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Bid Receiving Public Works and Government
Services Canada/Réception des soumissions
Travaux publics et Services gouvernementaux
Canada
800 Burrard Street, Room 219
800, rue Burrard, pièce 219
Vancouver
British Columbia
V6Z 0B9
Bid Fax: (604) 775-9381

SOLICITATION AMENDMENT

MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Public Works and Government Services Canada -
Pacific Region
800 Burrard Street, Room 219
800, rue Burrard, pièce 219
Vancouver
British C
V6Z 0B9

Title - Sujet Roof Replacement	
Solicitation No. - N° de l'invitation F1700-150961/A	Amendment No. - N° modif. 002
Client Reference No. - N° de référence du client	Date 2016-01-22
GETS Reference No. - N° de référence de SEAG PW-\$PWY-005-7711	
File No. - N° de dossier PWY-5-38349 (005)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2016-01-29	
Time Zone Fuseau horaire Pacific Standard Time PST	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Pillay, Sal (PWY)	Buyer Id - Id de l'acheteur pwy005
Telephone No. - N° de téléphone (604) 775-9386 ()	FAX No. - N° de FAX (604) 775-6633
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: DFO - West Vancouver Lab - West Vancouver, BC	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

Solicitation No. - N° de l'invitation
F1700-150961/A
Client Ref. No. - N° de réf. du client

Amd. No. - N° de la modif.
002
File No. - N° du dossier
pwy-5-38349

Buyer ID - Id de l'acheteur
pwy005
CCC No./N° CCC - FMS No/ N° VME

Please find following Addendum #2.

All other terms and conditions remain unchanged.

Addendum 2

p1|2

Project No	5437	Date	January 21, 2016
Project	Centre for Aquaculture and Environmental Research ROOF REPLACEMENT 4160 Marine Drive West Vancouver, BC Department of Fisheries and Oceans - West Vancouver Laboratory		

The following supplements and/or supersedes the bid documents issued on January 15, 2016.

This Addendum forms part of the contract documents and is to be read, interpreted and co-ordinated with all other parts. The cost of all contained herein is to be included in the contract sum. The following revisions supersede the information contained in the original drawings and specifications issued for the above-named project to the extent referenced and shall become part thereof. Acknowledge receipt of this Addendum by inserting its number and date on the Tender Form. Failure to do so may subject the Bidder to disqualification.

Previous addendum:

- Addendum 1 dated January 15, 2016

Enclosure:

- Architectural drawings
- Architectural Specifications
- Structural Addendum S-2
- Questions and Answers
- Sign-in sheets for the site visit of January 17 and January 21, 2016

ARCHITECTURAL

DRAWINGS

A201 Roof Plan

Add: Note: Roof 3.2

- Existing grille to be replaced.

Add: Note: Roof 3.4

- Mechanical Unit / fume vents / exhaust fans (north side)
- Remove existing floating concrete pad to facilitate replacement of existing roofing materials underneath concrete pad.
- Reinstall concrete pad after completion of type R1 roofing assembly with the following properties:
 - Strength: 32 MPa
 - W/C Ratio: 0.45
 - Air Entrain: 5% To 8%
 - Slump: 80 Mm +/- 30 Mm
 - Cement Type: G.U.
 - Finish: Conventional (smooth)
 - Concrete Slab Thickness: 100 mm
 - Reinforcing: 10m @ 400 mm o/c each way at mid-depth of slab plus 10m cont. around perimeter plus 10m x 1000 mm long each way extra at each steel column penetration

- Reinstall mechanical equipment on top of concrete slab with new anchors.
- Removal of existing steel frame for chimney exhaust is not required.
- Existing steel columns to be repainted w/ rust-inhibitive paint.

Add: Note: Roof 3.7 & 3.8

- Existing planter to be removed for re-roofing and relocated as per DFO's direction on-site.
- Finish as per roof type R1 assembly.
- If existing, green roof water line is to be removed and capped.

Delete: Note: Roof 3.11

- Existing equipment to be disconnected, moved and reconnected.
- Equipment and curb profiles to match existing locations U.N.O
- Remove all existing curbs & replace with new curbs as required by mechanical equipment.

A202 Roof Plan & Details**Add: Note:**

- Overlay to continue over tapered insulation

A301 Details**Add: Note:**

- Metal base flashing

A302 Details**Add: Note:**

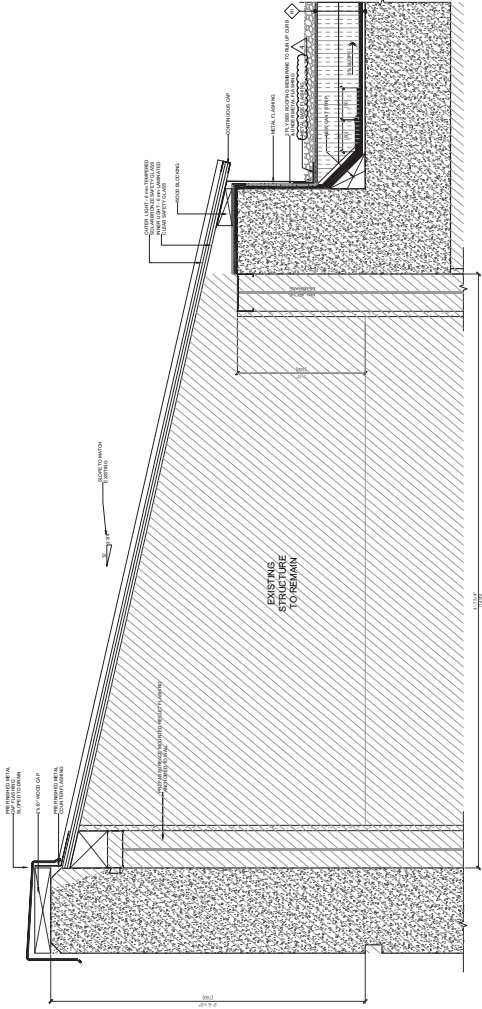
- Metal flashing **and fascia board to be repaired /** reinstalled correctly.
- Metal base flashing

SPECIFICATIONS**07540 SBS MODIFIED BITUMEN MEMBRANE**

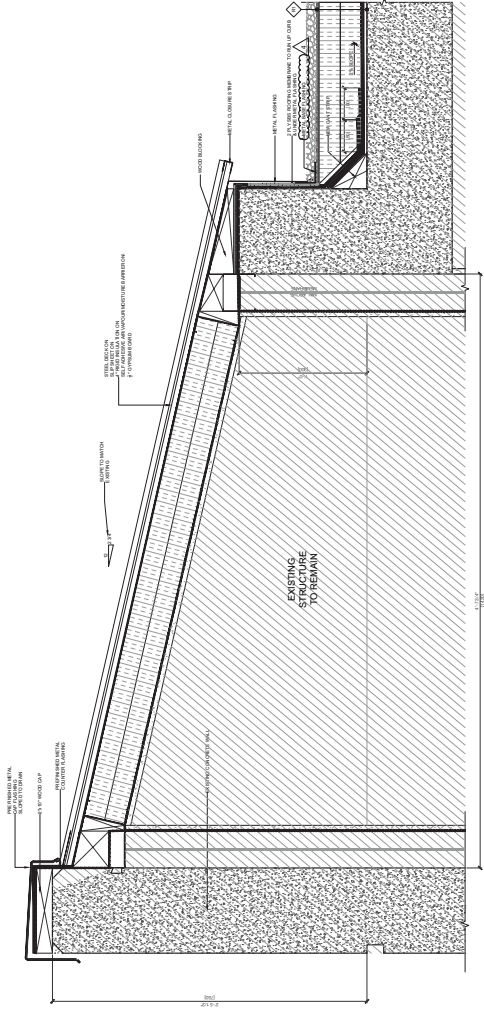
2.7 Support Panel

Add: .3 Accepted Alternate: 1/2" SECUROCK® GYPSUM-FIBER ROOF BOARD by USG**STRUCTURAL****Add:** See attached Structural Addendum S-2

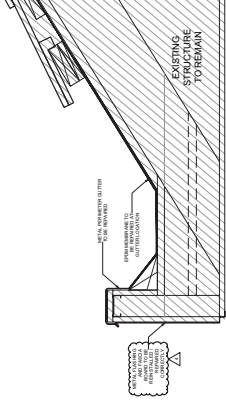




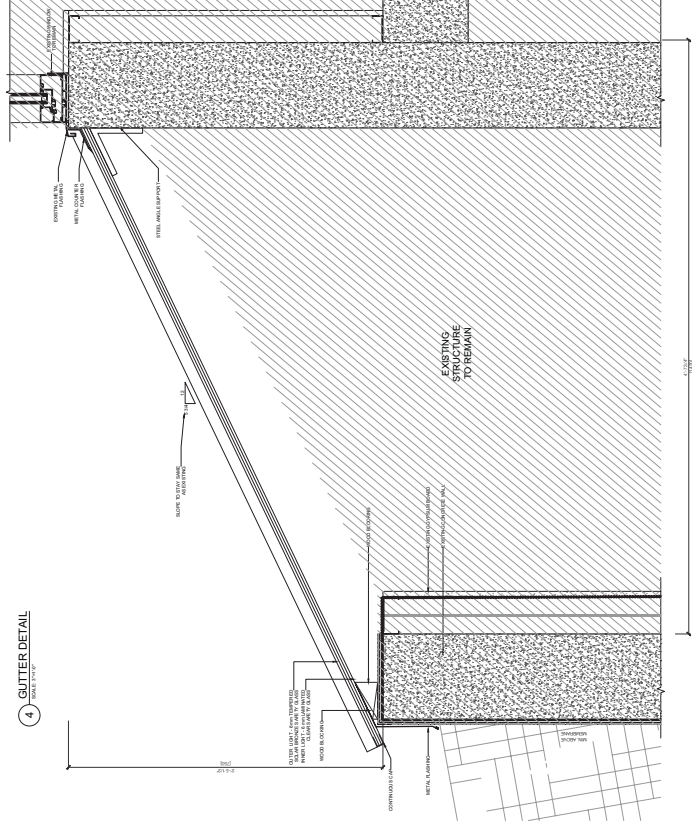
1 SKYLIGHT DETAIL
 SCALE: 1/8" = 1'-0"



2 SKYLIGHT DETAIL
 SCALE: 1/8" = 1'-0"



3 GUTTER DETAIL
 SCALE: 1/8" = 1'-0"



4 SKYLIGHT DETAIL
 SCALE: 1/8" = 1'-0"

1	EXISTING STRUCTURE TO REMAIN
2	NEW ROOF
3	NEW WALL
4	NEW FLOOR
5	NEW CEILING
6	NEW ROOF DRAIN
7	NEW ROOF FLASHING
8	NEW ROOF GUTTER
9	NEW ROOF DRAINAGE
10	NEW ROOF FLASHING
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100	NEW ROOF FLASHING

Structural Addendum S-2

Project No	5437	Date	January 21, 2016
Project	Centre for Aquaculture and Environmental Research – ROOF REPLACEMENT 4160 Marine Drive West Vancouver, BC Department of Fishery and Oceans – West Vancouver Laboratory		

The following supplements and/or supersedes the bid documents issued on December 22, 2015.

This Addendum forms part of the contract documents and is to be read, interpreted and co-ordinated with all other parts. The cost of all contained herein is to be included in the contract sum. The following revisions supersede the information contained in the original drawings and specifications issued for the above-named project to the extent referenced and shall become part thereof. Acknowledge receipt of this Addendum by inserting its number and date on the Tender Form. Failure to do so may subject the Bidder to disqualification.

STRUCTURAL

A Proponent asked if a Bobcat can be used on the roof to aid in the removal of the existing landscaping on the Laboratory section of the building. We are providing this Memorandum in response to that inquiry.

Construction Means and Methods

The Contractor is responsible for ensuring construction activities do not result in overloading the existing structural capacity of the building and do not result in damage or distress to the building structure and non-structural components. The Contractor shall ensure that no part of the building is subjected to a load which will endanger the safety of the building or its occupants and workers. The Contractor's use of a Bobcat, temporary placement of construction materials, and temporary stockpiling of existing landscaping materials on the roof are some examples of construction loading that could result in loading conditions worse than that which the building structure was originally designed for. Temporary bracing/shoring, proposed construction loading, construction sequencing, and all other construction related activities are the sole responsibility of the Contractor, who is responsible for hiring their own Professional Engineer, as required, to ensure that the above conditions are satisfied.

Structural Design Loads for Existing Laboratory Roof

Based on our review of the existing drawings, the original design loads for the roof of the Laboratory building are unclear:

- The original design snow load for the roof is 1.75 kPa; however, it is not clear whether or not the original roof was designed for additional snow accumulation in lower roof areas, such as around the office penthouse area.
- The design dead load for the Laboratory roof is not provided on the original drawings, so it is unknown what allowances were made for roofing materials, landscaping and ballast above the roof and for non-structural components below the roof.

DNA has not carried out a structural analysis of the gravity load-carrying capacity of the existing structure to verify the magnitude of loads it can safely support.

(continued on next page)...

Use of Bobcat on the Roof

It is the Contractor's responsibility, through confirmation by and guidance from their own Professional Engineer, to determine whether or not a Bobcat can be used on the roof to aid in the removal of the existing landscaping materials and under what conditions it may be used. It may be feasible to use a small Bobcat, such as a Bobcat S70 Skid Steer Loader (operating weight of 2845 lb), on the existing Laboratory roof areas 3.4 and 3.6, which are defined in page A201 of the 2015.12.22 Issued For Tender drawings. However, the ability to use this Bobcat or others, along with the conditions and limitations associated with its use, are the Contractor's responsibility to confirm through consultation with their own Professional Engineer.

The following items should be considered by the Contractor considering to use a Bobcat on the roof.

1. If more than one Bobcat is proposed to be used, the Contractor should assess the impact of having both of them in the same area of the roof at the same time. Minimum spacing requirements between Bobcats should be outlined if required.
2. It is likely not conceptually feasible to use the Bobcat on the roof when there is snow or ponding water on the roof, unless more detailed analysis is done to verify the existing structural capacity of the building.
3. We recommend that the Contractor inspect the operation of all roof drains and ensure they are functioning efficiently. The roof drains should remain clear and free of obstructions for the duration of the roof replacement.
4. Should a Bobcat be used on the roof, care should be taken during operation to ensure no damage is inflicted on the existing structural and non-structural building components that are to remain post-roofing.
5. The use of a Bobcat on the roof should consider the effects of other construction loading conditions, including stockpiling of construction or landscaping materials, movement of materials and workers, other construction equipment, etc.
6. The Contractor shall have a construction plan in place that clearly identifies guidelines for construction activities on the roof to prevent overloading the existing roof structure and causing damage to structural and non-structural building components.

Questions & Answers

p1|3

Project No	5437	Date	January 21, 2016
Project	Centre for Aquaculture and Environmental Research ROOF REPLACEMENT 4160 Marine Drive West Vancouver, BC Department of Fisheries and Oceans - West Vancouver Laboratory		

1. Can we use the existing metal ladder inside the Aeration Tower to access the roof?

Yes, you can use it as long as there is no disruption to the circulation water system inside the Tower.

2. General existing Mechanical Equipment questions.

- All existing mechanical equipment is to be disconnected, moved & reconnected to its existing operational condition.
- All equipment and curb profiles are to match existing locations and dimensions unless otherwise noted.
- Remove all existing curbs and concrete pads (when pads are not tied to existing concrete deck) & replace with new curbs/pads as required by mechanical equipment.

3. Treatment of the Mechanical Unit located on the north side of the green roof (fumes vents, exhaust fans).

- The contractor needs to provide DFO with **a week of notice** before interrupting operation of any mechanical equipment. A maximum of 4 days of interruption of the unit is allowed.
- Remove existing floating concrete pad to facilitate replacement of existing roofing materials underneath concrete pad. Reinstall concrete pad after completion of roofing with the following properties:
 - Strength: 32 MPa
 - W/C ratio: 0.45
 - Air Entrain: 5% to 8%
 - Slump: 80 mm +/- 30 mm
 - Cement Type: G.U.
 - Finish: Conventional (smooth)
 - Concrete Slab Thickness: 100 mm
 - Reinforcing: 10M @ 400 mm o/c each way at mid-depth of slab plus 10M cont. around perimeter plus 10M x 1000 mm long each way extra at each steel column penetration
- Reinstall mechanical equipment on top of concrete slab with new anchors.
- Removal of existing steel frame for chimney exhaust is not required.

4. What are we doing with the existing green roof water lines?

Existing green roof water lines are to be removed. The water supply line to the roof needs to be closed (there is one shut off valve in the building) and permanently capped.

5. How will we be accessing roofs to do the job?

General contractor/roofing contractor will provide its own means of roof access. No access to the roofs will be provided/allowed from the inside of the buildings.

6. What is the structural design load for the existing concrete roof? And is it possible to use a bobcat to help in removing the gravel/landscaping?

See Structural S-2

7. What are the existing roof assemblies?

#	Existing Roof Assembly	#	Existing Roof Assembly
3.1	2 Ply SBS roofing membrane 1/2" Fibreboard 2" Rigid insulation Steel deck	3.2	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck
3.3	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck	3.4	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck
3.5	Sloped glazed dual pane sealed units Metal mutton bars Infill red corrugated metal panel	3.6	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck
3.6a	Sloped glazed dual pane sealed units Metal mutton bars Infill red corrugated metal panel	3.7	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck
3.8	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck	3.9	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck
3.10	Concrete tiles Single Ply EPDM membrane Wood deck Insulation: not determined	3.11	Concrete canopy
3.12	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Wood deck Concrete deck	3.13	Gravel ballast Polyester Scrim Sheet 2" Rigid insulation Single Ply EPDM membrane Concrete deck
3.14	Sloped glazed dual pane sealed units Metal mutton bars		

- 8. Can a standard low E 272 glass be used for the skylights instead of the specified solar bronze? The low E glass is just as effective at keeping the heat out, brings more light into the rooms below, and is more cost effective.**

See specifications Section 08800 Glazing, Part 2 Products, 2.1.3 Materials

- 9. On the west side of the building, one of the planters sits about 3 feet on top of the lower roof. Please provide the finishing details and does the planter need to be reinstated?**

Existing planter is to be removed and relocated as per DFO's directions and requirements to be provided on-site. Roof is to be finished as per Roof assembly Type R1. Green roof water line is to be removed and capped if existing.

- 10. Information: All overhanging trees and vegetation will be cleared from overhanging the project area by the end of January.**

Yes

- 11. Is the lower skylight on the East side of the building that is used as a canopy included in this contract to be replaced?**

No

- 12. Can the contractors/roofing contractors use the driveway at the back of the building (north side) as a laydown area?**

Yes

West Van Lab Roofing Project - Sign-In

Location: West Vancouver Lab

Date & Time: January 18th, 2016 at 10am

Company Name	Name of Representative	Phone & Email Address
Transwest Roofing Ltd	Ray Grabowski	604-596-7440 ray@transwestroofing.com
WEST COAST BUILDING COATINGS	GABE UKRAINEZ	604 839 3174 GABE@WESTCOASTBUILDING.CO
Olympic Roofing	Dean Dettamel Ernesto Sandoval	604-552-4743 info@olympicroofing.ca
MARIC KING ROOFING	RICHARD McNAUGHTON	604 759-7121 richard@machkirkroofing.com
Spectrum Skyworks	James Peters	604 944 8477 James@spectrumskyworks.com
NAICO CONSTRUCTION	EBERTH WACHONG	EWACHONG@NAICOCONSTRUCTION.COM 604 942 2140
NAICO CONSTRUCTION	Edgar Novans	edgar@naicoconstruction.com 778-991-7858
Flynn Canada Ltd.	Ray Vincenzo	604-830-2248 ray.vincenzi@flynn.ca
Cascade Roofing	Corey Corvoni	604 991-0633 Corey@CascadeRoofing.ca

Nelson Roofing

Brady Thorp

778 317-7249 brady@nelsonroofing.com

METAS ROOFING

DAN KIMASEY

604-558-4856 DAN.METROKROOFING@SHAW.CA

ADVANCED SYSTEMS

Nikho Stevens

604 341 5765. nstevens@advancedsys.ca

West Van Lab Roofing Project - Sign-In

Location: West Vancouver Lab
 Date & Time: January 21st, 2016 at 2pm

Company Name	Name of Representative	Phone & Email Address
U&W Glass Innovations	Walter Sclaf	604-319-0725 42733-228 vanster@kardw.ca
BONNIE ENTERPRISES	GEORGE BOGNAR	778 378-1835-george18.bogie@gmail.com
Transwest	Ray Grubowski	604-596-7448 ray@transwestroofs.com
EBERTH WACHOW	NAVCO CONST.	obeth@navcoconstruction.com
EDGAR NAVARRO	NAVCO CONST.	edgar@navcoconstruction.com

PART 1 - GENERAL**1.1 GENERAL**

- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- .2 Employ skilled applicators approved by membrane manufacturer.

1.2 REFERENCE STANDARDS

- .1 Roofing and sheet metal work will be performed in conformance with the roofing manufacturer's written recommendations as well as the requirements of the ULC.
- .2 Submit a document issued by the CSA certifying that the roofing system offered meets the requirements of CAN/ULC-S107-03 "Standard Methods of Fire Tests of Roof Coverings Class C
- .3 CSA A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
- .4 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft)-1985, Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .5 CAN/ULC-S702-97 Thermal Insulation, Mineral Fibre, Boards for Buildings.
- .6 CAN/ULC-S704-2001 Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.
- .7 All membrane roofing systems installed shall conform to the CSA A123.21-14 Standard test method for the dynamic wind uplift resistance of membrane roofing systems.
- .8 Conform to the latest "Minimum Standards" of the Roofing Contractors Association of British Columbia (RCABC) as published in the "RCABC Roofing Practices Manual" for a ten (10) year guarantee. Conform to the appropriate CCMC, CSA, CGSB, FM and ASTM Standards for the materials used in the roofing system specified; materials to be listed on RCABC Accepted Materials List (Section 2.2, Roofing Practices Manual) Submit a report, issued by a certified materials testing laboratory, attesting that the specified roofing system was tested in accordance with CSA A123.21-14, *Standard test method for the dynamic wind uplift resistance of membrane-roofing systems*.

1.3 COMPATIBILITY

- .1 All waterproofing materials will be provided by the same manufacturer.

1.4 INSPECTION AND GUARANTEE

- .1 Perform using an independent inspection company acceptable to RCABC and Roofing Manufacturer.
- .2 Inspection costs paid for directly by the Roofing Contractor.
- .3 Provide to the Owner the "RCABC Roofing System Record" upon completion of this contract.

-
- .4 Provide the standard Roofing Contractors Association of British Columbia (RCABC) ten (10) year guarantee.
 - .5 The product manufacturer to issue a written and signed document in the owner's name, certifying that the roofing membranes are free of manufacturing defects for a period of ten (10) years, starting from the date of acceptance. This warranty will cover the removal and replacement of defective roof membrane products, including labour. The warranty must remain a full warranty for the duration of the period specified. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.
- 1.5 SHOP DRAWINGS**
- .1 Submit shop drawings in conformance with Section 01330 requirements.
 - .2 Provide details of flashing, penetration, parapet wall, and around atrium walls.
 - .3 Submit drawings locating and identifying sloped insulation blocks.
- 1.6 CONTRACTOR QUALIFICATION**
- .1 Roofing contractors and sub-contractors must, when tendering or performing work, possess a roofing contractor operating license.
 - .2 Only qualified, certified installers employed by a company with the appropriate equipment may execute the roofing work.
 - .3 Roofing contractors and sub-contractors must also be members of RCABC and provide the architect with a certificate to this effect before beginning any roofing work.
- 1.7 MANUFACTURER'S REPRESENTATIVE**
- .1 The roofing product manufacturer can delegate a representative to visit the work site at the start of roofing installation.
 - .2 The contractor must at all times enable and facilitate access to the work site by said representative.
- 1.8 STORAGE AND DELIVERY**
- .1 All materials will be delivered and stored in conformance with the requirements described in the manufacturer's manual; they must remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.
 - .2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance. Only materials destined for same-day use can be

removed from this storage area. In cold weather, these materials should be stored in a heated area at a minimum temperature of +10°C and removed prior to application. If rolls cannot be stored in a heated environment, they may be pre-conditioned before installation. For precise description, please consult manufacturer's "Roofers' Guide" on membrane application procedures.

- .3 Store adhesives and emulsion-based waterproofing mastics at a minimum +5°C. Store adhesives and solvent-based mastics at sufficient temperatures to ensure ease of application.
- .4 Materials delivered in rolls will be carefully stored upright; flashing will be stored to avoid creasing, buckling, scratches or any other possible damage.
- .5 Avoid material overloads which may affect the structural integrity of specific roof areas.

1.9 FIRE PROTECTION

- .1 Prior to the start of work, conduct a site inspection to establish safe working practices and make sure that all procedures and proposed changes are approved to minimize the risk of fires.
- .2 Respect safety measures described in the manufacturer's Specifications Manual as well as R.C.A.B.C. recommendations.
- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.
- .4 Never apply the torch directly to old and wood surfaces.
- .5 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 metres of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products. Torches should never be used where the flame is not visible or cannot be easily controlled.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Extruded Polystyrene Insulation Minimum R-20:
 - .1 Description: Type IV extruded polystyrene foam insulation board, staggered, in conformance with CAN/ULC-S701-11.
 - .2 Specified product: 2 layers of 51mm STYROFOAM ROOFMATE by DOW or approved equal extruded polystyrene.
 - .3 Tapered slope package as required to provide slope of min 2%.

2.2 MEMBRANES

- .1 Roof membrane Base Sheet:

- .1 Description: Roofing membrane with heavy-duty polyester reinforcement covered by ASTM 6164. Both the top and bottom surfaces have a thermofusible plastic film.
- .2 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft).
- .3 Specified product: SOPRALENE FLAM 180 by SOPREMA or approved alternate.
- .2 Roof membrane base sheet flashing / parapet:
 - .1 Description: Roofing membrane with glass reinforcement and SBS modified bitumen covered by ASTM 6163. The top face is covered with a thermofusible plastic film. The underface is self-adhesive. The top face must be marked with three (3) distinctive chalk lines to ensure proper roll alignment.
 - .2 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft).
 - .3 Specified products: SOPRAFLASH FLAM STICK by SOPREMA or approved alternate.
- .3 Roofing membrane Cap Sheet, Cap Sheet Stripping, Parapet Cap Sheet:
 - .1 Description: Roofing membrane with heavy-duty polyester reinforcement covered by ASTM 6164. The top face is protected by coloured granules. The under face is covered with a thermofusible plastic film.
 - .2 Specified product: SOPRALENE FLAM 180GR by SOPREMA or approved alternate.
 - .3 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft).
 - .4 ULC certifications, Class C.
- .4 Gutters:
 - .1 Description: Non-woven, polyester fabric coated with a two-component (PMMA) methyl methacrylate-based liquid membrane.
 - .2 Specified product: ALSAN RS FLEECE and ALSAN RS 230 FLASH
- .5 Colour choices:
 - .1 Roofing membrane granular finishes will be of the following colour(s): For regular surfaces: grey.

2.3 ACCESSORY MEMBRANES

- .1 Reinforcement membrane:
 - .1 SOPRALENE FLAM 180 by SOPREMA or approved alternate.

2.4 PRIMER

- .1 Primer for heat welded membranes:
 - .1 Description: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied waterproofing membranes.

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- .2 Specified product: ELASTOCOL 500 by SOPREMA or approved alternate.
 - .2 Primer for self-adhesive membranes
 - .1 Description: ELASTOCOL STICK: Composed of SBS synthetic rubber, volatile solvents, adhesive enhancing resins and volatile solvent used to prime porous substrates and non-porous substrates such as wood, concrete or metal to enhance the adhesion of self-adhesive membranes at temperatures above - 10°C.
 - .2 Specified product: ELASTOCOL STICK by SOPREMA or approved alternate.
- 2.5 FLAME-STOP MEMBRANE**
- .1 Description: Self-adhesive membrane composed of a reinforced glass mat and SBS modified bitumen designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.
 - .2 Specified products: SOPRAGUARD tape by SOPREMA or approved alternate.
- 2.6 COMPLEMENTARY WATERPROOFING PRODUCTS**
- .1 Waterproofing mastic:
 - .1 Description: Mastic made of synthetic rubbers, plasticized with bitumen and solvents. Aluminum pigments are added to SOPRAMASTIC ALU to provide greater resistance to U.-V.
 - .2 Specified product: SOPRAMASTIC [ALU] by SOPREMA or approved alternate.
 - .2 Pitch pocket filler:
 - .1 Description: An aluminum coloured solvent-based mastic containing superior grade bitumen modified with SBS synthetic rubber and fibres. Designed for pitch box filling.
 - .2 Specified product: INTERCLIP SYSTEM by SOPREMA or approved alternate.
 - .3 Sealing product
 - .1 Description: Composed of a bitumen/polyurethane waterproofing mono-component and polyester reinforcements. Designed to finish upstands and details. (no-flame installation).
 - .2 Specified product: ALSAN RS 230 by SOPREMA or approved alternate.
- 2.7 SUPPORT PANEL:**
- .1 Description: 12.7mm fiberglass mat faced gypsum support panel with water-resistant core.
 - .2 Specified Product: ½" DENSDECK ROOF BOARD by GEORGIA PACIFIC or approved equal.

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- .3 Accepted Alternate: ½" SECUROCK GYPSUM-FIBER ROOF BOARD by USG
- 2.8 DRAIN MAT**
- .1 Description: High-strength drainage panel consisting of a polypropylene core with a factory-laminated geotextile.
- .2 Specified product: SOPRADRAIN 10G by SOPREMA or approved alternate.
- 2.9 GRAVEL BALLAST**
- .1 Gravel minimum 16 mm to maximum 35 mm diameter. Gravel shall be round, washed, and exempt of dust, humidity, ice, snow, and foreign objects.
- .2 Thickness: 1 layer (to be confirmed by Contractor) intended to hold down drain mat and insulation layers. Thickness/weight of gravel ballast must be installed as required by CSA A123.21-14, standard test method for dynamic wind uplift resistance of membrane roofing systems.
- 2.10 ROOF GUARD**
- .1 See section 05520 Guardrails and Handrails.
- 2.11 CONCRETE RESTORATION (ROOF ASSEMBLY R4)**
- .1 Waterproofing for existing concrete canopy (R4):
- .1 Description: A waterproofing one-component polyurethane / bitumen resin. Reinforcement mesh approved by manufacturer required for repair of cracks in existing concrete canopy.
- .2 Specified product: ALSAN FLASHING by SOPREMA or approved alternate.

PART 3 – EXECUTION

3.1 SURFACE EXAMINATION AND PREPARATION

- .1 Surface examination and preparation must be completed in conformance with recommendations in the SOPREMA Specifications Manual, particularly for fire safety precautions.
- .2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood blocking) as well as upstands and parapets, construction joints, roof drains, plumbing vents, ventilation outlets and others. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of roofing work will mean roofing conditions are acceptable for work completion.
- .3 Do not begin any work before surfaces are smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other work has been duly completed.
- .5 No materials will be installed during rain or snowfall.

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- 3.2 METHOD OF INSTALLATION**
- .1 Prepare surfaces and complete waterproofing work in conformance with SOPREMA'S requirements, and the "Roofers' Guide"
 - .2 Install roofing elements on clean and dry surfaces, in conformance with manufacturer's instructions and recommendations.
 - .3 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
 - .4 It's preferable to seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.
 - .5 Whenever membranes are torch-applied, a continuous and even bead of molten bitumen must be visible as the membrane is unrolled and torched.
 - .6 Ensure waterproofing conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.).
- 3.3 SITE PROTECTION**
- .1 Protect finished work to avoid damage during roof installation and material transportation. Install protective boardwalks over installed roofing materials to enable passage of people and products. Assume full responsibility for any damage.
- 3.4 CLEANING**
- .1 The work site must be routinely cleared of rubbish and other materials which may hinder roof installation, performance, or present a fire hazard.
 - .2 Carefully collect all roofing debris and dispose of in accordance with Section 01355
- 3.5 EQUIPMENT FOR WORK EXECUTION**
- .1 Maintain all roofing equipment and tools in good working order.
 - .2 Use torches recommended by SOPREMA
- 3.6 PREPARATION WORK CONCRETE DECK**
- .1 Prepare surfaces according to [manufacturer's] [local authorities'] recommendations. Surfaces to be waterproofed with elastomeric bitumen membrane must have a Concrete Surface Profile (CSP) of 3 to 6 (CSP as per the International Concrete Repair Institute).
- 3.7 PREPARATION WORK METAL DECK**
- .1 Prepare surfaces according to [manufacturer's] [local authorities'] recommendations.
- 3.8 APPLICATION PRIMER**
- .1 Roofing substrates of wood, metal, concrete, masonry or gypsum board surfaces will receive a coat of asphalt primer at

manufacturer approved rate. (none required for factory-painted metals). All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Cover primed surfaces with roofing membrane as soon as possible (same day coverage for self-adhesive membranes). [Application temperature limit of +5°C for ELASTOCOL STICK.]

3.10 INSTALLATION OF SUPPORT PANEL

- .1 Support Panels to be mechanically fastened to steel decking as per manufacturer's recommendations to meet CSA A123.21-14, Standard test method for the dynamic wind uplift resistance of membrane-roofing systems.
- .2 All boards must be in perfect connection, without any significant variances in level, and must be completely adhered to the surface.
- .3 [All vertical joints between [flat boards and sloped modules] [the two rows of insulation boards] will be staggered.
- .4 Install only as much insulation as can be covered in the same day.

3.11 INSTALLATION OF FLAME-STOP MEMBRANES

- .1 [Adhere the membrane directly onto an approved substrate by peeling back the silicone release film. SOPRAGUARD TAPE is designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.]
- .2 [Unroll the flame-stop membrane onto the insulation without adhering, being careful to overlap adjacent strips to ensure that the flame will not come in contact with the insulation.]

3.12 INSTALLATION OF TORCH-APPLIED BASE SHEET

- .1 Concrete/support panel surfaces to be primed with Elastocol 500 prior to installation of torch applied base sheet.
- .2 Dry unroll the flame-stop membrane onto the concrete/support panel, being careful to overlap adjacent selvages to ensure that the flame will not penetrate the decking.
- .2 Dry unroll the base sheet membrane on the substrate, taking care to align the edge of the first selvedge with the centre of the drain (parallel to the edge of the roof).
- .3 Base sheet to be torched applied (fully heat welded) to concrete/support panel. Base sheet must be installed as required by CSA A123.21-14, standard test method for dynamic wind uplift resistance of membrane roofing systems. Corners and perimeters must be installed as per manufacturer's requirements.

- .4 Each selvedge should overlap the previous one along the lines provided for this purpose.
- .5 Adhere the first 60 mm (2.5 in) of the self-adhesive side laps using a roller, then heat-weld the last 40 mm (1.5 in) (combined self-adhesive and heat-welded side laps). Heat weld 100mm (4 in) of side laps.
- .6 Seal end laps by welding a 330-mm (13-in) wide protection strip centered on the joint. End laps to be staggered, cover strips are not required.
- .7 Avoid the formation of wrinkles, swellings or fishmouths.

3.13 INSTALLATION OF REINFORCED GUSSETS

- .1 Install gussets at every angle, on inside and outside corners.
- .2 [Heat-weld the gussets in place after installing the thermofusible base sheet membrane.]
- .3 [Install the thermofusible gussets after installing the self-adhesive base sheet membrane.]
- .4 [Install the self-adhesive gussets before installing the self-adhesive base sheet membrane.]

3.14 BASE SHEET FLASHING / PARAPET INSTALLATION (SELF ADHERED)

- .1 Apply base sheet flashing only after primer coat is dry.
- .2 Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply ELASTOCOL STICK to the area to be covered at the foot of the parapets.
- .3 Position the pre-cut membrane piece. Peel back 100 to 150 mm. (4 to 6 in.) of the silicone release paper to hold the membrane in place at the top of the parapet.
- .4 Then, gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.
- .5 Cut off corners at end laps to be covered by the next roll.
- .6 Install a reinforcing gusset in all inside and outside corners.
- .7 Always seal overlaps at the end of the workday.

3.15 ROOFING CAP SHEET INSTALLATION (TORCH-APPLIED MEMBRANE)

- .1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.
- .2 Begin with double-selvedge starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a 75 mm. width.

- .3 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).
- .4 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.
- .5 Avoid overheating.
- .6 Make sure joints between the two layers are staggered by at least 300 mm.
- .7 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. All overlap surfaces must be degranulated.
- .8 Complete perfect welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)
- .9 Once cap sheet is installed, carefully check all overlapped joints.
- 10 [During installation, take care to avoid excessive bitumen bleed-out at joints.]

3.16 INSTALLATION OF CAP SHEETS ON UPSTANDS AND PARAPETS (HEAT-WELDED)

- .1 This cap sheet must be installed in one-metre-wide strips. The side joints must overlap by [75] - [100] mm. and must be staggered by at least 100 mm. with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive membrane thickness. The overlaps on the field surface must be 50 mm. wider than those of the base sheet membrane on the upstands and parapets. At end laps, angle-cut the corners that will be covered by the following roll.
- .2 Use a chalk line to draw a straight line on the field surface 150 mm. from the upstands and parapets.
- .3 Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen [starting from the chalk line on the field surface to the bottom edge of the upstand or parapet as well as] on the granulated vertical surfaces that are to be overlapped.
- .4 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top. This technique softens both membranes in order to obtain even, continuous weld.
- .5 [During installation, be careful not to overheat the membrane or to create [excessive] [bitumen] bleeding at the joints.]

3.17 INSULATION INSTALLATION

- .1 Loose laid insulation on roofing membranes.

- .2 All vertical joints between two rows of insulation board will be staggered.
 - .3 Install only as much insulation as can be covered in the same
- 3.16 INSTALLATION OF DRAIN MAT**
 - .1 Place drain mat on insulation, staggered.
- 3.17 INSTALLATION OF GRAVEL BALLAST**
 - .1 Once drain mat is installed, spread gravel in a uniform fashion in conformance with manufacturers requirements listed in PLPDS 1-29. Thickness: 1 layer (to be confirmed by Contractor) intended to hold down drain mat and insulation layers. Thickness/weight of gravel ballast must be installed as required by CSA A123.21-14, standard test method for dynamic wind uplift resistance of membrane roofing systems.
- 3.18 WATERPROOFING FOR VARIOUS DETAILS**
 - .1 Install waterproofing membranes in conformance with various roofing details illustrated in the manufacturer's manual.
- 3.19 INSTALLATION OF WATERPROOFING FOR CONCRETE RESTORATION (ROOF ASSEMBLY R4)**
 - .1 Prepare existing concrete canopy as per manufacturer's recommendations.
 - .2 Fill cracks with waterproofing one-component polyurethane/bitumen resin (1 layer) with reinforcement mesh. This layer must be thick enough to completely immerse the reinforcement. Reinforcement to be immediately covered with a second layer of waterproofing resin until saturation. Third layer of waterproofing resin to be applied when the second layer is dry and tack free.
 - .3 Apply waterproofing resin in two layers to existing concrete surfaces.

END OF SECTION