

.25 Defective work resulting from application of material on unsatisfactory surface will be considered the responsibility of the Contractor.

.26 Provide a 20 lb. Dry chemical fire extinguisher fully charged and in operable condition at every location where open flames are used. Extinguisher to be visible at all times.

3.4 Carpentry

.1 Add new wood blocking as necessary to maintain minimum heights at perimeters and curbs. The minimum height above the finished roof at curb locations and at wall bases is to be 200mm (8"). The minimum height at parapets is to be 150mm (6") above the finished roof.

.2 Replace any seriously damaged or deteriorated wood at perimeters and projections with new construction grade spruce wood blocking or exterior grade, good one side plywood to match existing. Determination of the suitability to re-use or replace existing wood to be at the sole discretion of the Consultant.

.3 Ensure existing wood blocking remaining at perimeters and curbs is securely fastened to existing substrate before installing any new blocking.

.4 Install wood blocking as required to ensure that all curbs and sleepers for H.V.A.C. and mechanical equipment are level.

.5 All wood blocking and plywood is to be considered part of the roof, and to be made watertight by the end of each working day to eliminate moisture infiltration into the roof system.

.6 All fasteners to be flush or slightly sunk with surface of wood blocking being secured where possible.

.7 As indicated on drawings, install blocking and cant strips to accommodate slopes and insulation, roofing and sheet metal.

.8 Carpentry alterations will be performed to accepted trade practice.

.9 Before proceeding, installation of vapour retarders is to be in place.

.10 Wood to wood, wood to metal, wood to masonry or concrete to be secured at 300mm (12″) on center staggered.

3.5 Vertical Surface Overlay Board

.1 Where shown on details and per roof system manufacturer's written instructions, install vertical overlay board.

.2 Mechanically fasten at board perimeter and at mid span of boards (maximum 1.2m (4'-0″) distance) and fasten vertically at maximum 229mm (9″) on centre with fasteners and plates or adhere in place as required by manufacturer.

.3 Butt joints with no gaps.

3.6 Deck Overlay Board

.1 Attach deck overlay board to deck with approved fasteners per roof system manufacturer's written instructions according to wind uplift requirements, at manufacturer's recommended rate and spacing. Stagger boards joint seams minimum 305 mm (12").

.2 Install underlay boards with long axis perpendicular to ribs, with end joints fully supported.

.3 Firmly butt each board to surrounding boards. Do not jam or deform boards.

.4 Cut and fit boards where roof deck intersects vertical surfaces.

.5 Provide filler boards every 450 mm in both directions.

3.7 Vapour Retarder – Self-Adhered Application

.1 Install one (1) ply self-adhered vapour retarder membrane and flashing as per manufacturer's written instructions, free of blisters, wrinkles and fish-mouths. Installation to be free of blisters, wrinkles and fish-mouths.

.1 Vapour retarder must be installed on same day as primer application.

.2 Do not install when it is raining or snowing, on wet/humid surfaces, or when inclement weather is expected shortly.

.3 Power vacuum metal deck surfaces to remove any loose dirt and debris. Substrate must be clean, dry, and free of non-bitumen compatible residues, dust, grease, and other contaminants.

.2 Primer Installation:

.1 Prime all non-metal exposed surfaces to receive vapour retarder membrane and flashing. Apply primer to clean and dry surfaces with a paint brush, roller or sprayer at temperatures 0°C (31°F) and above.

.2 Apply primer at a coverage rate between of 0.1 to 0.5 L/m2 (0.25 to 1.22 gallon/100 ft2) as recommended by membrane manufacturer for surface type.

.3 Ensure all substrates are fully covered with primer leaving no areas bare and avoid pooling.

.4 Allow primer to dry completely prior to installation of new vapour retarder membrane.

.3 Field Membrane Installation:

.1 Begin application at bottom of roof slope. Unroll self-adhered membrane onto substrate without adhered for alignment. Do not immediately remove release film.

.2 Overlap each preceding sheet by a minimum of 76mm (3") lengthwise following reference chalk line and by a minimum of 152mm (6") at each end. Stagger end laps by at least 305mm (12").

.3 Once aligned, peel back a portion of release film and press membrane onto substrate for initial adherence. Hold membrane tight and peel back release film by pulling diagonally.

.4 Use a manufacturer recommended weighted roller to press membrane down into substrate including laps. Finish by aligning edge of roller with lower end of side laps and rolling up membrane.

.5 Do not cut membrane to remove air bubbles trapped under laps. Squeeze out air bubbles by pushing roller to edge of laps.

.6 Carry vapour retarder up all vertical surfaces at parapets and projections where indicated on detail drawings.

.4 Membrane Flashing Installation:

.1 Prime substrate to receive self-adhered base sheet flashing with primer and rate of application as recommended by manufacturer. Avoid pools and heavy areas and allow primer to dry a minimum 30 minutes or until staining does not occur to touch and surface becomes tacky.

.2 Ensure complete coverage of primer to both prepared substrates and to field sheet membrane prior to placement of membrane flashing.

.3 Install membrane flashing onto substrate in strips one membrane roll wide (40″ or 1m) and extend over perimeters as shown on detail drawings.

.4 Field measure and cut flashing membrane to length required for flashing at each detail and roll up for installation. Allow for encapsulating of new insulation with roof membrane.

.5 Unroll and install membrane flashing onto substrate by removing release paper and discarding.

.6 Using weighted roller as recommended by manufacturer, roll all surfaces of roof membrane to ensure continuous adhesion with membrane to substrate. Firmly press membrane into substrate to ensure proper bond.

.7 Lap membrane flashing onto field membrane a minimum 152mm (6″). Side laps between adjacent sheets to be a minimum of 127mm (5″) wide.

.8 Extend membrane flashing minimum 76 mm (3″) above finished surface of insulation/cover board.

.9 Install vapour retarder tie-in flashings between new vapour retarder and roof membrane at projections and curbs and where indicated in detail drawings.

3.8 Rigid Insulation

.1 On Designated Roof Replacement Areas: Install layer(s) of insulation board over prepared vapour retarder in accordance with insulation manufacturer's instructions.

.2 Insulation boards to be no larger than 1.2m x 1.2m (4' x 4') when installed in cold adhesive.

.3 Where applicable, install tapered base insulation according to layout on reviewed shop drawings and roof plan drawing(s). Report any discrepancies to Consultant before proceeding.

.4 Do not install more insulation board than can be covered with membrane by end of work day or before onset of inclement weather.

.5 Do not install warped, curled, damaged, or wet insulation boards.

.6 Install insulation boards in parallel rows and butt tightly together with joints staggered by one half board length.

.1 Where multiple layers of insulation are required, stagger all board joints at least 305mm (12″) between rows.

.7 Adhere insulation to substrate using continuous beads of polyurethane foamable roofing adhesive. Follow manufacturer's installation instructions.

.1 Install continuous ribbons of polyurethane adhesive in parallel lines to meet CSA 123.21. Use a "Z" pattern over an application area no larger than 3.66m (12'-0") at a time. Minimum securement pattern:

.1 Adhesive ribbons to be no less than 13mm (1/2") to 19mm (3/4") in width at time of application.

.2 Parallel rows of adhesive ribbons to be no more than 305mm (1'-0") apart in field of roof.

.3 Along 3.05m (10'-0") wide perimeter zones, rows of adhesive to be no more than 127mm (6") apart.

.4 Rows of adhesive to be no more than 102mm (4") apart in corner zones.

.2 Do not allow rising foam adhesive to skin-over. Place insulation panels immediately into wet adhesive.

.3 Walk-in board panels to ensure positive adhesion of substrate across full panel. Repeat walk-in every five (5) minutes until insulation is firmly attached.

.4 Custom cut insulation boards as required at perimeters and projections to suit. Field cuts to be neat and provide tight fit around penetrations, projections, and at perimeters.

.5 For uneven surfaces, trimming or slitting of boards may be necessary. Fill all gaps larger than 3mm (1/8") with insulation slivers.

3.9 Cover Board

.1 On Designated Roof Replacement Areas: Install layer of cover board over prepared substrate in accordance with insulation manufacturer's instructions.

.2 Cover boards to be no larger than 1.2m x 1.2m (4' x 4') when installed in cold adhesive.

.3 Do not install more cover board than can be covered with membrane by end of workday or before onset of inclement weather.

.4 Do not install warped, curled, damaged, or wet cover boards.

.5 Install cover boards in parallel rows and butt tightly together with joints staggered by one half board length.

.6 Where multiple layers of insulation are required, stagger all board joints at least 305mm (12″) between rows.

.7 Adhere cover boards to substrate using continuous beads of polyurethane foamable roofing adhesive. Follow manufacturer's installation instructions.

.8 Install continuous ribbons of polyurethane adhesive in parallel lines to meet CSA 123.21 requirements. Use a "Z" pattern over an application area no larger than 3.66m (12'-0") at a time. Minimum securement pattern:

.9 Adhesive ribbons to be no less than 13mm (1/2") to 19mm (3/4") in width at time of application.

.10 Parallel rows of adhesive ribbons to be no more than 305mm (1'-0") apart in field of roof.

.11 Along 3.05m (10'-0") wide perimeter zones, rows of adhesive to be no more than 127mm (6") apart.

.12 Rows of adhesive to be no more than 102mm (4") apart in corner zones.

.13 Do not allow rising foam adhesive to skin-over. Place insulation panels immediately into wet adhesive.

.14 Walk-in board panels to ensure positive adhesion of substrate across full panel. Repeat walk-in every five (5) minutes until insulation is firmly attached.

.15 Custom cut boards as required at perimeters and projections to suit. Field cuts to be neat and provide tight fit around penetrations, projections, and at perimeters.

.16 For uneven surfaces, trimming or slitting of boards may be necessary. Fill all gaps larger than 3mm (1/8") with insulation slivers.

3.10 General Procedures

.1 The following general procedures shall apply to the modified bitumen membrane installation.

.2 Basic Rules For Application:

.1 Surface Inspection: Modified Bitumen membranes can be applied over wood, metal, gypsum board and concrete decks which must be clean, smooth, and free of snow, ice, moisture, and debris. Concrete decks must have all holes filled and rough patches removed.

.2 Application of Primer: Priming is required for all substrates prior to the installation of a modified bitumen membrane. The primer is to be applied at a rate of approximately 1/2 gal/100ft2 with a roller or sprayer. Contractor is to allow primer to dry prior to adhering membrane to the prepared substrate. Drying time will vary according to the deck and weather conditions.

.3 First Roll Starting Point (Low Slope Roofs): Base sheet to begin at drain level with the side lap aligned with the centre of the drain, rolls to run perpendicular to the slope (where applicable). Cap sheet to be installed over the base sheet and cover the overlap in the base sheet. Center of cap sheet to align up with centre of the drain.

.4 Alignment of Rolls: The first roll to be completely unrolled and aligned with the edge of the roof. Where required, the membranes are to be unrolled and allowed to relax for the required time. The membrane is to be re-rolled from both ends to the centre, then applied as per specifications.

.5 Staggering of Sheets: End laps between base and cap sheets to be staggered approximately 600mm (24″). Side laps between base and cap sheets are to be offset 300mm (12″). Laps in the membrane (base and cap) are to be 75mm (3″) wide for side laps and 150mm (6″) wide for end laps.

.6 Procedure to Sealing Voids Created by Overlapping Rolls of Membrane:

.1 Prior to installation, the corner of the salvage edge covered by the next roll of material is to be cut off when the membrane is unrolled.

.2 This procedure to be carried out for the application of membranes (base sheets, cap sheets and flashings).

.7 Salvage Edge Protection: Granular along the edge of the membrane is to be primed prior to the application of adhesive to provide good adhesion of the laps.

.8 Membrane Flashings:

.1 Base flashings to extend 150 (6″) onto the base sheet from the bottom of the perimeter detail.

.2 Cap flashings to extend 230mm (9″) onto the cap sheet from the bottom of the perimeter detail.

.9 Seams: Seams in all sheets to be checked with a round nosed trowel while work is in progress. Deficiencies found to be repaired prior to installing the covering layer or leaving the roof area at the end of the day.

.10 Reinforcement: Reinforcement is required at corners, vents and drains, mechanical units, and gravel stops.

.11 The membrane shall not be installed under the following conditions without consulting the manufacturer’s Technical Dept. for precautionary steps:

.1 The roof assembly permits interior air to pressurize the membrane underside.

.2 Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.

.3 The wall/deck intersection permits air entry into the wall flashing area.

.3 Torch Application:

.1 Torching Technique: The position of the flame to be 50mm to 150mm (2" to 6") from the surface being torched, depending on weather conditions. Torch to be waved in a sideways motion allowing flame to cover the entire width of the membrane without burning the side of the adjacent installed sheet. The flame is to be directed toward the inside of the roll on the salvage edge of the adjacent sheet to prevent such damage as discolouring of granulars, asphalt being blown out at the seams, etc., to the adjacent rolls. Membrane is to be pulled toward the torcher and not pushed.

.2 Salvage Edge Protection: Granulars along the edge of the membrane to be embedded into the membrane to provide good adhesion of the laps.

.3 How to Embed Granulars: Soften the bitumen by heating the mineral surface with the torch. Once the granulars begin to sink, use a hot trowel to embed the granulars into the bitumen.

Caution: The trowel is to be used in an "S" sliding motion. Do not attempt to scrape off the granulars from the bitumen. Embedding of the granulars on end laps should be done far enough in advance to allow the bitumen to cool. If the bitumen is not allowed to cool, the membrane will overheat and damage the membrane material. Side laps of granular sheets can be fully bonded without visible asphalt bleed-out, but a 6mm (1/4") maximum is an immediate sign the lap is sealed. Bleed out can be covered with matching granulars cast into reheated bitumen.

.4 Potential Defects/Deficiencies:

.1 Overheating:

.1 polypropylene film on top side of the membrane begins to melt
.2 granulars begin to sink
.3 modified bitumen melts away exposing polyester reinforcement
.4 visible waves in membrane.

.2 Delamination of Materials: The membrane may not be fully bonded to the substrate due to:

.1 moisture present on the substrate.
.2 dirt, dust or other contaminate on the substrate acting as a parting agent.
.3 inadequate application of primer or adhesive.
.4 the membrane was not adequately heated to provide a good bond between the membrane and substrate.

.3 Misalignment of Rolls: This occurs when the roll of membrane being applied swerves and the alignment to the starting line is lost. This can occur when the roll is not unrolled, aligned and re-rolled straight. When a roll becomes misaligned it is to be cut at the point where the swerve begins and restarted

.4 Wrinkles: Wrinkles are undulations located on the surface of the membrane after it has been applied. Depending on its origin, a wrinkle may have different appearances. With a Fully Adhered System, defects can be:

.1 Cross-Sheet Undulations: These appear as wrinkles, but are waves which occur when the membrane is installed in a stop and go fashion.

.2 Hollow Cross-Wise Wrinkles: Lack of adhesion due to non-continuous welds, insufficient heat application and a poor restarting of torching on a roll that was stopped will lead to this type of wrinkle. These two types of wrinkles do not affect the performance of the system, providing they are small, isolated and do not create an opening along a side lap.

.3 Solid Cross-Wise or Length-Wise Wrinkles: These wrinkles are formed when the membrane has been overheated.

.4 Continuous Ridging of the Membrane: These wrinkles are formed by movement of the substrate underneath the membrane. The contractor is responsible for ensuring that the substrate is secure prior to installing the membrane.

.5 Blisters: A blister is a pocket of air under the membrane where full adhesion was not attained or trapped moisture was released from the substrate. In isolated areas, no overlap location and low traffic areas, blisters pose no threat to the water tight integrity of the membrane. Large blisters should be removed and repaired. The repair consists of adhering any loose membrane, then applying a patch extending a minimum 150mm (6") beyond the cut out area on all sides.

3.11 Membrane & Membrane Flashing Installation

.1 General:

.1 Install two ply modified bitumen membrane system overtop of prepared substrate. All membrane to be installed as per the manufacturer's written instructions and as per the guidelines below.

.2 Membrane gusset reinforcement is to be installed on top of base sheet membrane at all inside and outside corners. Consultant to review gusset installation before installation of cap sheet membrane.

.2 Flame Stop:

.1 Self-Adhered Installation:

.1 Complete installation of flame stop membrane prior to torch applying membrane base

sheet.

.2 Prime substrate to receive self-adhering flame stop membrane with specified primer at rate recommended by manufacturer. Avoid pools and heavy areas and allow primer to dry a minimum 30 minutes or until staining does not occur to the touch and surface becomes tacky.

.3 Ensure complete coverage of the primer to prepared substrates prior to placement of the flame stop membrane.

.4 Install flame stop membrane centred over all joints in the substrate, at perimeters and all other openings.

.5 Unroll and install flame stop membrane onto substrate by removing the release paper and discarding.

.6 Using weighted roller as recommended by manufacturer, roll all surfaces of flame stop membrane to ensure continuous adhesion with membrane to substrate. Firmly press the membrane into the substrate to ensure proper bond.

.7 **All end laps of the flame stop membrane shall be heat welded with hot air gun to the satisfaction of the consultant**.

.3 Base Sheet:

.1 Torch Installation:

.1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and re-roll from both ends.

.2 The base sheet is to be torched across the flat of the roof, overtop of the prepared substrate, and terminated at perimeters and vertical surfaces ensuring a good bond.

.3 Lap sheets 75mm (3") for side laps and a minimum 150mm (6") for end laps. Turn sheet up at perimeters a minimum of 75mm (3”).

.4 Application to be free of blisters, wrinkles, and fish-mouths.

.5 Ensure membrane application is done in accordance with manufacturer’s recommendations.

.4 Base Sheet Flashing:

.1 Self-Adhered Installation:

.1 Complete installation of base sheet flashing prior to installing membrane cap sheet and cap sheet flashings.

.2 Prime substrate to receive self-adhering base sheet flashing with specified primer at rate recommended by manufacturer. Avoid pools and heavy areas and allow primer to dry a minimum 30 minutes or until staining does not occur to the touch and surface becomes tacky.

.3 Ensure complete coverage of the primer to both prepared substrates and to the field base sheet membrane prior to placement of the base sheet flashing.

.4 Install base sheet flashing onto substrate in 1m (40") wide strips extending over perimeters as shown on detail drawings.

.5 Unroll and install base sheet flashing onto substrate by removing the release paper and discarding.

.6 Using weighted roller as recommended by manufacturer, roll all surfaces of roof membrane to ensure continuous adhesion with membrane to substrate. Firmly press the membrane into the substrate to ensure proper bond.

.7 **All side and end laps of the base sheet flashing shall be heat welded with hot air gun** to the satisfaction of the consultant.

.8 Lap base sheet flashing onto base sheet membrane a minimum 150mm (6"). Side laps between adjacent sheets to be a minimum of 125mm (5") wide.

.9 Where indicated on details, secure top edge of membrane to substrate with fastening bar and fasteners spaced every 230mm (9") o/c.

.5 Cap Sheet:

.1 Torch Installation:

.1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and re-roll from both ends.

.2 The cap sheet is to be torched across the flat of the roof, overtop of the base sheet, and terminated at perimeters and vertical surfaces ensuring a good bond.

.3 Lap sheets 75mm (3") for side laps and a minimum 150mm (6") for end laps. Offset joints in cap sheet 300mm (12") minimum from those in base sheet.

.4 Application to be free of blisters, wrinkles and fish-mouths.

.5 Ensure membrane application is done in accordance with manufacturer's recommendations.

.6 Cap Sheet Flashing:

.1 Torch Installation:

.1 The cap sheet flashing shall be torched up and over perimeter details.

.2 The cap sheet flashing is to extend from the outside edge of the perimeter down on to the flat of the roof. Carry the cap sheet flashing a minimum of 200mm (8") on to the flat of the roof ensuring that it extends past the edge of the base sheet flashing by a minimum of 50mm (2").

.3 Set cap sheet to offset base sheet flashing joints by 50% and lap cap sheet flashing to membrane cap sheet 230mm (9”). Provide 75mm (3”) minimum side lap.

.4 Properly secure flashings to their support, without sags, blisters, fish-mouths or wrinkles with terminations as indicated on drawings and details.

.5 Ensure all work is done in accordance with the manufacturer’s recommendations.

.7 Liquid Applied Resin Flashing:

.1 Prepare all surfaces to receive resin flashing as per manufacturer’s requirements using recommended cleaners, primers, and all other required materials.

.2 Using masking tape, mask perimeter of area to receive flashing system.

.3 Apply resin primer to substrates requiring additional preparation and allow primer to set.

.4 Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.

.5 Apply an even, generous base coat of flashing resin using a roller at minimum rate specified by resin manufacturer to prepared surfaces requiring flashing coverage.

.6 Work fleece into wet resin using a brush or roller to fully embed fleece in resin and remove trapped air.

.7 Lap fleece layers a minimum of 2” (51mm) and apply an additional coat of resin between layers of overlapping fleece.

.8 Again using a roller, apply an even top coat of resin at minimum rate specified by resin manufacturer immediately following embedment of fleece, ensuring full saturation of fleece.

.9 Ensure that flashing resin is applied to extend a 0.25” (6mm) beyond fleece. Remove tape before resin sets. Make allowances for saturation of roller covers and application equipment.

.10 Should work be interrupted for more than 12 hours or surface of resin becomes dirty or contaminated by elements, wipe surface to be lapped with new flashing resin using specified cleaner/solvent.

.11 Allow surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work.

3.12 Drains

.1 General:

.1 Remove and discard existing drains and pipe fittings that are no longer required.

.2 Install new specified retro-drains at new drain locations. Make all joints watertight and gastight.

.3 Install new retro-drains as per the manufacturer's specifications and detail drawings.

.4 Ensure that the drains are clear of debris and free flowing prior to the installation of the insulation and the membrane.

.5 Any blockages are to be reported prior to the start of work. Once work has begun, the Contractor assumes responsibility for free flowing drains and the cost associated with clearing.

.6 Prior to the installation of new insulation and membrane, ensure that all new and retro drains are located at a height where the roof is able to clear the majority of roof top water caused by rainfall within a 72 hour period.

.7 No roof area shall be left overnight without adequate provision for drainage at the existing roof drain locations.

.8 All plumbing to be executed in accordance with relevant Provincial Building Codes and Local Building Codes.

.2 Retro Drain Insert Installation:

.1 Install new base membrane over the drain location prior to installing the drain as per drawing detail and membrane installation methods.

.2 Primed drain body to be set into a bed of mastic.

.3 Insert the retrofit drain body down into the existing drain pipe until the retrofit drain flange is embedded into the surface of the target membrane. If the drain body is too long, it may be shortened by cutting the copper drain stem prior to installing the drain seal connection.

.4 The drain body is to be secured to the substrate with a minimum of 4 fasteners per drain or additional as required to secure the drain body.

.5 Install the reinforcement ply of base sheet membrane and cap ply membrane as per roofing membrane manufacturer's flashing requirements. Use the drain seal hole puncher tool to make neat membrane penetrations for the drain studs.

.6 Place the Clamping Ring over the raised studs. Install stainless steel self-locking nuts to tighten the Clamping Ring against the membrane flashing until secure.

.7 Install ballast guard strainer dome and secure in place with the cotterless pin or wing nut screw.

At paver ballasted areas, drain cover to be flush with the surrounding pavers and secured with a flush mounted screw.

3.13 Roof Penetrations

.1 Install roof penetration flashings and seal with membrane in accordance with the manufacturer's recommendations and as indicated on detail drawings.

.2 Prime all metal flanges and allow to solvents to flash off prior to installation.

.3 Set metal flange in full layer of rubberized sealing compound ensuring a positive bond.

.4 Install an additional ply of base sheet membrane over the flange as per the manufacturer's written instruction prior to installing the field cap sheet membrane. The additional ply of membrane to extend a minimum of 150mm (6") past the edge of the flange.

.5 Install cap ply to the base ply flashing ensuring a full bond to the base ply and apply bead of sealing compound at the termination point.

3.14 Temporary Water Cut-Offs

.1 Temporary waterproof seals will be placed on daily work. Only areas which can be made watertight in the same day will be removed to ensure protection of the interior. Temporary seals will be removed before proceeding with the remaining work.

.2 All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses.

.3 All temporary water-stops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation.

.4 The new membrane shall be carried into the water-stop. The water-stop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing.

.5 The edge of the membrane shall be sealed in a continuous heavy application of sealant.

.6 When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of offsite. None of these materials shall be used in the new work.

.7 If inclement weather occurs while a temporary water-stop is in place, the Contractor shall provide the labour necessary to monitor the situation to maintain a watertight condition.

.8 If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Contractor's expense.

3.15 Metal Flashings

.1 After the installation of the roof membrane and membrane flashings, new perimeter metal and metal flashings shall be installed per Section 07 62 00 and the Drawings.

3.16 Cleaning

.1 Clean up and remove from job site on a daily basis, all rubbish and surplus materials resulting from this work.

.2 All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

END OF SECTION – 07 52 16