TAYLOR ARCHITECTURE GROUP

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ADDENDUM NO. 4

ADD 004

Project: Nunavut Water Board New Office Building
Location: Gjoa Haven, NU
Project no: RFP GH 2018-001 TAG:17-017
Date: March 1st, 2018

Note well: Addendum No. 4 is comprised of: **Specification General:** comprised of 07 addendum items. **Architectural Specification:** comprised of 14 addendum items. **Architectural Drawings:** comprised of 02 addendum items. **Mechanical Specifications:** comprised of 03 addendum items. **Mechanical Drawings:** comprised of 02 addendum items. **The Addendum contains a total of (26) - 8 ½" x 11" sheets and 28 items.**

Specifications - General

1.	0 21 13, Part 1.13.2.1	Addition	".1 References provided in the pre-qualification documents may be contacted during the tender review process for further assessment."
2.	00 21 13, Part 1.10.2.4	Clarification on Addenda #3, Item #3	Bidders are to submit one USB thumb drive containing both the pre-qualification documents and the bid documents clearly labelled. The USB thumb drive is to be included in the sealed envelop with the bid documents hard copies. Pre-qualification document hard copies are to be included in a separate sealed envelope.
3.	00 21 13, Part 1.12	Addition	".10.1 Items .2 to .9 to be included in a separate sealed envelope labelled "Bid Documents" and include the project name and number and contractor name." ".10.2 Pre-Qualifications envelope and Bid Documents envelope should be placed in a larger, sealed envelope labelled with the Project Name, Project Number, Owner Name and Contractor Name and contact information."
4.	00 21 13, Part 1.1.1	Remove	".3 Submit Supplementary Bid Information Form with Bid Form."

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5.	00 40 50, Part 3.1	Remove	".7 Photocopy of Certificate of Recognition (COR) issued by the Northwest Territories and Nunavut Construction Association."
6.	01 11 00, Part 1.3	Addition	".3 Furniture may be installed between September 1st and September 15th, 2019 with final completion of furniture installation by September 15th, 2019."
7.	00 80 00, Part 1.2.1	Addition	".2 The holdback percentage referred to in Article 5.1 shall be ten (10) percent."

Architectural Specifications

8.	07 27 13	Replace	Section 07 27 13 of the specifications has been replaced in its entirety with the specification 07 27 13 attached. Note: portions of the section that have been changed compared to tender specifications have been highlighted within the specification section attached.
9.	07 42 13, Part 2.1	Request for Alternates	Agway Corrugated Metal siding, colour QC 28306 is an acceptable alternate. Note: performance criteria must meet or exceed the criteria laid out in Part 2 of Section 07 42 13.
10.	07 52 00	Replace	Section 07 52 00 of the specifications has been replaced in its entirety with the specification 07 52 00 attached. Note: portions of the section that have been changed compared to tender specifications have been highlighted within the specification section attached.

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11.	12 21 16, Part 2.3.4	Remove	Section 12 21 16, Part 2.3.4 “Provide valances at both exterior and interior glazing” has been removed from the specifications. No valances/cassettes are required.
12.	12 21 16 Roller Shades	Clarification	No blinds required on doors in this project.
13.	12 50 00, Part 1.12	Addition	“.5 CAD files for furniture planning will be provided upon request.”
14.	12 50 01 Furniture Schedule -D	Clarification	• Generally, a common storage type across all D2 and D3 assemblies is preferred, though it is not a requirement. • In D3 assemblies, as noted in the Furniture Plan, the intent of the upper bin storage is that it spans the freestanding desk and filing cabinet. In this case a tape-on, hutch-style cabinet is not appropriate for the required installation location – a wall-mounted storage bin is anticipated to be required. • In D2 assemblies, the tape-on, hutch-style cabinet is an acceptable solution.
15.	12 50 01 Furniture Schedule - D	Remove	At D1, D2, D3, D4, D4a, D5 items under Finishes, remove: • “painted steel storage/cabinet fronts”, and • “Painted steel legs”
		Addition	And replace with: • “storage components/assemblies may be painted steel or laminate. All door and drawer fronts to be laminate.” And • “painted steel T- or C-style legs”
16.	12 50 01 Furniture Schedule - D	Clarification	The intent of a T- or C- style leg at desks is that the knee/leg clearance is free.

17.	12 50 01 Furniture Schedule - D	Clarification	Modesty panels are required as noted to facilitate future reconfiguration of offices.
18.	12 50 01 Furniture Schedule – T5	Acceptable Alternates	A Convex Racetrack table with T-legs and special castors is an acceptable alternate to the oval worktop.
19.	12 50 01 Furniture Schedule – T3	Acceptable Alternates	A 48” DIA table with post leg* base (*stretch legs, in which the connection to tabletop surface is set in from the edge of the table, and the foot of the leg extends to the edgeline of the table) is an acceptable alternate to a 48” DIA table with pedestal base.
20.	12 50 01 Furniture Schedule – T2	Remove	Under Description, “and painted wood finish”
		Addition	Under Description, “clear coat finish”
21.	12 50 01 Furniture Schedule – D3	Remove	Under Description, “54” x 24” worksurface with pedestal storage support”
		Addition	Under Description, add: “at Rm 136: 48”: x 24” worksurface with pedestal storage support At Rm 110: 42” x 24” worksurface with pedestal storage support”

Architectural Drawings

22.	A801-802	Clarification	Refer to drawings A801-802 Interior Elevations and A201 Main Floor Plan for interior window sizes.
23.	A601	Modification	Assemblies R2, F1, and F2 have been modified. See attached ASK-02 for modified assemblies.

Mechanical Specifications

24.	20 40 35, Part 2.3	Request for Alternate	Amtrol 2-AS is an acceptable product.
25.	20 40 35, Part 2.2	Request for Alternate	Amtrol model 747 High Capacity air vent is and acceptable product.
26.	22 05 90, Part 2.2	Request for Alternate	PPP Stainless steel 316 water hammer arrestors are an acceptable product.

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Mechanical Drawings

27.	M500	Request for Alternate	Unit Heaters: Beacon Morris Model HB-48 is an acceptable product.
28.	M500	Request for Alternate	Cabinet Unit Heaters: Beacon Morris cabinet unit heaters are an acceptable product.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 – Cast-In-Place Concrete

.2 Section 07 21 13 – Board Insulation

.3 Section 07 21 16 – Fibrous Insulation

.4 Section 07 21 19 – Foam-In-Place Insulation

.5 Section 07 52 00 – Modified Bituminous Membrane Roofing

.6 Section 07 92 00 –Sealants

.7 Section 08 11 14 – Steel Doors and Frames

.8 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES

.1 American Society for Testing of Materials (ASTM)

.1 ASTM D93-16a, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester.

.2 ASTM D146/D146M-04 (2012) e1, Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing.

.3 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.

.4 ASTM D1970-16, Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

.5 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.

.6 ASTM E283-04 (2012), Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.7 ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials.

.8 ASTM E2357-11, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

1.3 SCOPE OF WORK

.1 Provisions of this specification section apply only to air and vapour barrier materials applied to exterior walls. For air and vapour barrier materials applied to roofs, see Section 07 52 00 – Modified Bituminous Membrane Roofing.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Select products to be compatible with adjoining membranes previously installed under related Sections

.2 Select products from a single manufacturer, or products which are compatible from different manufacturers.

.3 Coordination between all installers of each component of vapour and air retarder system is essential to ensure continuity of system and that junctions between the various components are effectively sealed.

.4 Verify with manufacturers and all tradesmen involved with installation procedures of building products incorporated into air barrier elements including, but not limited to, various membranes, coating and sealants as well as continuity with roofing membrane.

.2 Pre-installation Meeting:

.1 Convene one (1) week before commencing Work of this Section.

.2 Arrange for manufacturer’s factory-trained agent to be on site at beginning of installation to provide training and supervision of personnel who will install membrane. Agent shall also provide frequent inspection visits thereafter to assure quality and competence of membrane installations.

.3 Sequencing:

.1 Sequence work in accordance with Construction Progress Schedule.

.2 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.5 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 – Submittals Procedures.

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS - Material Safety Data.

.3 Submit statement from manufacturer(s), indicating products supplied under this Section are compatible with one another and with products previously installed under the work of related Sections.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide duplicate 200 mm x 200 mm samples of membrane adhered to all project substrates, including adjoining membranes specified in other Sections.

.3 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Existing Substrate Condition: report deviations, as described in PART 3 - EXAMINATION in writing to Consultant.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.6 QUALITY ASSURANCE

.1 Applicator: company specializing in performing work of this section with minimum 3 years documented experience with installation of air/vapour barrier systems.

.1 Completed installation must be approved by the material manufacturer.

.2 Applicator: company:

.1 Currently licensed by National Air Barrier Association certifying organization.

.2 Must maintain their license throughout the duration of the project.

.3 Single-Source Responsibility: obtain primary air and vapour materials from a single manufacturer regularly engaged in the manufacturing and supply of the specified products and meeting or exceeding the material properties and performance characteristics of the materials and manufacturers named in this Section.

1.7 MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct typical exterior wall panel, 3 m long by 4 m wide, incorporating window and frame and sill, insulation, building corner condition, and junction with roof system; illustrating materials interface and seals.

.3 Locate where directed.

.4 Mock-up may remain as part of finished work.

.5 Allow review of mock-up by Consultant before proceeding with air/vapour barrier Work. Accepted mock-up will demonstrate minimum standard of quality required for this project.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

1.10 AMBIENT CONDITIONS

.1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Maintain temperature and humidity recommended by materials manufacturer before, during and after installation.

.4 Apply air/vapour barrier membrane to gypsum board surfaces which are dry, when temperature is 4 degrees C or higher or as per manufacturers recommendations.

1.11 WARRANTY

.1 Manufacturer's Material Warranty: issue written and signed warranty in the name of the Owner, certifying the product will meet the physical characteristics published by the manufacturer for a period of 10 years starting from the completion date of installation of membranes.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this section and as established by the Basis-of-Design materials, manufacturers offering similar products that may be incorporated into the Work include the following:

.1 Soprema Canada

2.2 SELF-ADHESIVE AIR AND VAPOUR BARRIER SYSTEM MATERIALS

.1 Primer: SBS synthetic rubbers, adhesive resins and solvents used to prime porous substrates to enhance adhesion of self-adhesive membranes.

.1 Specific gravity at 20°C (kg/l): 0.79 to 1.0 kg/l

.2 Solids by weight: 24% to 53%

.3 Flash point: -30°C to ASTM D93

.4 Acceptable materials:

.1 At temperatures above -10 °C: Soprema Elastocol Stick Zero

.2 At temperatures between -30 °C and -10 °C: Soprema Sopraseal Stick Primer

.2 Air/Vapour Barrier Membrane (winter application): to CAN/CGSB 37.56 or ASTM D1970; SBS modified bitumen, self-adhering sheet membrane with polyethylene facer, for application temperatures between -10°C and 10°C and as follows:

.1 Thickness: 1 mm to 1.5 mm

.2 Tensile strength: 11.3 kN/m to 15.4 kN/m to ASTM D5147.

.3 Ultimate elongation: 25% to 40%

.4 Flexibility at cold temperature: minimum -30°C

.5 Air permeability: <0.0003 L/sec. m^2

.6 Water vapour permeability: <0.05 perm

.7 Static puncture: minimum 178 N

.8 Lap adhesion: 800 N/m

.9 Acceptable materials:

.1 Sopraseal Stick 1100 T, Soprema.

Air/Vapour Barrier Membrane (summer application): to CAN/CGSB 37.56 or ASTM D1970; SBS modified bitumen, self-adhering sheet membrane with polyethylene facer, for application temperature above 5°C, and as follows:

.10 Thickness: 1 mm to 1.5 mm

.11 Tensile strength: minimum 6 kN/m

.12 Ultimate elongation: 25% to 40%

.13 Flexibility at cold temperature: minimum -17°C

.14 Air permeability: <0.0003 L/sec. m^2

.15 Water vapour permeability: <0.05 perm

.16 Static puncture: 400 N

.17 Lap adhesion: minimum 1750 N/m

.18 Acceptable materials:

.1 Sopraseal Stick 1100, Soprema.

2.3 MASTICS AND ADHESIVES

.1 Waterproofing Mastic: solvent-based mastic containing SBS modified bitumen, fibres and mineral fillers, used to seal around penetrations and extrusions.

.1 Compatibility: With air/vapour barrier membrane, substrate and insulation.

.2 Specific gravity at 20°C: 1.0 kg/l to 1.12 kg/l

.3 Application Temperature: -10°C to +35°C

.4 Solids by Weight: 70% to 83 %

.5 Acceptable materials:

.1 Sopreamastic, Soprema.

2.4 ACCESSORIES

.1 Thinner and cleaner for Butyl or Neoprene Sheet: as recommended by sheet material manufacturer.

.2 Attachments: galvanized steel bars and anchors.

.3 Roof-to-Wall Transition Membranes: Manufacturer’s recommended reinforced self adhesive, compatible with roofing air and vapour membranes and wall materials specified in this Section.

.1 Acceptable Materials:

.1 As recommended by Soprema

.4 Through Wall Membranes: Manufacturer’s recommended reinforced self adhesive, compatible with air and vapour membrane and that will not become plastic and extrude onto finished surfaces when exposed to high wall temperatures.

.1 Acceptable Materials:

.1 Sopraseal WFM, Soprema

.5 Butyl Adhesive: provide butyl based adhesive membrane for locations in contact with plasticized vinyl including, but not limited to, vinyl deck membranes.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 ENVIRONMENTAL REQUIREMENTS

.1 All membrane shall be installed at surface and ambient temperature of 5°C or above, in dry weather conditions.

.2 For applications below 5°C consult membrane manufacturer's technical representative for instructions and, obtain Consultant's approval before proceeding with Work.

.3 Self adhered membrane shall not be applied below application temperature of. minus 10 °C despite primers being able to be applied at colder temperatures.

3.3 EXAMINATION AND PREPARATION

.1 Verify that surfaces and conditions are ready to accept work of this section.

.2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

.3 Remove loose or foreign matter, which might impair adhesion of materials.

.4 Ensure substrates are clean of oil or excess dust; masonry joints struck flush, and open joints filled; and concrete surfaces free of large voids, spalled areas or sharp protrusions

.5 Do not install materials during rain or snowfall.

.6 Report unsatisfactory conditions to Consultant in writing.

.7 Do not start work until deficiencies have been corrected.

.1 Beginning of Work implies acceptance of conditions.

3.4 INSTALLATION: SELF ADHERING SYSTEM

.1 Apply primer to substrates in accordance with manufacturer’s written instructions. Apply primer that will be covered with membrane the same day. Re-prime areas that are not covered the same day.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 150 mm overlap at all end and side laps.

.3 Corner details: Double cover outside and inside corners, use 300 mm wide initial strip of membrane centred on axis of corner. Follow with full width of sheet membrane to cover initial strip completely.

.4 Construction and control joints: Install membrane in double thickness over properly sealed joints, use 300 mm wide initial strip of membrane centred over

joint. Follow with full width of sheet membrane. Assure that joints are properly sealed; joint filler and a compatible sealant are installed

.5 Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings.

.6 Roll laps and membrane with a counter top roller to effect seal.

.7 Small protrusions (pipes, etc.) through the waterproofing membrane, should be pre-stripped with a membrane and sealed with mastic

.8 Inspect membrane installation meticulously and immediately. Holes and tears in the membrane must be repaired with air / vapour barrier membrane material. The repair must exceed the affected surface area by a minimum of 150 mm. The membrane piece applied for the repair must be sealed around its edges with mastic.

3.5 FIELD QUALITY CONTROL

.1 The Architect shall inspect installed membrane for continuity of air barrier prior to placement of insulation. Provide Architect with a minimum of two weeks written notice in advance of inspection.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.7 PROTECTION OF WORK

.1 Protect finished work from penetrations.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished work is protected from climatic conditions.

.4 Repair to manufacturers written instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 31 00 – Structural Cast-in-Place Concrete

.2 Section 05 31 00 – Steel Decking

.3 Section 06 10 00 – Rough Carpentry

.4 Section 07 21 13 – Board Insulation

.5 Section 07 24 00 – Exterior Insulation and Finish System

.6 Section 07 27 19 – Sheet Membrane Air and Vapour Barrier

.7 Section 07 62 00 – Sheet Metal Flashing and Trim

.8 Section 07 92 00 – Sealants

.9 Division 22 – Plumbing: Coordination of pipes and pipe fittings and other materials penetrating roof membranes.

.10 Division 23 – Heating, Ventilation and Air Conditioning: Coordination of ductwork and other materials penetrating roof membranes.

.11 Division 26 – Electrical: Coordination conduit, wiring, communications cabling, cable trays and other materials penetrating roof membranes.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.

.2 ASTM D41/D41M-11(2016), Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

.3 ASTM D312/D312M-16, Standard Specification for Asphalt Used in Roofing.

.4 ASTM D448-12 Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

.5 ASTM D2178/D2178M-15a, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.

.6 ASTM D6162/D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.7 ASTM D6163/D6163M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.8 ASTM D6164/D6164M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.9 ASTM D6222/D622M-16, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.

.10 ASTM D6223/D6223M-16, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.

.11 ASTM D6509/D6509M-16, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.2 CGSB 37-GP-56M AMEND, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Canadian Roofing Contractors Association (CRCA)

.1 CRCA Roofing Specifications Manual.

.4 Canadian Standards Association (CSA International)

.1 CSA A123.21-14, Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems, Includes Update No. 1 (2010).

.2 CSA-A123.3-05 (R2015), Asphalt Saturated Organic Roofing Felt (Reaffirmed 2010).

.3 CAN/CSA-A123.4-04 (R2013), Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

.4 CSA A231.1-14/A231.2-14, Precast Concrete Paving Slabs/Precast Concrete Pavers.

.5 CSA O121-17, Douglas Fir Plywood, Includes Update No. 1 (2013).

.6 CSA O151-17, Canadian Softwood Plywood.

.5 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.7 Underwriters Laboratories' of Canada (ULC)

.1 CAN/ULC S107-10, Methods of Fire Tests of Roof Coverings.

.2 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meeting one week prior to beginning work of this Section, with Contractor, Consultant, installer, manufacturer’s representative in accordance with Section 01 31 19 – Project Meetings to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.5 Review ARCA warranty certificate requirements.

1.4 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 – Submittals:

.1 Provide copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide copies of WHMIS MSDS and indicate VOC content for:

.1 Primers

.2 Vapour retarder membrane

.3 Sealers

.4 Insulation

.5 Base and cap sheet

.2 Submit shop drawings in accordance with Section 01 33 00 – Submittals:

.1 Indicate flashing, control joints, tapered insulation details.

.2 Provide layout for tapered insulation.

.3 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.4 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumens, roofing felts, and membrane with specification requirements.

.5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

.6 Manufacturer's field report: in accordance with Section 01 45 00 – Quality Control.

.7 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

1.5 QUALITY ASSURANCE

.1 Obtain roofing membrane materials through one source from a single manufacturer.

.2 Installer Qualifications: company or person specializing in application of modified bituminous roofing systems with 5 years documented experience approved by manufacturer.

.3 Roofing and sheet metal work shall be performed in conformance with roofing manufacturer’s written recommendations using materials in accordance with CAN/ULC S107.

1.6 FIRE PROTECTION

.1 Comply with safety measures described in manufacturer's written installation requirements, requirements of insurance companies and other requirements of the Authorities Having Jurisdiction.

.2 Fire Extinguishers, located within six (6) meters of each roofing torch, ULC labelled for ABC protection.

.3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed hot spots. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.4 Do not apply torch directly to dry or unprotected wood surfaces.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 – Common Product Requirements.

.2 Storage and Handling Requirements:

.1 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.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.

.4 Remove only in quantities required for same day use.

.5 Place plywood runways over completed Work to enable movement of material and other traffic.

.6 Store sealants at +5 degrees C minimum.

.7 Store insulation protected from weather, daylight and deleterious materials.

.8 Do not store materials on roof in concentrations that exceed design live load.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Waste Management and Disposal.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Do not perform roofing work when air temperature, including wind chill, falls below the membrane manufacturer's recommended limit.

.2 Do not apply roofing materials to a damp, frozen or unsuitable surface.

.3 Do not expose roofing materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day.

1.10 WARRANTY

.1 Roofing Membrane Manufacturer: Provide manufacturer's material warranty stating that they will repair or replace defective roofing and base flashing

materials that do not remain watertight, that splits, tears, or separates at the seams or from the substrate within the specified warranty period and as follows:

.1 Warranty Period: 10 year Warranty, starting from Substantial Performance for the Project.

.2 Name of Warrantee: Warrantor shall issue a written and signed warranty identifying the owner's name as the warrantee, and stating that executed work will remain in place and be free of any defects in materials for the stated warranty period.

Part 2 Products

2.1 MANUFACTURERS

.1 Basis-of-Design: Materials and colours listed below form the Basis-of-Design materials for this project.

.2 Acceptable Membrane Manufacturers: Subject to compliance with requirements specified in this section and as established by the Basis-of-Design materials, manufacturers offering similar products that may be incorporated into the Work include the following:

.1 Soprema

.3 Use only materials from one manufacturer.

2.2 PERFORMANCE CRITERIA

.1 Provide system with products to achieve 10 year manufacturers warranty certificate.

.2 Compatibility between components of roofing system is essential. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.

.3 Roofing System: to CSA A123.21 for wind uplift resistance.

2.3 DECK COVERING

.1 Plywood: Douglas-Fir plywood to CSA O121 or Canadian Softwood plywood to CSA O151, Sheathing Grade, preservative treated in accordance with CAN/CSA O80.

.1 Tongue and groove, thickness as indicated.

2.4 PRIMER

.1 Primer comprised of elastomeric bitumen, volatile solvents and adhesive enhancing additives as recommended by membrane roofing manufacturer to suit substrate and installation conditions.

.1 Basis-of-Design:

.1 Sopraseal Stick Primer, Soprema.

2.5 VAPOUR RETARDER

.1 Premanufactured Self-Adhesive Air/Vapour Barrier: Self-adhesive vapour barrier membrane composed of SBS modified bitumen with thermoplastic polymers and high density polyethylene film and as follows:

- .1 Thickness: Minimum 0.8 mm.
- .2 Cold Bending: -35°C
- .3 Static Puncture: 400 N.
- .4 Membrane Breaking Strength (MPa): MD=75, XD=98.
- .5 Water Vapour Permeance: 0.92 ng/Pa•s•m^2 to ASTM E96.
- .6 Basis-of-Design:
  - .1 Sopravap'R, Soprema

.2 Vapour retarder continuity strip: SBS membrane with non-woven polyester reinforcement, glass grid and elastomeric bitumen. Sanded upper surface; underside self-adhesive, compatible with wall and roof air/vapour retarder membranes as recommended by accepted membrane manufacturers below.

- .1 Acceptable Materials:
  - .1 Sopraseal Stick 130 – Soprema

2.6 INSULATION

.1 Flat Insulation: Extruded polystyrene board insulation to CAN/ULC S701, Type 3 or Type X, minimum RSI 0.80 per 25 mm, compressive strength 100 kPa, thickness as indicated on drawings.

- .1 Acceptable Materials:
  - .1 Deckmate, Dow
  - .2 Foamular 150, Owens Corning

.2 Sloped Insulation: Extruded or expanded polystyrene board insulation conforming to CAN/ULC S701.

- .1 Expanded polystyrene, Type 2, minimum RSI 0.70 per 25 mm, compressive strength 100 kPa, thickness as indicated on drawings.
  - .1 Acceptable Materials:
    - .1 Plastispan, Plasti-Fab.
    - .2 Terrafoam, Beaver Plastics.
- .2 Extruded polystyrene, Type IV, minimum RSI 0.70 per 25 mm, compressive strength 100 kPa, thickness as indicated on drawings.
  - .1 Acceptable Materials:
    - .1 Foamular Thermapink 25, Owens Corning

2.7 MEMBRANE

.1 Composite Cover Board: Insulating base sheet panel:

- .1 Description: SBS modified base sheet membrane with non-woven polyester reinforcement, factory-laminated on an asphaltic support panel and on a 51 mm polyisocyanurate insulation board.
  - .1 Board size: 910 mm x 2440 mm x 56 mm.

.2 In conformance with: CGSB 37.56-M

.3 Properties:

		MD	XD
.1	Breaking Strength (N/50 mm)	17	12.5
.2	Ultimate Elongation (%)	60	65
.3	Tear Resistance (N)	60	
.4	Static Puncture Resistance (N)	500	
.5	Dimensional Stability (%)	<2.0	

.2 Basis-of-Design:

.1 Soprema, Soprasmart Board 180 ISO

.2 Membrane base sheet flashing (stripping):

.1 Primer: Manufacturer's recommended elastomeric bitumen or synthetic rubber blend, volatile solvents, adhesive enhancing additives and resins used to prime substrate to enhance the adhesion of self-adhesive membranes suitable for application temperatures.

.2 Roofing membrane with non-woven polyester reinforcement and glass grid and elastomeric bitumen. Top face covered with thermofusible plastic film, underside self-adhesive and protected by silicone release paper in accordance with CGSB 37-GP-56M type 2, class C, grade 1.

.3 Components:

.1 Reinforcement: Non-woven polyester and glass grid.

.2 Elastomeric bitumen: Mix of selected bitumen and SBS polymer.

.3 Mark top face with lines to ensure proper roll alignment.

.4 Characteristics:

.1 Cold bending at minimum -25°C: No cracking

.2 Softening point: ≥ 110°C

.3 Reinforcing weight: minimum 160 g/m^2

.4 Membrane Thickness: minimum 2.5 mm

.5 Basis-of-Design:

.1 Soprema, Sopralene Flam Stick

.2 Soprema, Sopralap

.3 Roofing cap sheet membrane for field surfaces and flashings and parapets:

.1 Description: Roofing membrane composed of SBS modified bitumen with a composite reinforcement and elastomeric bitumen. The surface is protected with coloured granules. The underface is covered with a release film.

.1 Coloured Granules: grey.

.2 In conformance with: ASTM D6162

.3 Properties:

		MD	XD
.1	Strain Energy (kN/m)	7.8	7.2
.2	Breaking Strength (N/50 mm)	15	13.5
.3	Ultimate Elongation (%)	60	65
.4	Tear Resistance (N)	125	

.5	Static Puncture Resistance (N)	560	
.6	Dimensional Stability (%)	0.2	0
.7	Plastic Flow (°C)	≥ 110	
.8	Cold Bending (at –30°C)	No Cracking	
.9	Lap Joint Strength (kN/m)	Pass > 4kN/m	

.2 Basis-of-Design:

.1 Soprema, Sopraply Traffic Cap 560

2.8 FASTENERS

.1 Roofing fasteners: cadmium-plated flat-headed, self-tapping screws, No. 12 of Type A or AB, in conformance with SCA B35.3

.1 Conforms to ASTM D6162

.2 Basis of Design:

.1 Soprema SopraFix Fasteners and Plates, as required to meet loads

.2 Miscellaneous metal framing: Cold rolled steel framing in accordance with CSA S136, and as follows:

.1 Z-Girts: Slotted or non-slotted web, face flange min 32 mm wide, attachment flange min. 22 mm wide, depth to suit insulation thickness, minimum 0.7 mm nominal bare metal thickness

.3 Metal framing fasteners: Type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates as recommended by manufacturer.

2.9 ACCESSORIES

.1 Perimeter Fire Seal: SBS modified bitumen, minimum 60 gm/m^2 glass fleece reinforced, self adhering membrane having sanded top face, cut into strips minimum 150 mm wide x nominal 1.5 mm thick.

.1 Acceptable Materials:

.1 Sopraguarde Tape, Soprema

.2 Flashing and sheet metal in accordance with section 07 62 00 – Sheet Metal Flashing and Trim.

.3 Waterproofing Mastic: Black, solvent based mastic containing SBS modified bitumen, fibres and mineral fillers.

.4 Torches: Use only torches designed for torching roofing material and acceptable to manufacturer.

2.10 PIPE SUPPORTS

.1 Roof drain pans, vent stack covers and other roof penetration flashings: pre-manufactured, stainless steel construction, purpose-made to suit application and location, designed to tie-in to SBS modified membrane roofing systems.

Part 3 Execution

3.1 QUALITY OF WORK

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and ARCA Roofing Manual.

.2 Do priming in accordance with manufacturers written recommendations.

.3 The interface of the walls and roof assemblies will be fitted with durable rigid material sheet metal and plywood providing connection point for continuity of air barrier.

.4 Assembly, component and material connections will be made in consideration of appropriate design loads.

3.2 EXAMINATION OF ROOF DECKS

.1 Verification of Conditions:

.1 Inspect with Consultant deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed. The start of roofing work will mean roofing conditions are acceptable for work completion.

.2 Evaluation and Assessment:

.1 Prior to beginning of work ensure:

.1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.

.2 Curbs have been built.

.3 Roof drains have been installed at proper elevations relative to finished roof surface.

.4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

.3 Do not install roofing materials during rain or snowfall.

.4 Provide fire protection during installation.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover walls, walks, sloped roofs and adjacent work where materials hoisted or used. Roofing Contractor shall assume full responsibility for damage.

.2 Use warning signs and barriers. Maintain in good order until completion of Work.

.3 Clean off drips and smears of bituminous material immediately.

.4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.

.5 Protect roof from traffic and damage. Comply with precautions deemed necessary by Consultant.

.6 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.

.7 Metal connectors and decking shall be treated with rust proofing or galvanization.

3.4 SHEATHING

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

.2 Attachment flange or bearing edge to be a minimum of 50 mm wide or doubled up at sheathing panel board edges.

.3 Install sheathing with the long edges perpendicular to the framing. Panels may be installed with either surface against the framing.

.4 Use adhesive at board joints.

.5 Fasten each panel to framing in accordance with manufacturer's recommendations.

.6 Install rows of sheathing in a running bond pattern so that end joints fall over the centre of the framing members and are staggered by at least two supports from where the end joints fall in adjacent rows.

3.5 PRIMING DECK

.1 Apply deck primer to deck substrate at the rate recommended by manufacturer.

.2 Surfaces to be primed must be free of rust, dust or any residue that may hinder adherence.

.3 Cover primed surfaces with roofing membrane within time limits recommended by roofing membrane system manufacturer.

3.6 VAPOUR RETARDER INSTALLATION

.1 Install self adhering air/vapour barrier membrane by unrolling air/vapour barrier membrane onto substrate aligned with substrate materials starting at bottom of slope without removing silicone release sheet, and as follows:

.1 Align roll parallel to steel deck flutes supporting membrane overlaps on top of flute along entire length.

.2 Peel back one end of silicone release sheet and adhere membrane to substrate; peel remaining release sheet at a 45° angle to avoid wrinkles in membrane.

.3 Cut roll and start again where membrane is not properly aligned to deck flutes; re-align membrane and overlap end of misaligned piece by 150 mm.

.4 Overlap adjacent membranes by 75 mm; overlap end laps by 150 mm; stagger end laps by 300 mm; place thin sheet of metal under end lap of membrane to provide structural support to lapped membranes.

.2 Overlap roof air/vapour barrier to wall air/vapour barrier using compatible continuity strip to provide continuity of building envelope.

3.7 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

.1 Insulation - mechanically fastened application:

.1 Fasten insulation as per manufacturer's written recommendations.

.2 Number and pattern of screws per board to meet Factory Mutual requirements.

.3 Hold insulation in place with girt furring and framing members with spacing as indicated on Drawings. Securely attach narrow flanges of furring members to roof deck with screws spaced 600 mm O.C.

.4 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.5 Cut end pieces to suit.

.6 Extend insulation in thickness indicated to cover entire roof in accordance with installation requirements in Section 07 21 13 and as indicated on Drawings.

.7 Install tapered insulation in accordance with shop drawings. Stagger joints between layers 150 mm minimum.

.2 Insulating base sheet panel – mechanically fastened application:

.1 Mechanically fasten boards with screws and plates designed for membranes.

.2 Install mechanical fasteners in the centre of the membrane side selvedge and on board surface at a rate recommended by manufacturer.

.3 Install mechanical fasteners on the field surface, on the roof perimeter, and on corners.

.4 Avoid the formation of wrinkles, swellings, or fishmouths.

.5 Line up end laps of the cover boards (not staggered) and apply primer as per manufacturer's recommendations and allow to "flash off" in preparation for the application of the self-adhesive cover strip membrane.

.6 Self-adhesive cover strip membrane shall be applied over each primed end lap of the cover board, rolled into place and a hot air welder or propane torch is required to heat seal the side and end laps.

.7 Avoid the formation of wrinkles, swellings or fishmouths.

.8 Prior to installation of cap sheet, cover all exposed fasteners with square patches of heat-applied MBM flashing or stripping materials. Patches to be minimum 150 mm in size, or per manufacturer specifications.

.3 Perimeter Fire Seal Application

.1 Apply perimeter fire seal to roof perimeter and curb substrates prior to applying base sheet materials. Apply fire seal to vertical joints in parapet or curb sheathing, and at vertical corners.

.2 Extend fire seal minimum 50 mm up parapet faces and extend fire seal minimum 75 mm onto adjacent substrates. Ensure air bubbles and fish mouths are removed.

.3 Install perimeter fire seal to act as temporary moisture seal until installation of flashing materials.

.4 Reinforced gusset installation:

.1 Install gussets at every angle, and on inside and outside corners.

.2 Install self adhesive gussets before installing self adhesive base sheet flashing membranes.

.5 Base sheet flashing installation:

.1 Apply base sheet flashing when primer coat is dry and in accordance with manufacturer's written instructions.

.2 Position pre-cut membrane pieces; peel back 100 mm to 150 mm of silicone release paper to hold the membrane in place at the top of the parapet, then gradually peel back remaining silicone release paper, pressing down on the membrane with aluminium applicator to provide good adhesion and to provide smooth transition between up-stand and field surface; smooth entire membrane surface with a roller for full adhesion.

.3 Cut off corners at end laps being covered by next roll.

.4 Install a reinforcing gusset in all inside and outside corners.

.5 Seal overlaps at the end of each workday.

.6 Cap sheet application – torched:

.1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.

.2 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).

.3 Weld cap sheet onto base sheet with torch recommended by membrane manufacturer. During application, simultaneously melt both designated contact surfaces so a bead of bitumen is apparent as cap sheet unrolls.

.4 Avoid overheating. Take care to avoid excessive bitumen bleed-out at joints during installation.

.5 Unless overlap widths differ between cap and base sheets, make sure joints between the two layers are staggered by at least 300 mm.

.6 Overlap cap sheet side laps by 75 mm and end laps by 150 mm. Cut off corners at end laps to be covered by next roll. Overlap surfaces must be granule-free or degranulated.

.7 Complete welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam.

.8 Once cap sheet is installed, carefully check overlapped joints. Leave bleed-out at joints ungranulated until inspected and accepted by the roofing inspector. Apply coloured granules to bleed-out area by priming with self-adhesive primer, and while still tacky shake granules onto surface and press into place.

.7 Cap Sheet Flashings Application:

.1 Install cap sheet flashing in 1 m widths. Overlap side by 100 mm. Stagger base and cap sheet overlaps by minimum 100 mm. Make overlaps 150 mm wide.

.2 Draw parallel chalk line 150 mm from parapet or upstand bases. Sink surface granules into bed of hot bitumen with torch from chalk line to parapet or upstand.

.3 Adhere cap sheet to base sheet membrane starting from bottom and working to top using trowel grade adhesive applied with 5 mm notched steel trowel at a rate recommended by membrane manufacturer; use

roller to apply even pressure over entire surface to provide uniform adhesion across entire surface.

.8 Roof penetrations:

.1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.8 FIELD QUALITY CONTROL

.1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Owner in cooperation with Consultant.

.2 Inspection fees will be paid by Owner, in accordance with Section 01 45 00 – Quality Control.

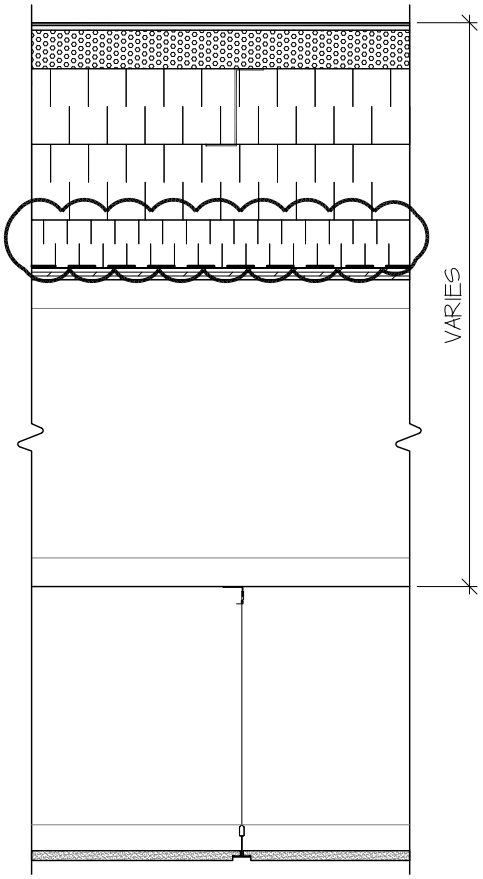
3.9 CLEANING

.1 Remove bituminous markings from finished surfaces.

.2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION

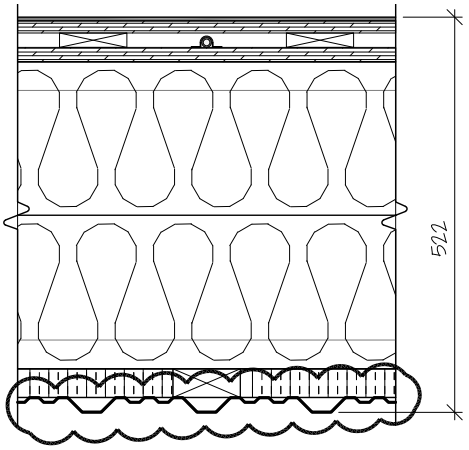


R2

SLOPED INSULATION ROOF ASSEMBLY (R-VALUE VARIES, R-52 MIN.)

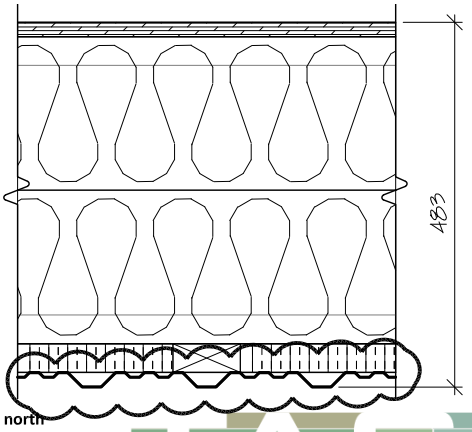
4 mm GRANULAR SURFACED MODIFIED BITUMEN MEMBRANE CAP SHEET, TORCH APPLIED (MBM)
56 mm LAMINATED BASE SHEET BOARD, FASTENED TO STEEL Z-GIRTS BELOW (R-12). COVER EXPOSED FASTENER HEADS WITH MBM PATCHES ACCORDING TO MANUFACTURER SPECIFICATIONS.
102 mm EXTRUDED POLYSTYRENE INSULATION (XPS), FASTENED TO STEEL Z-GIRTS (R-20)
102 mm GALVANIZED STEEL Z-GIRTS, 600 mm O.C. , FASTENED THROUGH LOWER LAYER OF INSULATION TO PLYWOOD SHEATHING
102 mm EXTRUDED POLYSTYRENE INSULATION (XPS), FASTENED TO PLYWOOD SHEATHING (R-20)
SLOPED EXTRUDED POLYSTYRENE INSULATION (XPS), FASTENED TO PLYWOOD SHEATHING (THICKNESS AND R-VALUE VARIES)
1 mm MODIFIED BITUMEN MEMBRANE AIR AND VAPOUR BARRIER, ADHESIVE APPLIED
16 mm TONGUE AND GROOVE PLYWOOD SHEATHING
WOOD I-JOISTS PER STRUCTURAL
CEILING FINISH PER FINISH SCHEDULE

TYPICAL FLOOR ASSEMBLY (R-70)



F1

FLOOR FINISH AS PER FINISH SCHEDULE
16 mm GOOD-ONE-SIDE PLYWOOD (G1S) SUBFLOOR
19x89 mm WOOD SLEEPERS, 300 mm O.C., COORDINATED WITH IN-FLOOR HEATING TUBING (SEE MECH.)
13 mm PLASTIC TUBING FOR IN-FLOOR HEATING (SEE MECH.)
19 mm TONGUE AND GROOVE PLYWOOD FLOOR SHEATHING, JOINTS CAULKED AND SEALED TO BE CONTINUOUS WITH WALL AIR AND VAPOUR BARRIER (AIR AND VAPOUR BARRIER)
2x203 mm MINERAL WOOL BATT INSULATION (R-64)
WOOD I-JOISTS PER STRUCTURAL
38x89 mm WOOD SLEEPERS, 600 mm O.C.
38 mm SEMI-RIGID MINERAL WOOL INSULATION (R-6)
19 mm DIAMOND RIB NATURAL FINISH GALVALUME SIDING, 26 GAUGE, FASTENED TO WOOD SLEEPERS
SPACE FRAME FOUNDATION PER STRUCTURAL



F2

MECHANICAL ROOM FLOOR ASSEMBLY (R-70)

FLOOR FINISH AS PER FINISH SCHEDULE
19 mm TONGUE AND GROOVE PLYWOOD FLOOR SHEATHING, JOINTS CAULKED AND SEALED TO BE CONTINUOUS WITH WALL AIR AND VAPOUR BARRIER (AIR AND VAPOUR BARRIER)
2x203 mm MINERAL WOOL BATT INSULATION (R-64)
WOOD I-JOISTS PER STRUCTURAL
38x89 mm WOOD SLEEPERS, 600 mm O.C.
38 mm SEMI-RIGID MINERAL WOOL INSULATION (R-6)
19 mm DIAMOND RIB NATURAL FINISH GALVALUME SIDING, 26 GAUGE, FASTENED TO WOOD SLEEPERS
SPACE FRAME FOUNDATION PER STRUCTURAL

project north
true north

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Addendum No. 004

Envelope Assemblies

NUNAVUT WATER BOARD NEW OFFICE BUILDING

date:	design by:	project #:	SK #:
2018-02-28	S.T.	TAG: 17-017	ASK-002
scale:	drawn by:		from dwg #:
1:10	C.O.		A601