



## SPECIFICATION

Project No. R.072866.001  
Public Works and Government Services Canada  
Roof Repairs, FOL Hanger, DND  
Iqaluit, NU  
Solicitation No. ET025-170317/A



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**DIVISION 0 – PROCUREMENT AND CONTRACT REQUIRMENTS**

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**END OF SECTION**

**Part 1            General**

**1.1                MINIMUM STANDARDS**

- .1        Execute work to meet or exceed:
  - .1        National Building Code (Latest Edition) unless more stringent requirements of National Building Code of Canada (Latest Edition) apply, including all amendments up to project date.
  - .2        National Fire Code (Latest Edition)
  - .3        Workers Compensation Act, S.N.W.T. 2007, c.21, in force April 1, 2008, with latest amendments.
  - .4        Northwest Territory & Nunavut Code of Practice, Personal Protective Equipment.
  - .5        Canadian Construction Safety Code (Latest Edition).
  - .6        Rules and regulations of authorities having jurisdiction.

**1.2                Contract Method**

- .1        Construction work to be completed under stipulated price contract.

**1.3                EXAMINATION OF PLANS, SPECIFICATIONS AND SITE OF WORK**

- .1        Bidders shall carefully examine and study all of the contract specifications in order to satisfy themselves by examination as to all conditions affecting the contract, the detailed requirements of the construction and extent of work involved.
- .2        Tenderers shall confirm overall dimensions and quantity of work and notify Department Representative of any discrepancies noted. No consideration shall be given for claims for extra compensations beyond that shown in the documents.

**1.4                DOCUMENTS**

- .1        Keep one copy of contract documents on the site.
- .2        Specifications shall govern over Drawings.
- .3        Where details shown on the drawing or in the specification are not in accordance with manufacturer's requirement, Contractor to notify the Departmental Representative immediately.

**1.5                ADDITIONAL DRAWINGS**

- .1        The Departmental Representative may furnish additional drawings to clarify work. Such documents become part of Contract Documents.

**1.6 AS-BUILT DRAWINGS**

- .1 Obtain from the Departmental Representative at commencement of work, two (2) sets of white prints of drawings for purpose of recording changes and deviations to work as-built.
- .2 Maintain these prints and make available to trades so that all changes and deviations may be recorded promptly as they occur. Be responsible for ensuring that such record of all changes is up to date at all times. Upon completion of work, return these drawings complete and in good condition to the Departmental Representative so that a record of the changes, location of services and equipment are recorded.

**1.7 SUBMITTALS**

- .1 Upon completion of the work and prior to the issuing of the Completion Payment Certificate the Contractor shall submit in the following:
  - .1 Respective guarantees on materials and workmanship in writing and signed as required by the Contract Documents.
  - .2 As-built drawings indicating the locations and approximate shape and size of all repairs carried out under the contract.

**1.8 SUPERVISION**

- .1 Ensure that any defects discovered are corrected before continuing work.
- .2 Ensure site conditions are satisfactory for execution of work. Address to Department Representative all questions on work. The Departmental Representative will transmit verbal instructions through contractor's superintendent.
- .3 The Contractor shall have a competent person for emergency calls after construction hours and during weekends. It shall be the Contractor's responsibility to supply the Departmental Representative with the name and telephone number of the person to be contacted during these periods.

**1.9 PLANT**

- .1 Supply all transportation, labour, materials, shoring, scaffolds, tools, cranes, derricks, plant and equipment to continuously carry out work, in an efficient manner.

**1.10 CO-ORDINATION AND CO-OPERATION**

- .1 Execute work with minimum disturbance to occupants, public and normal use of site and building. Maintain access and exits. Where security has been reduced by work of contract, provide temporary means to maintain security.

**1.11 PROTECTION**

- .1 Be responsible for use of building and premises from time site turned over for execution of contract until final acceptance.

- .2 Protect surfaces and finishes of building, services, equipment, vehicles and pedestrians using building and adjacent areas, and all other conditions and uses, during construction from operations of work. Repair any damage with material and finish to match original.

**1.12 USE OF SITE FACILITIES**

- .1 The Contractor shall provide washroom services.
- .2 The Contractor shall assume all liability for, and be responsible for loss of or damage to, all equipment and materials stored on site, and for any equipment or materials delivered from whatever source to the site of the work.
- .3 The Contractor shall arrange, pay for connection fee and maintain temporary electrical power supply in accordance with governing regulations and ordinances. The Contractor shall be responsible for all cost associated with the use of temporary electrical power supply.

**1.13 TEMPORARY FACILITIES AND SERVICES**

- .1 The Contractor shall provide and maintain temporary facilities and services required to carry out the work.
- .2 At the completion of the work, all temporary connections and equipment shall be removed and the services and finishes shall be made good by the Contractor to the satisfaction of the Departmental Representative.

**1.14 SITE ACCESS**

- .1 The Contractor shall provide access to and about the site to ensure continuous and efficient delivery and movement of materials and equipment. Arrange routes so that they do not conflict with DND and airport authority operations.

**1.15 GARBAGE**

- .1 Provide garbage container for use by all trades and maintain it a safe distance from finished work in a location approved by the Departmental Representative and the airport authority.

**1.16 INTERFERENCE**

- .1 Work requiring the shutdown of any of the buildings existing services or equipment must not be done without prior written approval, and according to the agreed construction schedule unless other arrangements are specifically arranged for through the Department Representative.

**1.17 MATERIAL AND EQUIPMENT**

- .1 Use new products unless otherwise specified. Deliver and store material and equipment with manufacturer's labels and seals intact.

- .2 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

**END OF SECTION 01 00 50**

**Part 1            General**

**1.1               GENERAL CONDITIONS**

- .1       Sections of division 1 - general requirements, as applicable, shall form part of this summary and scope of work and of the contract.
- .2       Each Contractor shall examine and become familiar with the work, specifications and drawings of all other Contractors which may affect the Work of the Contractor.
- .3       This Summary and Scope of Work shall be read in conjunction with and form part of this Contract, and is intended to indicate the extent of the work and responsibilities to be undertaken by this Contractor.

**1.2               Scope of Work**

- .1       This Section includes the provisions for the repair of the existing metal roof system along with removal and replacement of a designated area of the existing roof system as indicated on the drawings and specified herein.
- .2       This section of work includes all labour, materials, equipment and services necessary or required to complete the work specified.
- .3       In instances where more than one code, regulation or specification requirement may exist, the more restrictive requirement shall govern. Contractor shall provide written notification to the Departmental Representative where clarification is required or conflict in governance exists.
- .4       Supply and installation of all required temporary safety systems, fencing, protective covered entrance hoarding, barriers, equipment and site security necessary to complete the work in a safe manner and in conformance with the contract documents.
- .5       In general the scope of work includes:
  - .1       Removal and replacement of the metal roof system in the area defined within the design documents.
  - .2       Removal of all existing perimeter and end lap seals, this material shall include previously installed painted finishes and treatments, sealants and asphalt bitumen.
  - .3       Supply and installation of new microsealant tape seals along the perimeter of the roof system on all four elevations. This work includes installation of tape seals at:
    - .1       All end laps within the entire roof deck.
    - .2       All standing seams within the entire roof deck.
    - .3       All perimeter joints along the north, south, east and west elevations.
    - .4       All lighting arrest system cable securement straps and rods.
    - .5       New and existing joints within the rain gutters along the north and south elevations of the building.
  - .4       Installation of new exhaust and vent stack membrane flashing.

- .5 Replacement of damaged section of rain gutter and accessories necessary to install new length of rain gutter on the north elevation of the building.
- .6 Installations shall include all necessary material, equipment, accessories and trim required to complete the Scope of Work as defined within the Contract Documents.
- .6 The existing roof system has 51 panels on the short access and 5 panels (per side, total of 10) on the long access of the roof system. The roof deck has a total of 510 end laps to be repaired.
- .7 Removal and transport of all construction debris from the site and disposal of all construction debris at an approved landfill site. The Contractor's bid amount shall include all costs and fees related to and associated with the transportation and disposal of all construction waste and debris.
- .8 The Contractor shall be responsible for confirming the installation requirements. Errors and omissions in the Contractor's bid submissions do not relieve the Contractor of their responsibilities to supply the materials and services defined within the Contract Documents.

### **1.3 DESIGN REQUIREMENTS**

- .1 Design replacement roof system to resist
  - .1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.
    - .1 Snow Load- 2.5 KPa
  - .2 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.
    - .1 (1/50)- 0.75 KPa
  - .3 Dead load of roof system.
  - .4 Maximum uplift centre / body of roof: 3.6 KPa
  - .5 Maximum uplift perimeter of roof: 4.6 KPa
- .2 Deflection of the roof system is not to exceed 1/180<sup>th</sup> of the span for the specified live loading.
- .3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
  - .1 Temperature Change (Range): -40 deg C, ambient; 20 deg C, material surfaces

### **1.4 REFERENCES AND STANDARDS**

- .1 Design of cladding system in accordance to the latest edition of:
  - .1 CSA-S136 for the design of Cold Formed Steel Structural Members.
  - .2 CAN/CGSB-93.1, Sheet Aluminum Alloy, Prefinished, Residential.



- .3 Canadian Sheet Steel Building Institute Standards 10M and 20M.
- .4 National Building Code of Canada, latest edition.
- .2 Aluminum Association (AA).
  - .1 AA DAF-45, Designation System for Aluminum Finishes - 9th Edition.
  - .2 AA ASM-35, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .3 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
- .4 Department of Justice Canada.
  - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .6 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).
  - .1 CCMC, Registry of Product Evaluations.
- .7 Execute work to meet or exceed:
  - .1 National Building Code of Canada 2010 (Latest Edition), including all amendments up to project date.
  - .2 Canadian Construction Safety Code (Latest Edition).
  - .3 Rules and regulations of authorities having jurisdiction.
  - .4 In instances where more than one code, regulation or specification requirement may exist, the more restrictive requirement shall govern. Contractor to provide written notification where clarification is required or conflict in governance exists.

## **1.5 Drawings and Specifications**

- .1 Dimensions shown on the design drawings were taken from the as-built documentation made available to the the Departmental Representative. Contractor to verify all dimensions prior to start of work on site.
- .2 The drawings shall serve as the working drawings, but absolute accuracy of dimensions is not guaranteed and no claim for extra payment on account of differences between actual and estimate dimensions will be allowed.

**1.6 CONTRACT METHOD**

- .1 Construct Work under stipulated price contract.

**1.7 CONTRACTOR USE OF PREMISES**

- .1 Limit use of premises for Work and for storage.
- .2 Co-ordinate use of premises under direction of the Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which are to remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the Departmental Representative.
- .6 At completion of operations the condition of the existing work is to be equal to or better than that which existed before new work started.

**1.8 OCCUPANCY**

- .1 Co-operate with the Department Representative in scheduling operations to minimize conflict and to facilitate usage of adjacent occupied buildings.

**1.9 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference disturbance to garage operations, occupants, public, and normal use of premises. Arrange with the Departmental Representative to facilitate execution of Work.

**1.10 EXISTING SERVICES**

- .1 Notify, the Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give the Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to tenant operations.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify the Departmental Representative of findings.
- .4 Submit schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

- .5 Provide temporary services when directed by the Departmental Representative to maintain critical building and tenant systems.
- .6 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .8 Record locations of maintained, re-routed, and abandoned service lines.
- .9 Construct barriers in accordance with specifications, drawings, and all applicable regulations.

**1.11 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Other documents as specified.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1            General**

**1.1            ACCESS AND EGRESS**

- .1      Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, territorial and other authorities having jurisdiction therein.

**1.2            USE OF SITE AND FACILITIES**

- .1      Work to be completed under this contract shall be within an area under the jurisdiction of the Iqaluit Airport Authority and the Department of Defence.
- .2      The Contractor shall be required to comply with the operational and security requirements necessary to operate within the area controlled by the Airport Authority and the Department of Defence.
- .3      Work under this Contract will require the Contractor to enter and exit an operational / active airport. The Contractor shall be required to adhere to all security protocols and measures in place at the time of work. This shall include security clearances for the contractor's staff, vehicular access to the site and limitations on equipment permitted on site.
- .4      Execute work with least possible interference or disturbance to normal use of premises. Make arrangements the Departmental Representative to facilitate work as stated.
- .5      Maintain existing services to building and provide for personnel and vehicle access.
- .6      Where security is reduced by work provide temporary means to maintain security.
- .7      Contractor is to provide sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .8      Closures: protect work temporarily until permanent enclosures are completed.

**1.3            ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1      Execute work with least possible interference or disturbance to building operations, public and normal use of premises. Arrange with the Departmental Representative to facilitate execution of work.
- .2      Design, construct, and maintain temporary protection around areas of work within the existing structure.

**1.4            EXISTING SERVICES**

- .1      Notify, the Departmental Representative, and utility companies of intended interruption of services and obtain required permission.

- .2 Where Work involves breaking into or connecting to existing services, give the Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum.
- .3 Provide for personnel, pedestrian and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

**1.5 SPECIAL REQUIREMENTS**

- .1 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.

**1.6 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION 01 14 00**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       07 61 00 - Metal Roofing Repair.
- .2       07 62 00 - Sheet Metal flashing.
- .3       07 90 00 – Sealant.

**1.2               REFERENCES**

- .1       Public Works Government Services Canada (PWGSC)
  - .1       PWGSC Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect As Of: May 14, 2004
  - .2       PWGSC - AES Best Practice - Shop Drawing Review Process.

**1.3               ADMINISTRATIVE**

- .1       Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2       Do not proceed with Work affected by submittal until review is complete.
- .3       Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4       Where items or information is not produced in SI Metric units converted values are acceptable.
- .5       Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6       Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7       Verify field measurements and affected adjacent Work are co-ordinated.
- .8       Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9       Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved review.
- .10      Keep one reviewed copy of each submission on site.

**1.4 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow 5 days for Departmental Representative's review of each submission.
- .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .6 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .7 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.

- .5 Performance characteristics.
- .6 Standards.
- .7 Operating weight.
- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .8 After Departmental Representative's review, distribute copies.
- .9 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .10 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
- .12 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .13 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .14 Delete information not applicable to project.
- .15 Supplement standard information to provide details applicable to project.
- .16 If upon review by Departmental Representative no errors or omissions are discovered or if only minor corrections are made copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .17 Review of shop drawings in accordance with AES Best Practice - Shop Drawing Review Process. Review of shop drawings is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains



solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

**1.5 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's office.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

**1.6 PROGRESS PHOTOGRAPHS**

- .1 Submit progress photographs with monthly invoice submissions.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            REFERENCES**

- .1      Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2      Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .3      Material Safety Data Sheets (MSDS).
- .4      Nunavut Safety Act, registered 29 March 2016.
- .5      WORKERS' COMPENSATION ACT, S.N.W.T. 2007, in force April 1, 2008 with latest amendments.
- .6      Northwest Territory & Nunavut Code of Practice, Personal Protective Equipment, Respiratory Protection.

**1.2            SUBMITTALS**

- .1      Make submittals in accordance with Section 01 33 00 - Submittals.
- .2      Submit site-specific Health and Safety Plan: Within 14 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1      Results of site specific safety hazard assessment.
  - .2      Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3      Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction, if required.
- .4      Submit copies of reports or directions issued by Territorial health and safety inspectors.
- .5      Submit copies of incident and accident reports.
- .6      Submit WHMIS MSDS - Material Safety Data Sheets.
- .7      The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to the Departmental Representative within 7 days after receipt of comments from the Departmental Representative.
- .8      Any review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

### **1.3 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project.

### **1.4 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 The Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .3 Observe and enforce construction safety measures required by the airport authority.

### **1.5 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, territorial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

### **1.6 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Territory of Nunavut and authorities having jurisdiction, advise the Departmental Representative verbally and in writing.

### **1.7 HEALTH AND SAFETY CO-ORDINATOR**

- .1 An employer shall ensure that compliance with the Nunavut Safety Act (registered 29 March 2016) and the Occupational Health and Safety Regulations for the territory of Nunavut. This compliance shall include the following at the work site:
  - .1 Work is sufficiently and competently supervised;
  - .2 Supervisors have sufficient knowledge of the following:
    - .1 Any occupational health and safety program applicable to workers supervised at the work site,
    - .2 The safe handling, use, storage, production and disposal of hazardous substances,
    - .3 The need for, and safe use of, personal protective equipment,
    - .4 Emergency procedures required by these regulations,

- .5 Any other matters that are necessary to ensure the health and safety of workers;
- .3 Supervisors have completed an approved regulatory familiarization program and supervisors comply with the Act and these regulations.
- .4 A supervisor shall ensure that workers comply with the Act and these regulations as they apply to the work site.
- .2 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have minimum 2 years' site-related working experience specific to activities associated with construction health and safety.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

## **1.8 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the Departmental Representative.
- .2 Provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop Work at the cost of the contractor if non-compliance of health and safety regulations is not corrected.

## **1.9 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of, and in consultation with Territory of Nunavut and authorities having jurisdiction.

## **1.10 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION 01 35 30**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 07 61 00 - Metal Roofing Repair.
- .2 07 62 00 - Sheet Metal flashing.
- .3 07 90 00 – Sealant.

**1.2 DEFINITIONS**

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

**1.3 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Environmental protection plan: include:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
  - .3 Names and qualifications of persons responsible for training site personnel.
  - .4 Descriptions of environmental protection personnel training program.
  - .5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
  - .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary

- facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
  - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
  - .9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
  - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
  - .12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
  - .13 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
  - .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
  - .15 Pesticide treatment plan: to be included and updated, as required.

#### **1.4 FIRES**

- .1 Fires and burning of rubbish on site is not permitted.

#### **1.5 DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

#### **1.6 DRAINAGE**

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

**1.7 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

**1.8 NOTIFICATION**

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan. Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .2 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .3 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



**Part 1 General**

**1.1 REFERENCES**

- .1 Work shall conform with the requirements of the National Building Code and all amendments and all local, Municipal and Territorial building by-laws and ordinances.

**1.2 INSTALLATION AND REMOVAL**

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

**1.3 HOARDING**

- .1 Provide and maintain all necessary barriers, signs and safety measures as required to complete work. Temporary site enclosures/hoarding shall be installed in accordance with airport authority and other authorities having jurisdiction.
- .2 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .3 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

**1.4 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades around open shafts, open edges of floors and roofs.

**1.5 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**1.6 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

**1.7 FIRE ROUTES**

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

**1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of Work.

- .2 Be responsible for damage incurred.

**1.9 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Be responsible for damage incurred, including all cost to restore effected areas, due to lack of or improper protection.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION 01 56 00**

**Part 1            General**

**1.1            PROJECT CLEANLINESS**

- .1      Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by other Contractors.
- .2      Remove waste materials from site at regularly scheduled frequencies.
- .3      Provide on-site waste containers for collection of waste materials and debris.
- .4      Dispose of waste materials and debris at designated dumping waste handling locations.
- .5      Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .6      Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .7      Provide adequate ventilation during use of volatile or noxious substances.
- .8      Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .9      Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**1.2            FINAL CLEANING**

- .1      When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2      Remove waste products and debris and leave Work clean and suitable for occupancy.
- .3      Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4      Remove waste materials from site at regularly scheduled frequencies. Do not burn waste materials on site.
- .5      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6      Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, floors and walls.
- .7      Clean lighting reflectors, lenses, and other lighting surfaces.
- .8      Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas. Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .11 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION 01 74 11**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1       07 61 00 - Metal Roofing Repair.
- .2       07 62 00 - Sheet Metal flashing.
- .3       07 90 00 – Sealant.

**1.2               INSPECTION AND DECLARATION**

- .1       Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .2       Request Departmental Representative Inspection.
- .2       Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .3       Completion: submit written certificate that following have been performed:
  - .1       Work has been completed and inspected for compliance with Contract Documents.
  - .2       Defects have been corrected and deficiencies have been completed.
  - .3       Equipment and systems have been tested and are fully operational.
  - .4       Operation of systems have been demonstrated to the Department Representative.
  - .5       Work is complete and ready for final inspection.
- .4       Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.
- .5       Declaration of Substantial Performance: when Departmental Representative consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.
- .6       Commencement of Lien and Warranty Periods: date of the Department Representative's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7       Final Payment: when Departmental Representative consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

**1.3               CLEANING**

- .1       In accordance with Section 01 74 11 - Cleaning.

- .2 Remove waste and surplus materials, rubbish and construction facilities from the site.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1        07 61 00 - Metal Roofing Repair.
- .2        07 62 00 - Sheet Metal flashing.
- .3        07 90 00 – Sealant.

**1.2               SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3        Revise content of documents as required prior to final submittal.
- .4        Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four (4) final copies of operating and maintenance.
- .5        Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6        Furnish evidence, if requested, for type, source and quality of products provided.
- .7        Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8        Pay costs of transportation.

**1.3               FORMAT**

- .1        Organize data as instructional manual.
- .2        Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3        When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4        Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5        Arrange content by Section numbers and sequence of Table of Contents.
- .6        Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

#### **1.4 CONTENTS - EACH VOLUME**

- .1 Table of Contents: provide title of project; Date of submission; names.
  - .1 Addresses, and telephone numbers of Department Representative and Contractor with name of responsible parties.
  - .2 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions

#### **1.5 AS-BUILTS AND SAMPLES**

- .1 Maintain at site for Departmental Representative, one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection reports.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.



- .5 Keep record documents and samples available for inspection by Departmental Representative.

## **1.6 RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.

## **1.7 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

## **1.8 WARRANTIES**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty, to Departmental Representative for review and approval.

- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .6 Except for items put into use with Department Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            PART 1 – GENERAL**

**1.1                GENERAL**

- .1        This site is a remote location and a visit by individual contractors is not required prior to tender close.
- .2        This is an operation military facility which will be actively utilized by the Client during roof repair work.
- .3        This facility is on an active airport and access to site, airport ramps and runways is strictly controlled by the airport authority.

**1.2                SCOPE OF WORK**

- .1        This Section includes the provisions for the repair of the existing metal roof system along with removal and replacement of a designated area of the existing roof system as indicated on the drawings and specified herein.
- .2        This section of work includes all labour, materials, equipment and services necessary or required to complete the work specified.
- .3        In instances where more than one code, regulation or specification requirement may exist, the more restrictive requirement shall govern. Contractor shall provide written notification to the Departmental Representative where clarification is required or conflict in governance exists.
- .4        Supply and installation of all required temporary safety systems, fencing, protective covered entrance hoarding, barriers, equipment and site security necessary to complete the work in a safe manner and in conformance with the contract documents.
- .5        In general the scope of work includes:
  - .1        Removal and replacement of the metal roof system in the area defined within the design documents.
  - .2        Removal of all existing perimeter and end lap seals, this work shall include removal of previously installed sealants, asphalt & mastic bitumen and painted finishes.
  - .3        Supply and installation of new microsealant tape. This work may require the use hot air guns to allow for the installation of the microsealant tape in cold weather. This work includes installation of tape seals at:
    - .1        All end laps within the entire roof deck.
    - .2        All standing seams within the entire roof deck.
    - .3        All perimeter joints along the north, south, east and west elevations.
    - .4        New and existing joints within the rain gutters along the north and south elevations of the building.
    - .5        All lightning arrest anchors, rods and cable securement straps within the entire metal roof system.

- .4 Installation of new exhaust and vent stack membrane flashing.
- .5 Replacement of 6.096 meters of damaged rain gutter and accessories necessary to install new length of rain gutter on the north elevation of the building.
- .6 Installations shall include all necessary material, equipment, accessories and trim required to complete the Scope of Work as defined within the Contract Documents.
- .6 The existing roof system has 51 panels on the short access and 5 panels (per side, total of 10) on the long access of the roof system. The roof deck has a total of 510 end laps to be repaired.
- .7 Removal and transport of all construction debris from the site and disposal of all construction debris at an approved landfill site. The Contractor's bid amount shall include all costs and fees related to and associated with the transportation and disposal of all construction waste and debris.
- .8 The Contractor shall be responsible for confirming the installation requirements. Errors and omissions in the Contractor's bid submissions do not relieve the Contractor of their responsibilities to supply the materials and services defined within the Contract Documents.

### **1.3 DESIGN REQUIREMENTS**

- .1 Design replacement roof system to resist
  - .1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.
    - .1 Snow Load- 2.5 KPa
  - .2 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.
    - .1 (1/50)- 0.75 KPa
  - .3 Dead load of roof system.
  - .4 Maximum uplift centre / body of roof: 3.6 KPa
  - .5 Maximum uplift perimeter of roof: 4.6 KPa
- .2 Deflection of the roof system is not to exceed 1/180<sup>th</sup> of the span for the specified live loading.
- .3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
  - .1 Temperature Change (Range): -40 deg C, ambient; 20 deg C, material surfaces

### **1.4 REFERENCES AND STANDARDS**

- .1 Design of cladding system in accordance to the latest edition of:
  - .1 CSA-S136 for the design of Cold Formed Steel Structural Members.
  - .2 CAN/CGSB-93.1, Sheet Aluminum Alloy, Prefinished, Residential.

- .3 Canadian Sheet Steel Building Institute Standards 10M and 20M.
- .4 National Building Code of Canada, latest edition.
- .2 Aluminum Association (AA).
  - .1 AA DAF-45, Designation System for Aluminum Finishes - 9th Edition.
  - .2 AA ASM-35, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .3 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
- .4 Department of Justice Canada.
  - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .6 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).
  - .1 CCMC, Registry of Product Evaluations.
- .7 Execute work to meet or exceed:
  - .1 National Building Code of Canada 2010 (Latest Edition), including all amendments up to project date.
  - .2 Canadian Construction Safety Code (Latest Edition).
  - .3 Rules and regulations of authorities having jurisdiction.
  - .4 In instances where more than one code, regulation or specification requirement may exist, the more restrictive requirement shall govern. Contractor to provide written notification where clarification is required or conflict in governance exists.

## **1.5 DRAWINGS AND SPECIFICATIONS**

- .1 Dimensions shown on the design drawings were taken from the as-built documentation made available to the Departmental Representative. Contractor to verify all dimensions prior to start of work on site.
- .2 The drawings shall serve as the working drawings, but absolute accuracy of dimensions is not guaranteed.

**1.6 EXAMINATION**

- .1 Verify building and roof system dimensions on site prior to start of work. Confirm tolerances, method of attachment and compatibility of materials included in the scope of work.
- .2 Verify and comply with security access and operational requirements of the Airport Authority and Department Representative prior to preparation of bid amount and start of work.
- .3 The existing roof system and new roof system design are based upon information provided and assumed conditions and assemblies. The Contractor shall include costs for minor adjustments to the final installation to accommodate as found conditions.
- .4 The Contractor shall be responsible for the safety of the building and equipment therein, Contractor's work force, occupants of the building and members of the public.
- .5 The Contractor shall supply and install temporary safety measures including:
  - .1 Covered hoarding at entrances, where necessary or requested by the Department Representative.
  - .2 Temporary perimeter guard rails at the roof level.
  - .3 Safety barricades.
  - .4 Safety signage.

**1.7 SUBMITTALS**

- .1 Product Data sheet:
  - .1 Manufacturer's printed product literature, specifications, installation instructions and data sheet.
  - .2 Pre-printed WHMIS / MSDS Data Sheets for all building components and materials, describing storage of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards, handling and safety precautions.
  - .3 Include installation instructions for the roofing materials specified.
- .2 At the completion of the stages listed below the Contractor shall:
  - .1 At the completion of the work, an affidavit indicating that only new material was used and that work (material and application workmanship) meets the manufacturer's requirements and standards.
  - .2 Roofing work was completed in accordance with applicable standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.
- .3 Submit all required information promptly and in orderly sequence to not cause delay in Work. Failure to submit all required information or samples in time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed. Do not proceed with Work affected by submittal, until review is complete.

- .4 Contractor to review and verify all submittals prior to submission to the Departmental Representative. The Contractor's review and submission represents confirmation that all necessary requirements have been determined and verified by the Contractor on site, and that each submittal has been checked and coordinated with requirements of the Work, Contract Documents and their sub-trades or suppliers. Submittals not stamped, signed, dated and identified by the Contractor will be returned without being examined and considered rejected.
- .5 Keep one reviewed copy of each submission on site.

## 1.8 SHOP DRAWINGS

- .1 The term "shop drawings" means drawings, diagrams, illustrations, manufacturers data sheets, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work. Provide shop drawings for:
  - .1 Design and installation of new metal roof system within the designated area of the existing metal roof deck.
  - .2 Submit shop drawings for review prior to fabrication. The Contractor shall be responsible to verify field measurements and existing site conditions prior to start of work. Errors in field recording and shop drawing submissions are the sole responsibility of the Contractor and their sub-trades and suppliers. The Contractor's responsibility for errors and omissions within their submission is not relieved by the Departmental Representative review.
  - .3 Adjustments made on shop drawings by the Departmental Representative is not intended to change the Contract Price. If adjustments affect value of Work, state such in writing the Departmental Representative prior to proceeding with Work.
  - .4 Make changes in shop drawings required, consistent with Contract Documents and review process. When resubmitting, notify the Departmental Representative in writing of revisions other than those requested. Do not make any changes to Shop Drawings after final review without written permission from the Departmental Representative.
  - .5 Shop drawing submissions shall include but not be limited to:
    - .1 Project title and project number:  
**2016 FOL Hanger Roof Repair**  
**PWGSC – Iqaluit**  
**PWGSC Project No.: R.075595.001**  
**Concentric Project No: 14-5911B**
    - .2 Indicate materials and details to scale for layout, installation and description of related components.
    - .3 Indicate materials, methods of construction and attachment or anchorage details, erection diagrams, connections, explanatory notes and other information necessary for completion of Work Date and revision dates.
    - .4 Name and address of (as applicable):
      - .1 Contractor
      - .2 Subcontractor.

- .3 Supplier.
- .4 Manufacturer.
- .5 Other pertinent details including product or model numbers where applicable.
- .5 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .6 Details of appropriate portions of Work as applicable:
  - .1 Continuity of air and vapour barriers.
  - .2 All roof level equipment and systems.
  - .3 Transitions and slope.
  - .4 Relationship to adjacent work.
  - .5 Integration and installation of new and existing building systems and components.
- .6 If upon review, no errors or omissions are noted, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of revised shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .7 Contractor to review shop drawings prior to submission to the Departmental Representative. The Contractor is responsible for dimension which shall be confirmed on site and prior to fabrication. The Contractor shall also confirm the installation details, techniques and for the co-ordination of Work of all sub-trades and suppliers. Review of shop drawings by the Departmental Representative or their designated agent is for the sole purpose of ascertaining conformance with the contract documents, specifications and general concept. Review by the Departmental Representative does not represent or confirm that all necessary requirements and dimensions have been determined and verified by the Contractor. The Departmental Representative shall not be responsible for errors or omissions within the reviewed shop drawings submitted by the Contractor, their sub-trades, suppliers or the costs associated with these errors and or omissions therein.
- .8 Indicate arrangement of metal roof panels, including joints, types and locations of support members, panel anchor clips, size & type of fasteners, seals, flashings, gutters and all system components related to the new roof installation.
- .9 Drawings shall be signed and sealed by a Professional Engineer, attesting to the ability of the metal panel's assembly to withstand the specified snow loads and wind loads.
- .10 After final review, distribute copies.

## **1.9 WARRANTY**

- .1 Contractor's guarantee: Provide a written warranty, signed and issued in the name of the Departmental Representative, stating that the Contractor will guarantee to repair at his own expense any leaks in the new roofing system, end lap seals and related work resulting from faulty workmanship or installation, for a period of five (5) years after the date of the Certificate of Substantial Performance and acceptance of the completed work by the Departmental Representative.



- .2 Manufacturer's guarantee: Provide a written warranty, signed and issued in the name of the Departmental Representative, stating that the metal roof system manufacturer will guarantee to repair at his own expense material and labour any leaks in the metal roof deck resulting from defects in the manufacture of the metal roof panels for a period of ten (10) years from the date of the Certificate of Substantial Performance.

#### **1.10 FIELD QUALITY CONTROL**

- .1 A project representative will be appointed by the Departmental Representative to supervise the work of this Section and to verify the satisfactory completion of the work in accordance with the Contract documents.
- .2 The Contractor shall provide fourteen (14) working days' written notice to the Departmental Representative prior to the commencement of work on site. Work on site shall be coordinated with the Departmental Representative's use and occupation of the site and building.
- .3 The Contract includes for an initial 5 days of fulltime inspection by the Departmental Representative at which time the Contractor shall be responsible to undertake the following work on site:
  - .1 Initial site meeting.
  - .2 Removal and replacement of the designate area of metal roof deck.
  - .3 Mock-up of typical end lap repairs.
  - .4 Mock-up of typical roof perimeter repairs (end and side elevations).
  - .5 Mock-up of typical exhaust stack / vent repairs.
- .4 The initial site meeting will be held on the day the project starts, with the following present:
  - .1 Prime / General Contractor.
  - .2 Metal roof deck sub-trade (if applicable).
  - .3 Design Consultant.
  - .4 The Departmental Representative's project representative(s).
- .5 The project representative will present the agenda and will take minutes of the meeting.
- .6 Ensure all sub-trades and effected parties receive copies of minutes as required no later than three (3) days after distribution by the Departmental Representative.
- .7 Cooperate with the Departmental Representative and afford all facilities necessary to permit full inspection of the work and testing of materials prior to and during their installation. Act immediately on the instructions given by the Departmental Representative.

#### **1.11 DELIVERY AND STORAGE**

- .1 All materials shall be delivered and stored in their original packaging, bearing the manufacturer's name, related standards and any other specification or reference accepted as standard.

- .2 Carefully store materials delivered to the site, store metal panels and flashings in such a way as to prevent wrinkling, twisting, scratches and other damage.
- .3 Do not stockpiling materials on the roof decks in a way which could cause overloading or damage to the existing roof system, building & structure. Damage to the roof system or building structure caused by the Contractor, their work force, sub-trades or suppliers shall be repaired by the Contractor, at their expense, as required and directed by the Departmental Representative.
- .4 The Contractor shall be responsible for the security of their equipment and materials on site.
- .5 The Departmental Representative shall not be responsible for costs associated with transport, theft, loss or damage to equipment and materials stored on site or at the Contractors facilities.

#### **1.12 USE OF SITE FACILITIES**

- .1 The Contractor shall provide access to and about the site to ensure continuous and efficient delivery and movement of materials and equipment by the Departmental Representative s forces. Arrange routes so that they do not conflict with operations and access to the building.
- .2 The Contractor may not use the existing washroom services, the Contractor shall provide their own portable washroom facilities.
- .3 The Contractor shall assume all liability for, and be responsible for loss of or damage to, all equipment and materials stored on site, and for any equipment or materials delivered from whatever source to the site of the work.
- .4 The use of the power services will not be provided to the Contractor.
- .5 At the completion of the work, all temporary connections and equipment shall be removed and the services and finishes shall be made good by the Contractor to the satisfaction of the Departmental Representative.
- .6 The Contractor shall provide and maintain temporary enclosures and interior building temperature required to prevent moisture, frost, snow and cold related damage to the work, the building or the contents therein.
- .7 The Contractor shall provide and maintain temporary facilities and services required to carry out the work.
- .8 Restrict all personnel employed in connection with the work to the area(s) approved for access by the Contractor.

#### **1.13 SCHEDULE**

- .1 Format

- .1 Prepare a proposed work schedule in form of line type gant chart or manual sequence of events with dates.
  - .2 Provide line for each trade or operation.
  - .3 Provide horizontal time scale identifying first work day of each week.
  - .4 Format for listings: Chronological order of start of each item of work.
- .2 Submission
  - .1 Submit initial schedule within 10 days after award of Contract.
  - .2 Submit updated schedules with each progress claim or as agreed upon at start-up meeting.
- .3 Removal and installation of the metal roof deck must be undertaken by the Contractor with the the Departmental Representative present. The Contractor shall be required to co-ordinate the removal, installation and inspection of the metal roof deck replacement with the Departmental Representative. The Contractor must provide written notice to the the Departmental Representative 14 days in advance of the metal roof deck replacement.

#### **1.14 AS-BUILT DRAWINGS AND DOCUMENTATION**

- .1 Obtain from the Departmental Representative at commencement of work, two (2) sets of white prints of drawings for purpose of recording changes and deviations to work as-built.
- .2 Maintain these prints and make available to trades so that all changes and deviations may be recorded promptly as they occur. Be responsible for ensuring that such record of all changes is up to date at all times. Upon completion of work, return these drawings complete and in good condition to the Departmental Representative, so that a record of the changes, location of all services and equipment is documented.

#### **1.15 PROTECTION**

- .1 Special measures shall be taken for dust control and debris on site. Provide dust filters to any intake and exhaust ducts affected by this contract. Shutting down of the existing ventilation system may not be permitted. Protect all doors and openings against dust penetration into areas of the building.
- .2 Prevent movement, settlement or damage of adjacent structures, paving and landscaping. Provide bracing or shoring as required. Repair damage caused by demolition or work on site as directed by the Departmental Representative.
- .3 Support affected columns and adjacent floor structure and, if safety of the structure or services appears to be endangered, take preventative measures and then cease operations and notify the Departmental Representative.
- .4 Prevent debris from blocking surface drainage systems, mechanical and electrical systems which must remain in operation.
- .5 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses or land features. Ensure proper disposal procedures are maintained throughout the project. Do not pump water

containing suspended materials into watercourses or onto adjacent properties. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

- .6 Prevent extraneous materials from contaminating air beyond work area, by providing temporary enclosures during demolition work.
- .7 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all affected levels.
- .8 At end of each day's work, leave work in safe, secure and stable condition.

#### **1.16 FIRE & SAFETY REQUIREMENTS**

- .1 Comply with the requirements the Safety Act, DND regulations and Federal / Territorial regulations for Constructions Projects in effect.
- .2 Have at a minimum of three (3) serviceable 9Kg (20lbs), 'A-B-C' fire extinguisher in the area of work.
- .3 Fire extinguishers are to be inspected prior to the start of work each day by the Contractors' site supervisor. Damaged or discharged fire extinguishers are to be removed from site and replaced immediately and prior to the start of work.
- .4 Comply with all site safety regulations as stipulated by the Departmental Representative, the air authority, including the proper use and wearing of foot, eye, fall and head protection at all times. All required safety regulations will be stringently enforced by the Departmental Representative and the airport authority. Failure to comply with on-site safety requirements will result in expulsion of the non-compliant worker(s). No claim for delay or extension shall be permitted due to non-conformance with safety regulations.
- .5 The building is an operational facility and the Contractor must co-ordinate all access and work on site with the operational requirements of the Department Representative and the airport authority.

#### **1.17 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site, transport and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic waste in designated containers, transport and dispose at an authorized site approved to receive hazardous or toxic waste.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Federal, Territorial and Municipal regulations.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Divert unused metal materials from landfill to metal recycling facility.

- .6 Unused paint, caulking, and sealing compound materials must not be disposed of into water courses, onto ground or in other location where it will pose health or environmental hazard.
- .7 Fold up metal banding, flatten and place in designated area for recycling.

## **Part 2        PART 2 – PRODUCTS**

### **2.1        MATERIALS:**

- .1 This section establishes the standard of quality required for the complete metal roof system. Proposed substitutions must meet this standard, and will be considered as follows:
  - .1 A written request for approval of a substitution is received at least ten (10) days prior to tender closing.
  - .2 The request includes a complete item-by-item description comparing the proposed substitution to the specified system, together with manufacturer's literature, samples, test data, engineering standards and performance evaluation indicating comparable standards to those specified.
- .2 Prefinished Roof Sheet, exposed to exterior.
  - .1 Metal Roof Panel 22 Ga, grade 33 galvanized metal panel, sheet steel conforming to ASTM A653M structural quality, TSR 1000 by Vicwest.
  - .2 Profile: TSR, Seamed joint at 610 mm wide, with seams a minimum of 50 mm above the bottom of the ribbed profile.
  - .3 Coating: Prepainted with WeatherX™ on interior (underside) face.
  - .4 Clip and Fastening System: TSR Clip, made from galvanized material, 12 Ga thickness, 317 mm long, 133 mm high, purpose-made, with two sliding clips designed to accommodate expansion and contraction of the metal roof panel / sheet.
- .3 Metal Roof Panel Fasteners:
  - .1 Panel Clip securement:
    - .1 14A x 31 mm Self Tapping Screws.
    - .2 Stainless steel
    - .3 Quantity as specified by the manufacturer, minimum 2 screws per TSR clip
    - .4 As specified by manufacturer and design engineer, to resist wind uplift and snow loads.
  - .2 Exposed Prefinished Metal Fastener:
    - .1 8 mm x 25 mm, self tapping screws.
    - .2 Prefinished with gasket
    - .3 As specified by manufacturer and design engineer, to resist wind uplift and snow loads.
  - .3 Thermal Block Fastener: Self drilling, 87 mm long with a flat pan head.

- .4 Butyl Tape: 3 mm x 13 mm wide
- .5 End Lap tape:
  - .1 Microsealant tape: colour grey
  - .2 Width: 150 mm
  - .3 Thickness: 35 mils.
  - .4 Tensile strength: 31026 kPa (+/- 3447 kPa).
  - .5 Permanence: 0.001 perms.
  - .6 Cleaner: a non-residue cleaner such as acetone or lacquer thinner.
  - .7 Primer: Primer, recommended by manufacture
  - .8 Acceptable material: Microsealant tape, manufactured by ETERNABOND or approved alternate.
- .6 DoubleStick Tape:
  - .1 Width: 50 mm
  - .2 Thickness: 30 mils.
  - .3 Permanence: 0.001 perms.
  - .4 Cleaner: a non-residue cleaner such as acetone or lacquer thinner.
  - .5 Primer: Primer, recommended by manufacture
  - .6 Acceptable material: DoubleStick tape, manufactured by ETERNABOND or approved alternate.
- .7 Insulation: Thickness to match the existing batt insulation, with an uncompressed areas to provide R40.

## **2.2 ACCESSORIES**

- .1 Flashing: Formed from same materials and colour as the existing roof flashings. Custom fabricated to suit architectural details and existing site conditions or as required.
- .2 Gable End Foam Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.
- .3 Sealants: In accordance with manufacturer's recommendation and Section 07 90 00.
- .4 Rain gutter support brackets: Aluminum or galvanized metal rain gutter support and securement brackets compatible with existing rain gutters.

## **2.3 BITUMENOUS FLASHINGS**

- .1 Membrane Flashings
  - .1 SBS- modified bitumen sheet, for torch application, with granule surfacing, minimum 3.8 mm thick, minimum 250 g/m2 non-woven polyester reinforcement, meeting CGSB 37-GP-56-M classification type 2, Class G, Grade 2.
  - .2 Acceptable manufacturers:

- .1 Bakor Inc. (Henry)
  - .2 Soprema Waterproofing Inc.
  - .3 IKO
- .2 Primer: Recommended by manufacturer.

### **Part 3        PART 3 — EXECUTION**

#### **3.1            SURFACE INSPECTION AND PREPARATION**

- .1 Before commencing works, ensure that all surfaces are smooth, dry, clean, and free of ice, snow, moisture and debris. The deck must be free of contamination by materials which could affect the adhesion and securement of the new roofing seals or the physical integrity of the membrane itself. No salt or calcium shall be used to remove ice or snow.
- .2 Removal of the existing bituminous sealant and mastic materials must be completed prior to installation of new materials. This work may include the use of solvents cleaners and non-ferrous wire brushes.
- .3 Areas with surface corrosion shall be wire brushed cleaned and repainted with the application of two coats of a compatible galvanized paintable sealer.
- .4 Ensure that the work of other trades has been properly completed prior to the installation of new metal panels and microsealant tape.
- .5 Commencement of roofing installation shall be construed as acceptance of the substrate, and thereafter the Contractor shall be fully responsible for satisfactory completion of the work as required herein.
- .6 After removal of the existing metal roof system assembly within the designated area and before commencing the work of this Section, conduct an inspection of the existing substrate and steel support members with the Departmental Representative to review and accept the condition of the existing substrate. Ensure that the deck and all parts of the structure that are to be covered with the new metal roof panels are secure and free of excessive moisture or other deficiencies that will impact the installation and performance of the metal roof system

#### **3.2            PROTECTION**

- .1 Cover walls and adjacent work where materials are hoisted or used. Protect adjoining surfaces against any damage that could result from roofing repairs.
- .2 At end of each day's work or when stoppage of work occurs due to inclement weather, provide protection for completed and incomplete work. Contractor shall be responsible for inspection and securement of all materials, equipment and building systems on the roof level. Contractor shall inspect the site on a daily basis during periods of severe weather or prolonged work stoppage due to weather or other factors.
- .3 Use and maintain warning signs and barriers at roof and ground level.

- .4 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed and incomplete work.
- .5 Ensure that all materials or equipment left on the job site or atop the roof system are tarped, secured in place and protected from the elements and extreme weather conditions.

### **3.3 FABRICATION**

- .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
- .2 Fabricate all components of the system in the factory, ready for field installation.
- .3 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

### **3.4 INSTALLATION OF NEW METAL ROOF DECK**

- .1 Do not install materials under conditions of rain, snow or fog. Install roofing elements on clean and dry surfaces, in accordance with the manufacturer's requirements and recommendations. Perform work on a continuous basis as surface and weather conditions allow.
- .2 Insulation: Install new insulation where existing insulation has been compromised by previous moisture leakage. Install new insulation to match existing, insulation shall conformance with the manufacturer's recommendations. Ensure proper compression at purlins. Lap all side and end joints to form a continuous, sealed air/vapour barrier. The Contractor shall include for the removal and replacement of 50% of the existing insulation within the area designated for roof deck replacement.
- .3 Panel clips shall be installed at every purlin location where metal roof panel replacement is designated for replacement. Do not re-use the existing screw holes when installing new panel clips to the existing purlins.
- .4 It may be necessary to remove and re-install the existing thermal blocks installed atop the steel purlins to allow installation of the new metal panel clips.
- .5 Installation of the TSR panels is a progressive system. The panels interlock one into the other, beginning at the existing roof system designated to remain. Before installing each panel, check that the panel's alignment and that the seam sealant is in place at the standing seam and is not damaged or contaminated.
- .6 Stagger end lap seams between each panel.
- .7 Install metal roof panels on panel support clips, using manufacturer's recommended construction procedures. Ensure metal roof panel is positively locked along the full length of roof. Close interlocking side joints by using a purpose-made seaming machine, as recommended by the manufacturer.



- .8 Install new panel clips at all purlins within the designated area of repair (double the existing installation).
- .9 Clips are secured to the existing supports purlins with (minimum 2) self-drill fasteners. Ensure that all tabs of the clips are positioned in the center of the clip slots prior to seaming of the roof panel and allow for optimum sheet movement.
- .10 Check and verify the coverage and alignment of each panel during and after installation, correct if required. It is recommended that the TSR Roof Panel side laps be seamed immediately as the installation of the TSR progresses. Un-seamed panels can disengage in high winds.
- .11 Where indicated, secure the end-lap of metal roofing sheets in accordance with the manufacturer's specifications, reviewed shop drawings and details to provide a weather-tight seal. Use exposed fasteners to match colour of the existing roof system. Secure all end joints and provide a weather tight seal.
- .12 Install all companion flashing gutters, as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of existing flashings.
- .13 At the eave, a double row of Butyl Tape is applied on top of the Eave / Gutter flashing in such a fashion that it is concealed when the TSR Roof Panel is installed. TSR sheets are anchored at the eave with exposed fastener which are installed between the two rows of the Butyl Tape sealant.
- .14 Installation of the TSR Roof Panels shall include the installation of 7 exposed fasteners at the eave and panel ends using #3pt, 7mm x 25mm long self-drilling fastener, c/w Neobonded Washers, U.N.O. Ensure that the two outer fasteners catch the leg on either side of the Eave Metal Closures at the fascia.
- .15 Install a panel stiffener plate under the leading edge of each metal TSR roof panel. The stiffener plate leg is facing down into the insulation and should bear directly over the support. Ensure that the stiffener plate does not get fastened into the support member below.
- .16 The upper TSR Roof Panel shall be centered on the TSR clip below the lower panel.
- .17 Apply two rows of the Butyl Tape at the end laps of the metal TSR roof panel.
- .18 The upper TSR Roof Panel should lap onto the lower TSR Roof Panel by a minimum of 64mm. The upper and lower TSR Roof Panels are fastened through to the stiffener plate using #3pt, 7mm x 25mm long self-drilling fastener, c/w Neobonded Washers, across the width of the panel.
- .19 Staggered end laps across the width of the roof system
- .20 Replace all damaged existing metal securement straps at gable end of the roof system, along gridline A and H. Contractor to include for replacement of 30% of the existing securement straps.

### **3.5 INSTALLATION OF MICROSEALANT TAPE**

- .1 This section includes installation of microsealant tape seals at:
  - .1 All end laps within the entire roof deck.
  - .2 All standing seams within the entire roof deck.
  - .3 All perimeter joints along the north, south, east and west elevations.
  - .4 All lighting arrest system cable securement straps and rods.
- .2 Install microsealant tape at all end lap joints within the new and existing standing seam, metal roof deck. New microsealant end lap seals shall include the installation of 50 mm doublestick Tape and 150mm width, microsealant tape. Install end lap seals prior to installation of standing seam microsealant tape.
- .3 Install microsealant tape atop all standing seams in the roof deck. Install microsealant tape seal in a shingle fashion, down the slope of the roof deck.
- .4 Install microsealant tape seals atop all joints between the metal roof deck and sheet metal flashings along the perimeter of the roof deck, on all four elevations.
- .5 All surfaces must be clean and dry prior to installation of the new tape seals. Remove asphalt mastic, bitumen, oil, grease, moisture, dust, dirt, sealants, oxidation, foreign matter or contaminants prior to installation of the new microsealant tape seals.
- .6 If surface rust is present, remove rust from the surface of the metal roof deck prior to installation of microsealant tape. Use non-ferrous metal brush if necessary.
- .7 Clean prepared surface with recommended cleaner or a non-residue cleaner such as acetone or lacquer thinner.
- .8 Pre-treat cleaned surfaces with a recommended surface primer. Allow primer to dry completely prior to installation of tape seals.
- .9 Use a hot air gun to remove frost and moisture from the surface of the metal roof deck prior to installation of the microsealant tape. Use of a hot air gun may be required to warm the surface of the metal roof deck and microsealant tape when the temperature drops below 2 degrees Celsius.
- .10 Do not leave gaps or fish mouths at the end of a tape seal.
- .11 Installation of microsealant roof tape:
  - .1 Remove release liner on the underside of the tape, only remove enough liner for the area you are working on. Keep adhesive side clean and dry. Apply tape to prepared surface.
  - .2 Apply pressure to activate bonding process, use a steel roofer's roller and apply a uniform / firm pressure and ensure full and complete bonding of the tape seals to the underlying surfaces.
  - .3 For cold weather application, keep tape at room temperature (+20 deg. C) before applying.
  - .4 Install end lap seals prior to installation of standing seam seal.

- .12 Fish mouths and air pockets within the completed microsealant tape will not be acceptable. Remove and re-install defective microsealant tape.

### **3.6 MODIFIED BITUMENOUS FLASHINGS**

- .1 Install new SBS modified bitumen membrane flashings at all mechanical equipment openings within the entire roof system.
- .2 Clean metal surfaces and remove all existing flashing repair materials.
- .3 Asphalt Primer Application
  - .1 Treat all surfaces to be roofed with Primer to improve adhesion. Apply by brush or roller at a rate recommended by the primer and or roof membrane manufacturer.
  - .2 Note that the drying time of the primer is related to the ambient temperature and may vary from a few hours to a whole day. Do not proceed until the primer is dry.
- .4 Weld cap sheet flashings onto top of metal roof deck and side mechanical unit opening with torch recommended by membrane manufacturer. Membrane flashings shall be laid in strips maximum 1 m wide and torch applied. Overlap 75 mm (minimum) on side laps and extend 450 mm onto flat roof deck area. Embed granules as required where other membrane work is to overlay granulated membrane surfaces.
- .5 Avoid overheating membrane during installation. Replace or repair areas and sections of membrane damaged by overheating.

### **3.7 GARBAGE AND DISPOSAL OF DEBRIS**

- .1 Remove stockpiled garbage material and debris as directed by the Departmental Representative and airport authority, when it interferes with operations of project construction or safety on site. Supply clearly marked disposal bins for waste material. All material and debris from the building become the property and responsibility of the Contractor once they have been removed from the building.
- .2 Transport garbage material and debris using approved haulers and receiving organizations in accordance with applicable regulations. Ensure that these materials will be disposed of in authorized landfill or waste disposal sites. Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
- .3 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

### **3.8 CLEAN-UP**

- .1 Remove protective film from panels.
- .2 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Departmental Representative and only where appearance after touch-up is acceptable to the Departmental Representative.

**END OF SECTION**

**Part 1 General**

**1.1 Scope of Work**

- .1 This Section includes the provision for the installation of new prefinished sheet metal flashings, trim and 6m length of rain gutter along perimeter of repair area on the north elevation of the building. This section of work includes all labour, materials, equipment and services necessary or required to complete the removal of existing and installation of a new prefinished sheet metal flashings and trim.
- .2 In general the scope of work includes, but is not limited to:
  - .1 All labour, materials, equipment and services required and necessary to remove the existing sheet metal flashings and trim and installation of a new sheet metal flashings and trim.
  - .2 Removal from site and disposal of the existing roof system and related sheet metal debris. The Contractor's bid amount shall include all costs and fees related to and associated with the transportation and disposal of all construction waste and debris.
  - .3 Installation of a new 24ga prefinished sheet metal flashings, continuous 22ga starter strips and prefinished non-corroding fasteners.
  - .4 Install new sheet metal flashings as specified and detailed herein.

**1.2 Samples**

- .1 Provide three, 150 mm x 150 mm samples of sheet metal material, colour and finish.

**Part 2 Products**

**2.1 Prefinished Sheet Metal**

- .1 Prefinished steel with factory applied silicone modified polyester, Class F1S.
- .2 Colour selected by Department Representative from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
- .4 Coating thickness: not less than 25 micrometers.
- .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate than 20% to ASTM D822 as follows:
  - .1 Outdoor exposure period 1000 hours.
  - .2 Humidity resistance exposure period 1000 hours.
- .6 Base metal thickness 0.635 mm (24 gauge) unless indicated otherwise. Base metal to be hot-dipped galvanized steel with coating designation Z275 (G90).
- .7 Contractor to allow for a choice of three different colours for use on this project.

## **2.2 Accessories**

- .1 Continuous Starters: sheet metal, minimum 50 mm wide or as required on site and detailed. Thickness of continuous starter to be 22 gauge.
- .2 Fasteners: of same material as sheet metal, to CSA B111, non-corroding, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .3 Exposed fasteners: Nylon head screws, hexagonal head with colour to match metal flashing colour and complete with neoprene washers.
- .4 Touch-up paint: as recommended by metal flashing and trim manufacture.

## **2.3 Fabrication**

- .1 Fabricate metal flashings and other sheet metal work as detailed and in accordance with applicable CRCA 'FL' series details.
- .2 Form pieces in 2400 mm maximum lengths. Installation and securement shall include allowance for expansion and contraction within the completed assembly and at the joints.
- .3 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Installation of the new exterior sheet metal flashing shall be completed and installed to match the existing detail, dimensions and profiles used on the existing roof systems.

## **Part 3 Execution**

### **3.1 Installation of Sheet Metal Flashing**

- .1 Install sheet metal work in accordance with CRCA FL series details, and as detailed.
- .2 Fabricate and install new rain gutters to match the existing profile, colour and metal thickness.
- .3 Use concealed and exposed fasteners where noted within the design drawings.
- .4 Starter strips shall be continuous and comprised of 22 ga. material, secure starter stripes to substrate with compatible, non-corroding fasteners at 300 mm on center.
- .5 Lock end joints and seal the joint with sealant.
- .6 Seal all flashing joints and termination points with sealant, see Section 07 90 00, Sealants.

- .7 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .8 Remove and re-install existing sheet metal flashings and siding designated to remain on the building as necessary to allow installation and integration of new roof system with the existing building. Re-install existing sheet metal flashings designated to remain or fabricate new sheet metal flashings and seal with the application of sealant material.
- .9 Install new continuous starter strips, inside and outside corners, edgings, soffit, drip, and caps where existing material has been damaged by removal.
- .10 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .11 Maintain joints in exterior sheet metal, true to line, tight fitting, hairline joints. Trim the existing sheet metal if necessary to complete the installation of the new roof system.
- .12 Attach components in manner not restricting thermal movement.
- .13 Seal junctions with adjoining work and dissimilar materials with sealant.

**END OF SECTION**

**Part 1 General**

**1.1 Scope of Work**

- .1 This Section includes the provision for the installation of new sealant material. This section of work includes all labour, materials, equipment and services necessary or required to complete the removal of existing sealant material and installation of a new sealant material.
- .2 Scope of work shall include:
  - .1 Removal and replacement of existing sealant materials within and between the dissimilar materials and sheet metal joints.
  - .2 Removal and replacement of existing sealant material as specified herein.
  - .3 Installation of new sealant material as noted within the design drawings and specified herein.

**1.2 References**

- .1 CAN/CGSB-19.13-M87 Sealing Compound, One-component, Elastomeric, Chemical Curing.

**1.3 SUBMITTALS**

- .1 Submit product data for all materials and products to be used on site.
- .2 Manufacturer's product to describe.
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit duplicate samples of each type of material and colour.
- .4 Submit duplicate copies of each Material data sheet.
- .5 Submit duplicate copies of each MSDS data sheet.

**1.4 Delivery, Storage, and Handling**

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture and water.

**1.5 PROJECT CONDITIONS**

- .1 Do not proceed with installation of joint sealants under following conditions:
  - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

- .2 When joint substrates are wet or damp.
- .3 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

## **1.6 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 If necessary or requested by the Department Representative, co-ordinate with building staff to arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants.

## **1.7 GUARANTEE**

- .1 Submit a guarantee of the work of this section covering a period of two years from date of substantial Performance of the Contract.
- .2 Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces.

## **1.8 Environmental and Safety Requirements**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 Do not use caulking that emits strong odors, contains toxic chemicals or is not certified for use in Canada. Provide Canadian Construction Materials Centre (CCMC) evaluated report for products used on site if requested by the Department Representative.
- .2 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.



- .3 Where sealants are qualified with primers use only these primers.

## 2.2 SEALANT MATERIAL

- .1 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.
- .2 Sheet Metal Joints sealant:
  - .1 Urethane, single component sealant, colours selected by Department Representative.
  - .2 To CAN/CGSB-19.13-M87, single component, elastomeric, chemical curing, compatible with roof membrane material
  - .3 Material properties:
    - .1 Single-component, polyurethane sealant.
    - .2 Adhesion-in-Peel ASTM C 794 >18-25 pli.
    - .3 Accelerated Weathering ASTM C 793 – pass.
    - .4 Movement Capability ASTM C 719 modified  $\pm 35\%$ .
    - .5 Primer and cleaner as recommended by manufacturer.
  - .4 Approved materials
    - .1 Dymonic® FC, manufactured by Tremco
    - .2 SikaFlex 1A, manufactured by Sika
    - .3 Alternate materials to be of same or better performance and meet the specified performance requirements.
- .3 At bituminous surfaces: As recommended by membrane manufacturer.

## 2.3 Preformed Compressible and Non-Compressible back-up materials.

- .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
  - .1 Extruded closed cell, reticulated polyethylene foam backer rod.
  - .2 Size: oversize 30 to 50 %.
- .2 Bond Breaker Tape.
  - .1 Polyethylene bond breaker tape which will not bond to sealant.

## 2.4 Joint Cleaner

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

## 2.5 Primer

- .1 Use primer and apply primer as recommended by manufacturer.

**Part 3 Execution**

**3.1 SURFACE PREPARATION**

- .1 Verify at the site that joints and surfaces have been provided and that joint conditions will not adversely affect execution, performance or quality of completed work; and that they can put into acceptable condition by means of preparation specified in this section.
- .2 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond of the sealant and substrate is attained. Clean bonding joint surfaces of harmful matter substances including dust, silt, scale and coatings from ferrous metals by wire brush, grinding or sandblasting. Remove oil, grease and other coatings from non-ferrous metals with approved cleaning solvent.
- .3 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work. Ensure joint surfaces are dry and frost free.
- .4 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .5 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .6 Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's recommendations for specified sealant.
- .7 Prepare surfaces in accordance with manufacturer's directions. Preparation of existing joint surfaces shall include:
  - .1 Removal of existing sealant material.
  - .2 Removal of all surface dirt and debris.
- .8 Remove all existing sealant from existing joint surfaces to be re-used.
- .9 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .10 Prepare surfaces in accordance with manufacturer's directions.

**3.2 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Surfaces shall be primed prior to installation of new sealant materials. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to installation of new sealant material and in accordance with manufacturer's instructions.

### 3.3 BACKUP MATERIAL

- .1 Install joint filler to achieve correct joint depth and shape, with approximately 30% - 50% compression.
- .2 Where depth of joint will prevent the use of backer rod, an adhesive backed polyethylene tape (bond breaker tape) should be used to prevent three-sided adhesion. All backing should be dry at time of sealant application.

### 3.4 INSTALLATION

- .1 Apply sealant in accordance with manufacturer's written instructions. Ensure the backer rod is friction fitted properly and any primers have been applied.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads. Apply sealant using gun with proper size nozzle filling the joint from the backer rod up.
- .4 Use sufficient pressure to fill voids and joints solid and ensure full contact and bonding of the sealant material to joint surfaces. Application of sealant at irregular surfaces such as masonry will require special attention to ensure full contact of sealant material within the irregular surfaces.
- .5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .6 Tool exposed surfaces before skinning begins to give slightly concave shape. Remove excess compound promptly as work progresses and upon completion.
- .7 Immediately tool the sealant with a spatula to ensure intimate contact with the joint walls. Dry tooling is always preferred, although xylene can be used in limited amounts to slick the spatula if needed.
- .8 Average sealant application joint width will vary from 6 – 15 mm in width.
- .9 Minimum recommended surface temperature should be 5°C or above at the time the sealant is applied. If sealant must be applied in temperatures below 5°C, refer to the manufactures Guide for Applying Sealants in Cold Weather .

### 3.5 Curing.

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

### 3.6 Cleanup

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.

**END OF SECTION**

**APPENDIX A**

**PHOTOGRAPHS**



**Photo 1:** Satellite photograph of FOL Hanger and adjoining areas. Access to the site is via the south access road. The DND service building is located south of the main hanger building.



**Photo 2:** Typical view of the main roof deck, photograph taken from the mid-section of the roof deck with a view of the south half of the hanger roof assembly. Note the lighting arrest system that spans the length and width of the roof deck and the bitumen mastic.

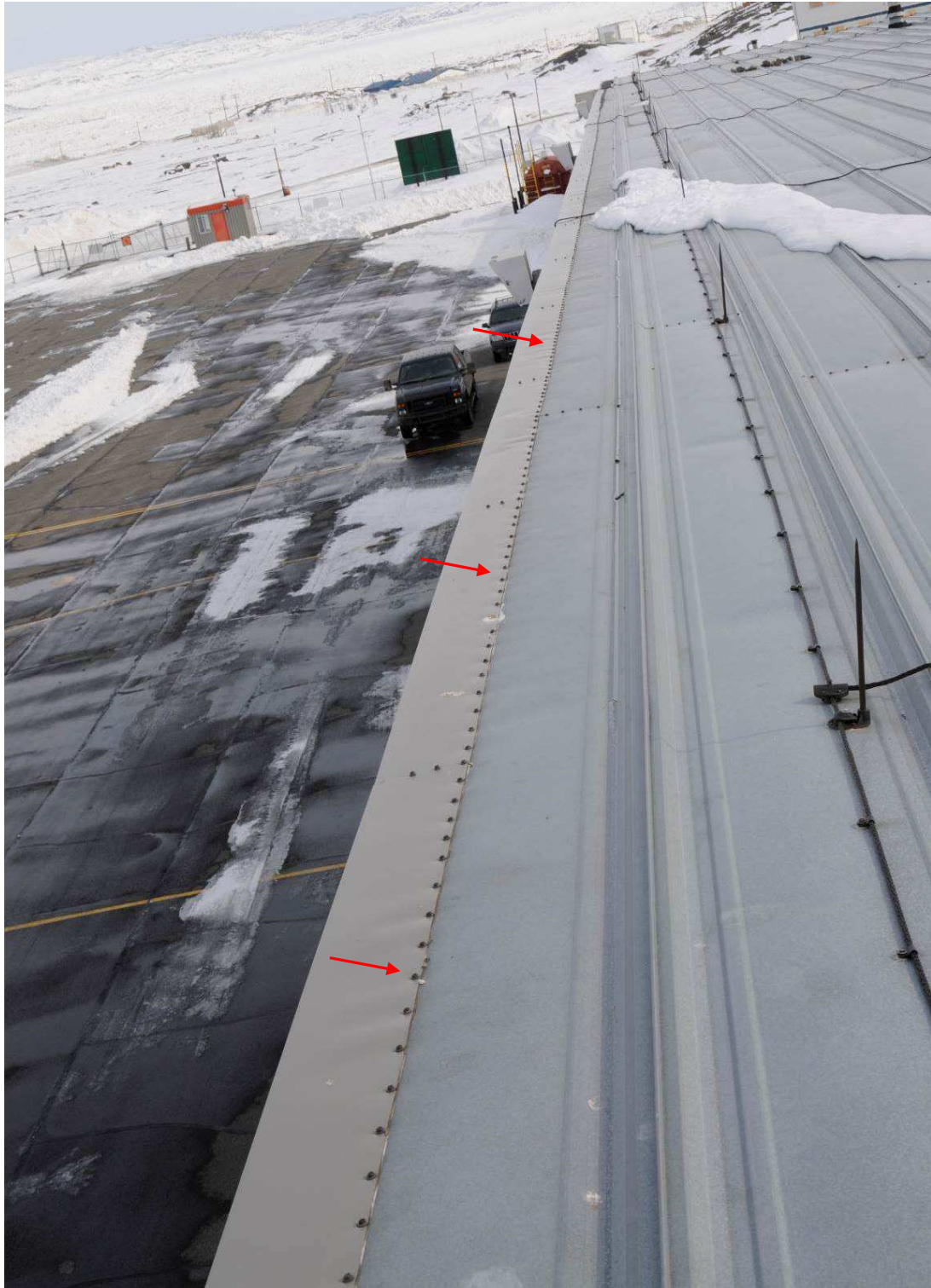




**Photo 3:** Photo of the south end of the roof deck.



**Photo 4:** Photo of the north end of the roof deck, note the rock on the roof deck (to be removed).



**Photo 5:** Photo at the eve of the roof deck along the east elevation of the building, viewing towards the south end of the roof deck. Joint between metal roof panel and sheet metal flashing to be repaired along the entire length of the east and west elevations.





**Photo 6:** Typical asphalt mastic application at the interface between the sheet metal flashings along the eve of the roof system and metal roof panels on the east and west elevations. Photo taken along west elevation. All asphalt material to be removed prior to installation of new microsealant tape material along the joint between the metal pan and the sheet metal flashings along the east and west elevations.

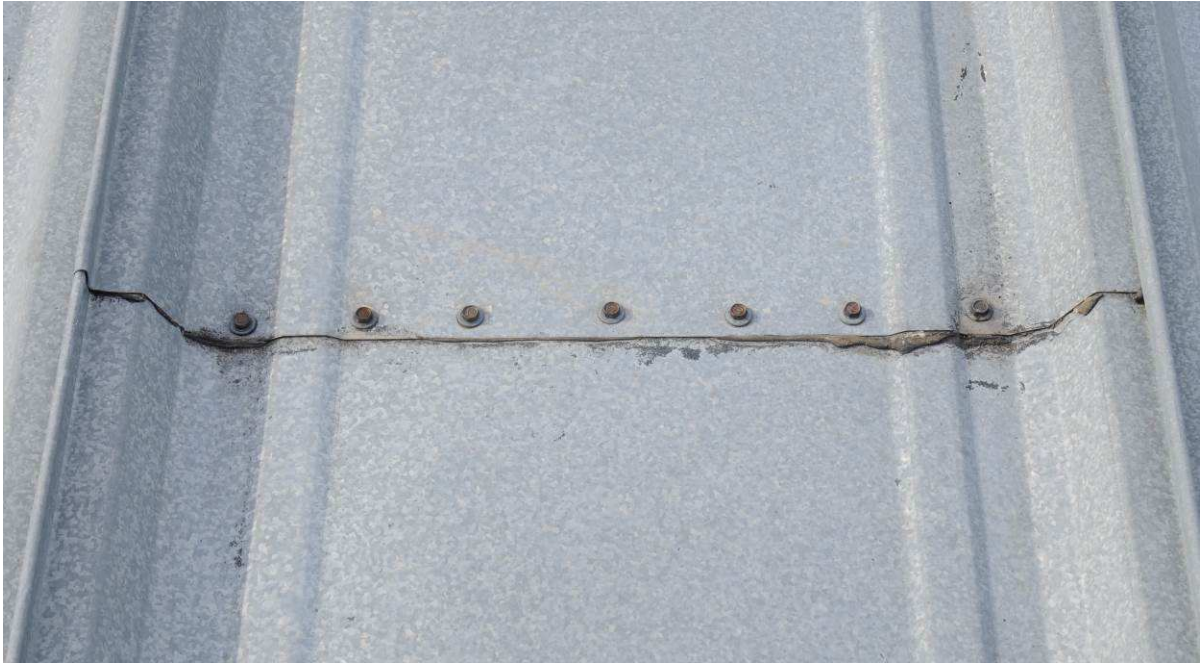


**Photo 7:** Typical asphalt mastic application at the interface between the sheet metal flashings along the eve of the roof system and metal roof panel on the north and south elevations. Photo taken at south elevation. All asphalt material to be removed prior to installation of new microsealant tape material.





**Photo 8:** Typical end lap at the north / south elevations of the roof system. Note the installation of the rain gutter at these locations. All asphalt, metallic paint material and surface corrosion to be removed prior to installation of new material. Contractor to re-install existing rain gutter support brackets and end lap clamp where existing brackets and clamps are loose or dislodged.



**Photo 9:** Typical head / end lap seam in the metal roof system.



**Photo 10:** Typical metallic paint applied at the head / end laps between metal roof panels. All metallic paint (and asphalt) material to be removed prior to installation of new microsealant tape material





**Photo 11:** Typical metallic paint and asphalt mastic applied at the standing seam and head / end laps in the metal roof system. All asphalt, metallic paint material and surface corrosion to be removed prior to installation of new microsealant tape material



**Photo 12:** Typical asphalt mastic application at the head / end laps between metal roof panels.  
All asphalt material to be removed prior to installation of new microsealant tape material



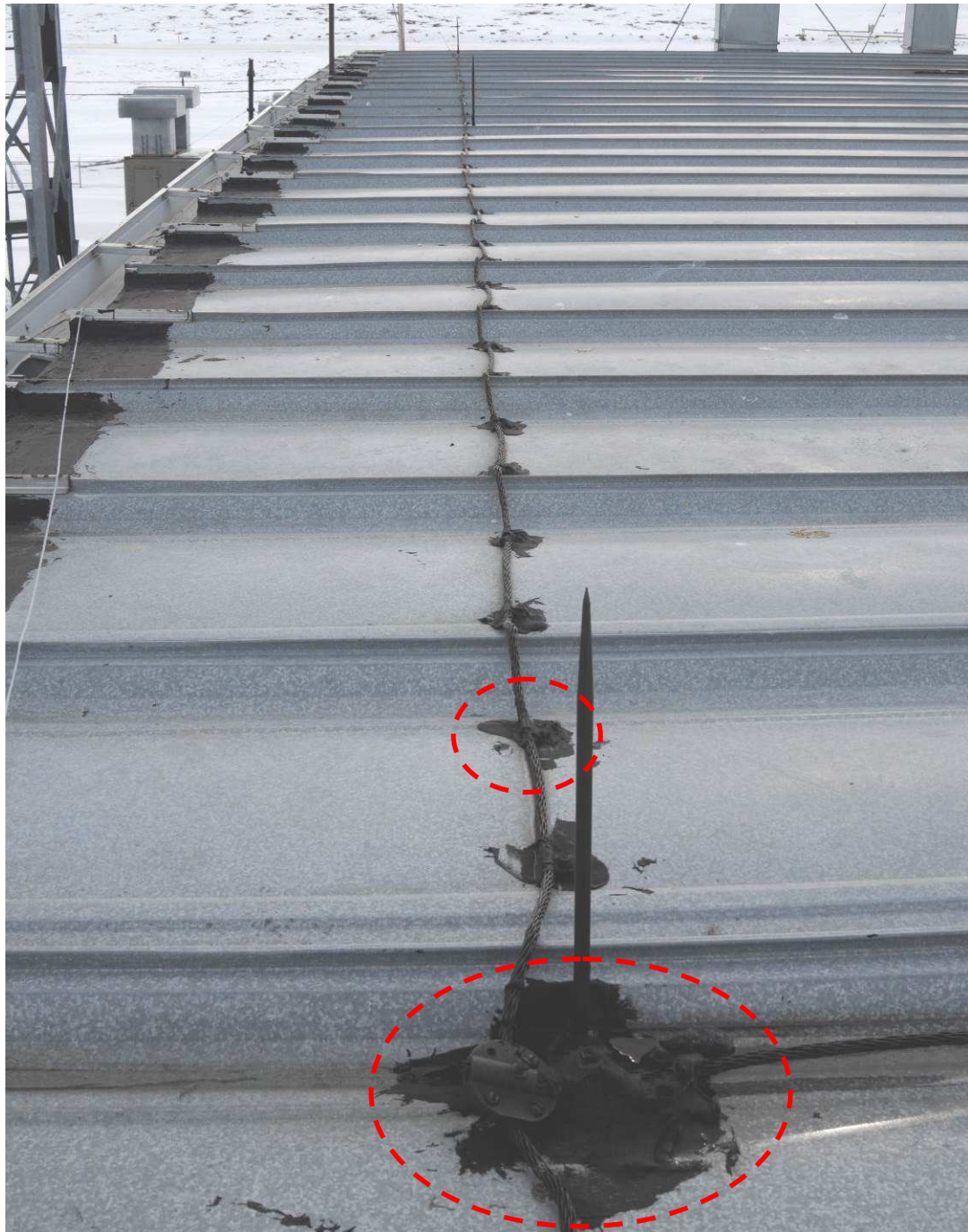


**Photo 13:** Typical metallic paint applied at the base of a exhaust stack. All metallic paint (and asphalt) material to be removed prior to installation of new bituminous membrane flashings.

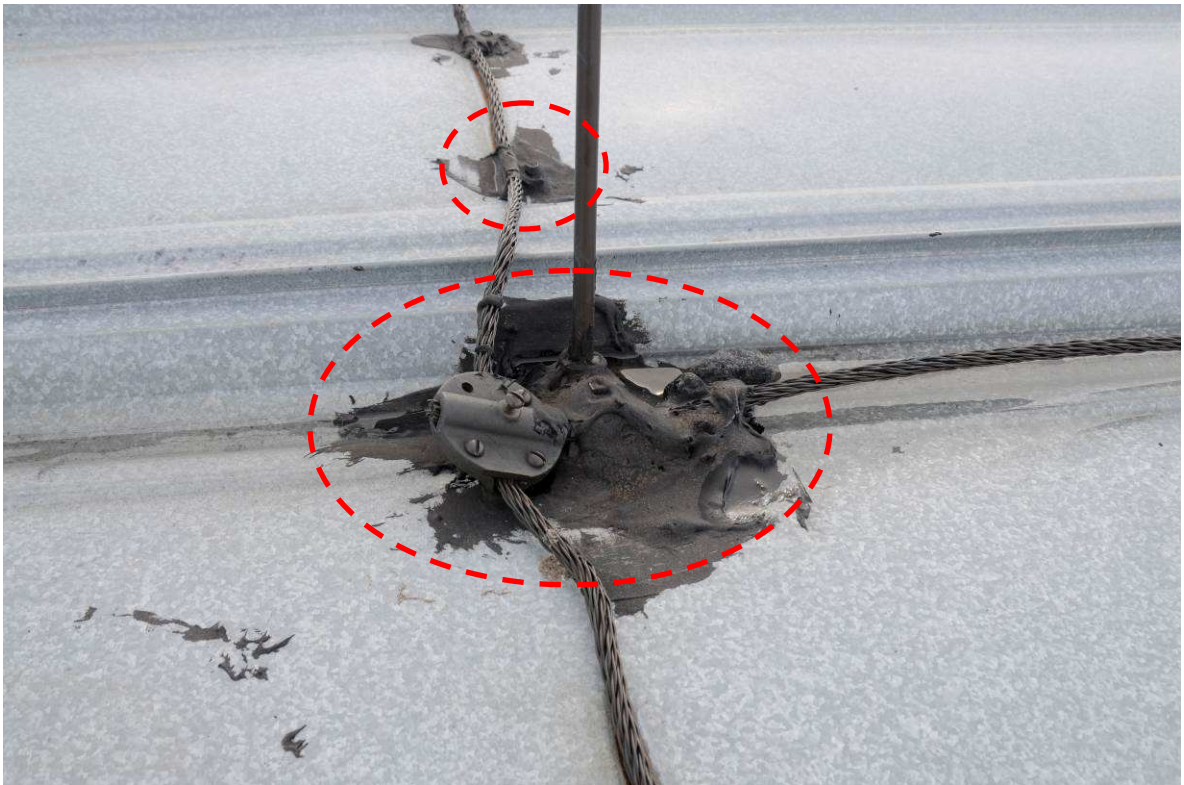


**Photo 14:** Typical metallic paint and asphalt mastic applied at the base of an exhaust stack. All asphalt and metallic paint material to be removed prior to installation of new bituminous membrane flashings.





**Photo 15:** Typical lightning arrest system installation and (previous) repair. All asphalt, metallic paint material and surface corrosion to be removed prior to re-installation of lightning arrest anchor base support brackets and cable ties. Photo along the south elevation, viewing to the west.

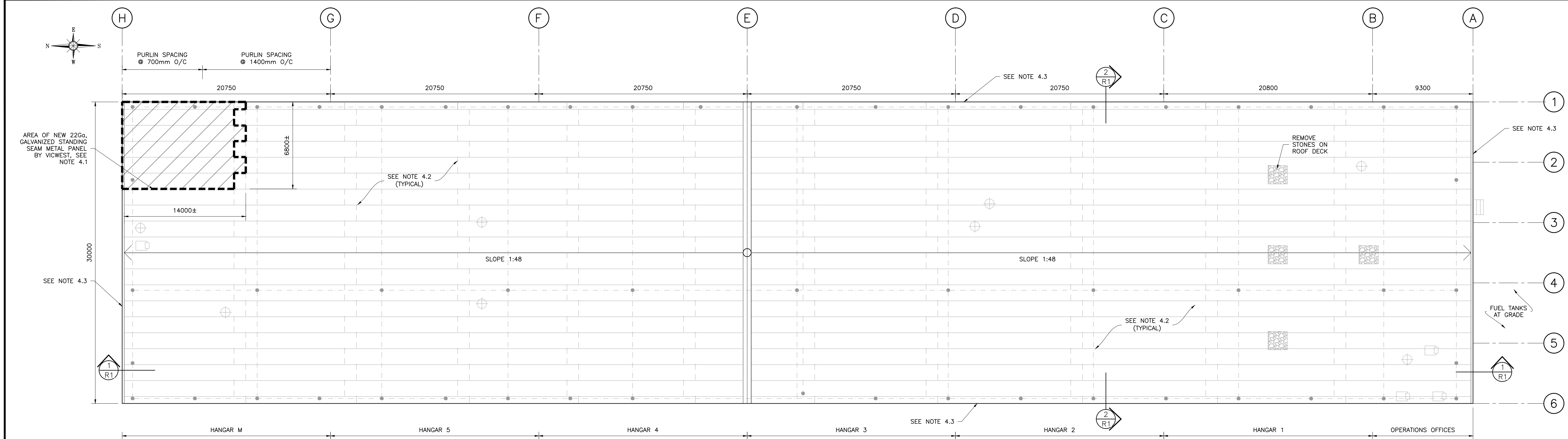


**Photo 16:** Typical lightning arrest system installation and (previous) repair. All asphalt, metallic paint material and surface corrosion to be removed prior to re-installation of lightning arrest anchor base support brackets and wire ties. .

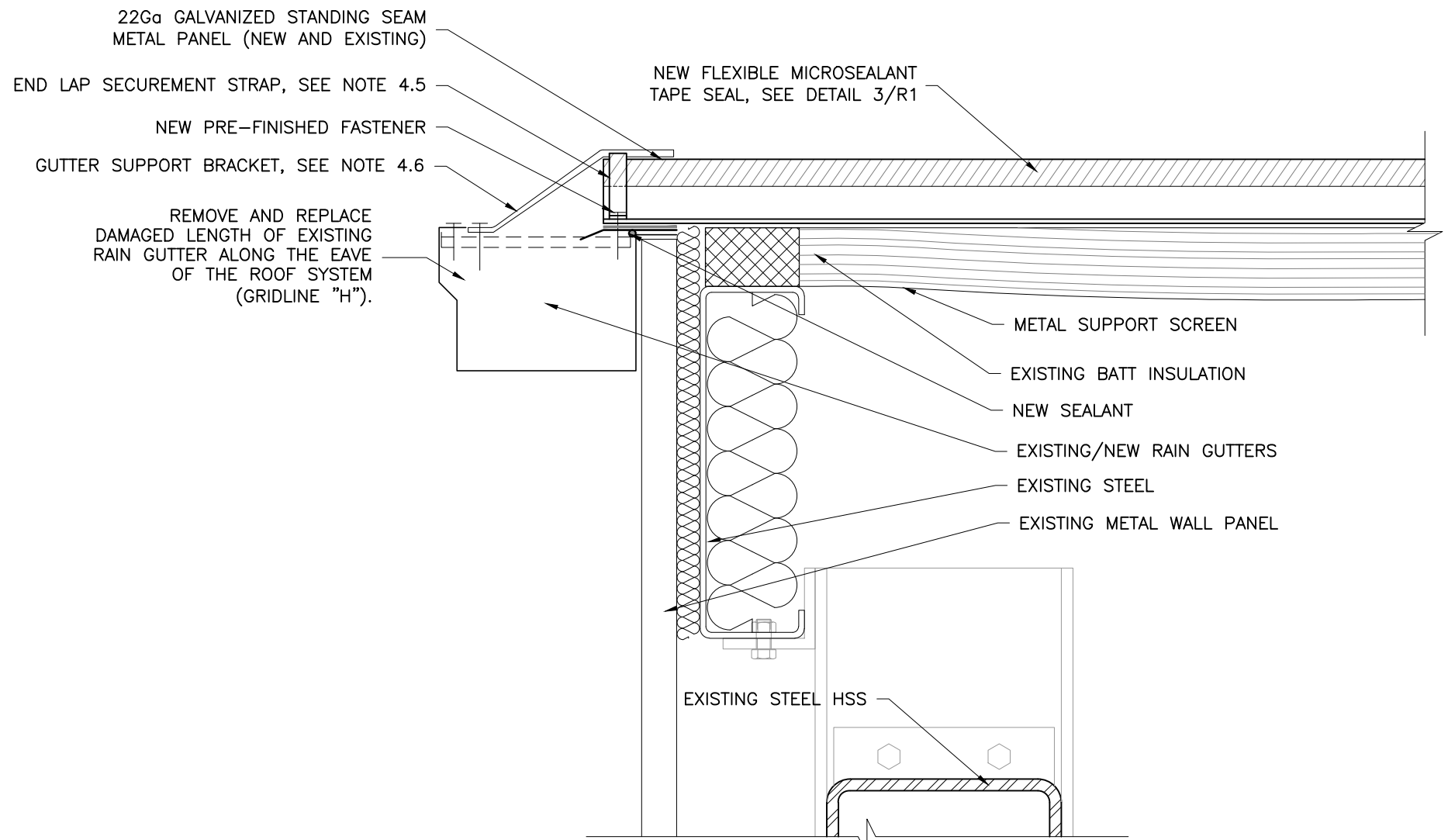


**Photo 17:** Typical Installation of asphalt mastic at the north and south ends of the roof deck. Note the installation of the rain gutter support bracket and end lap securement strap.

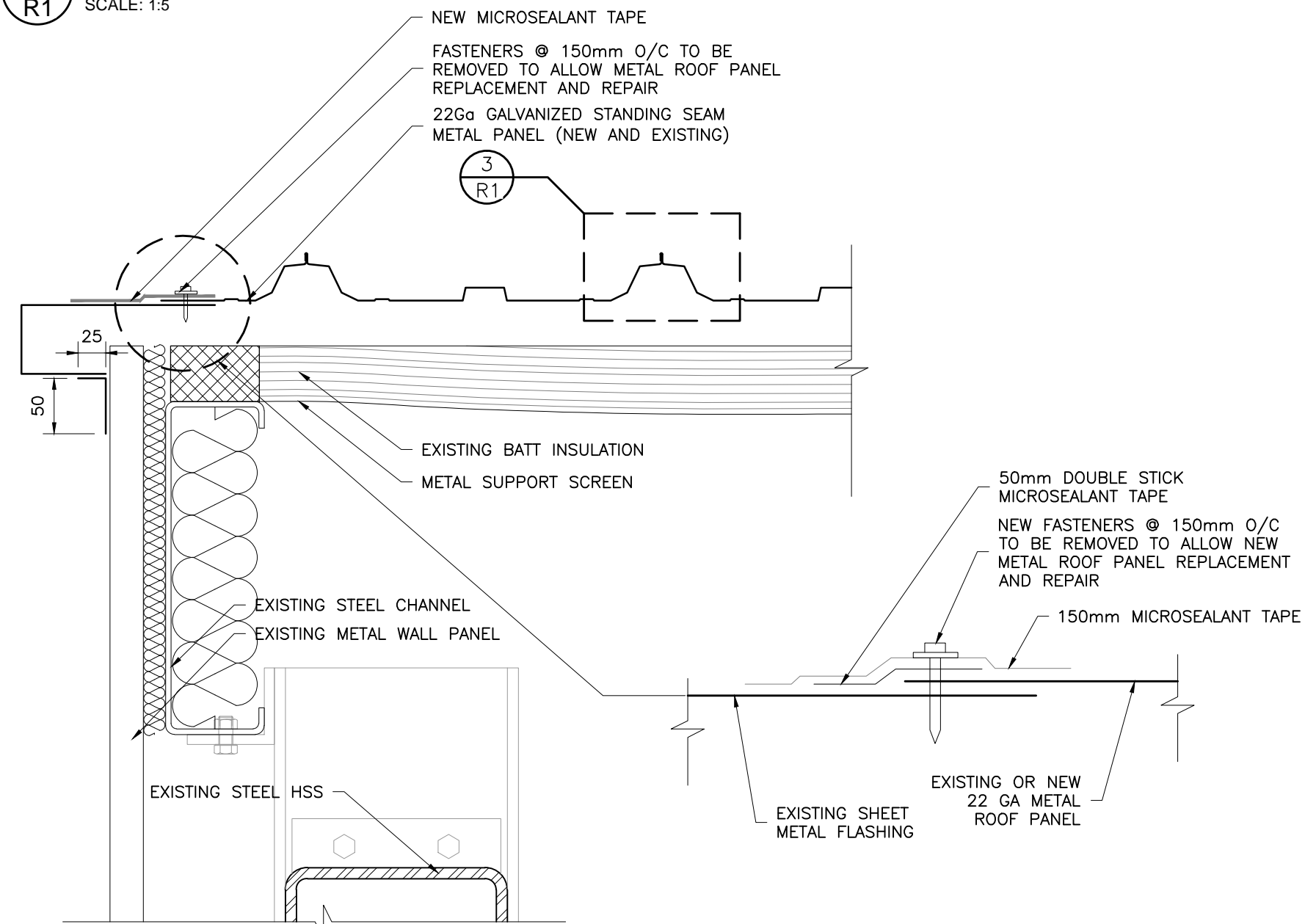




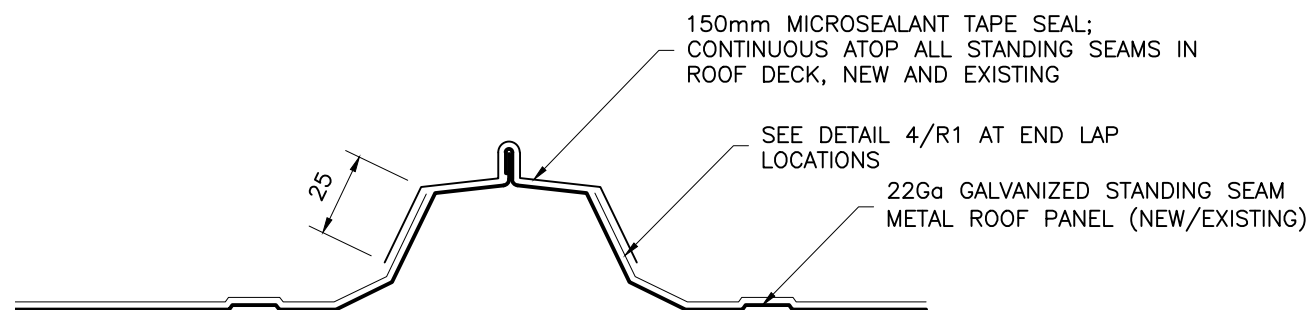
ROOF PLAN  
SCALE: 1:200



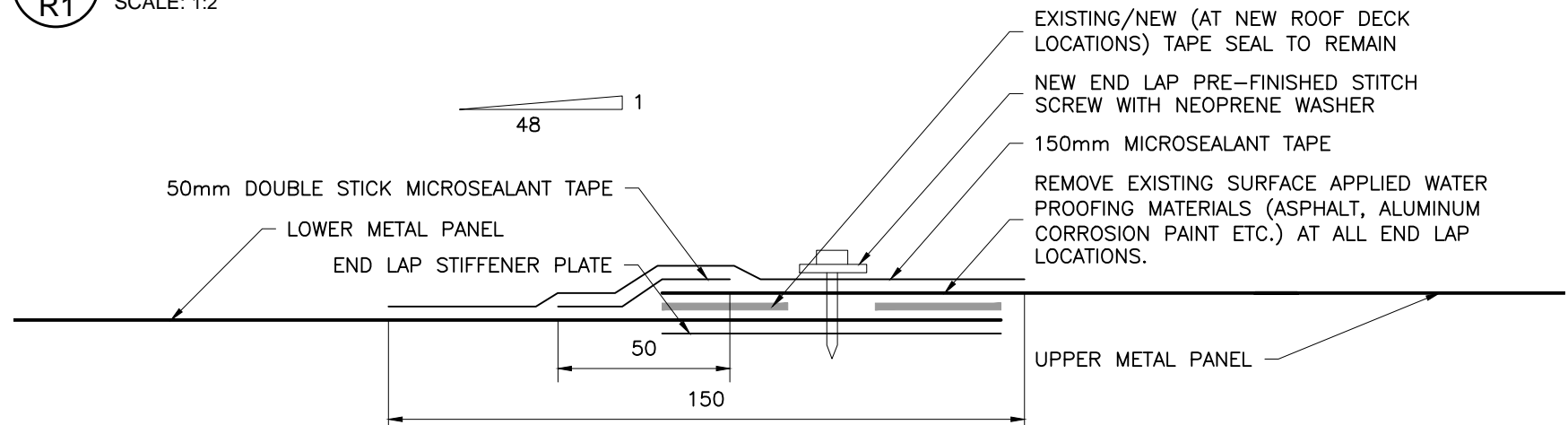
1  
R1  
TYPICAL PERIMETER (END LAP) ROOF DETAIL  
SCALE: 1:5



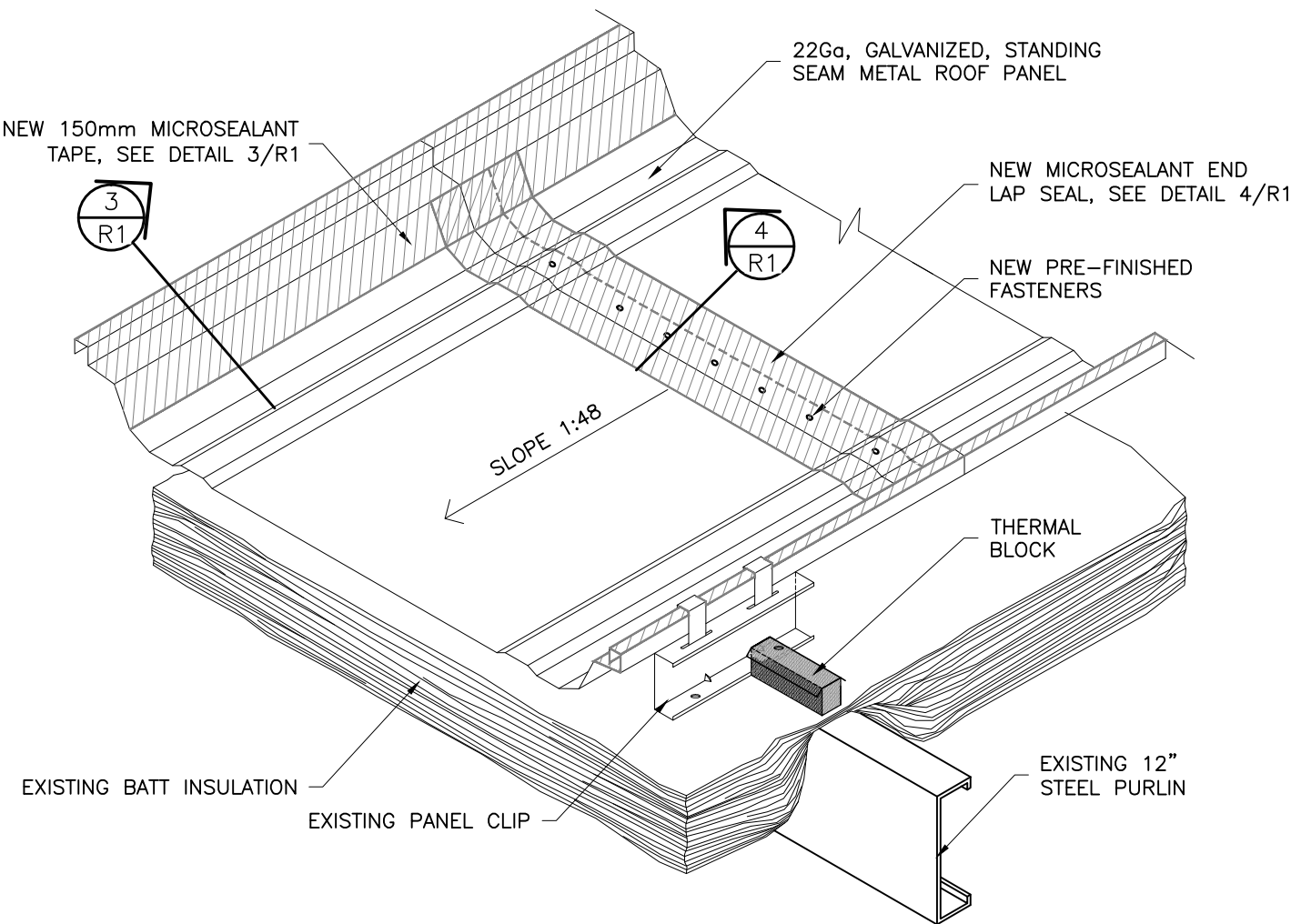
2  
R1  
TYPICAL PERIMETER (SIDE) ROOF DETAIL  
SCALE: 1:5



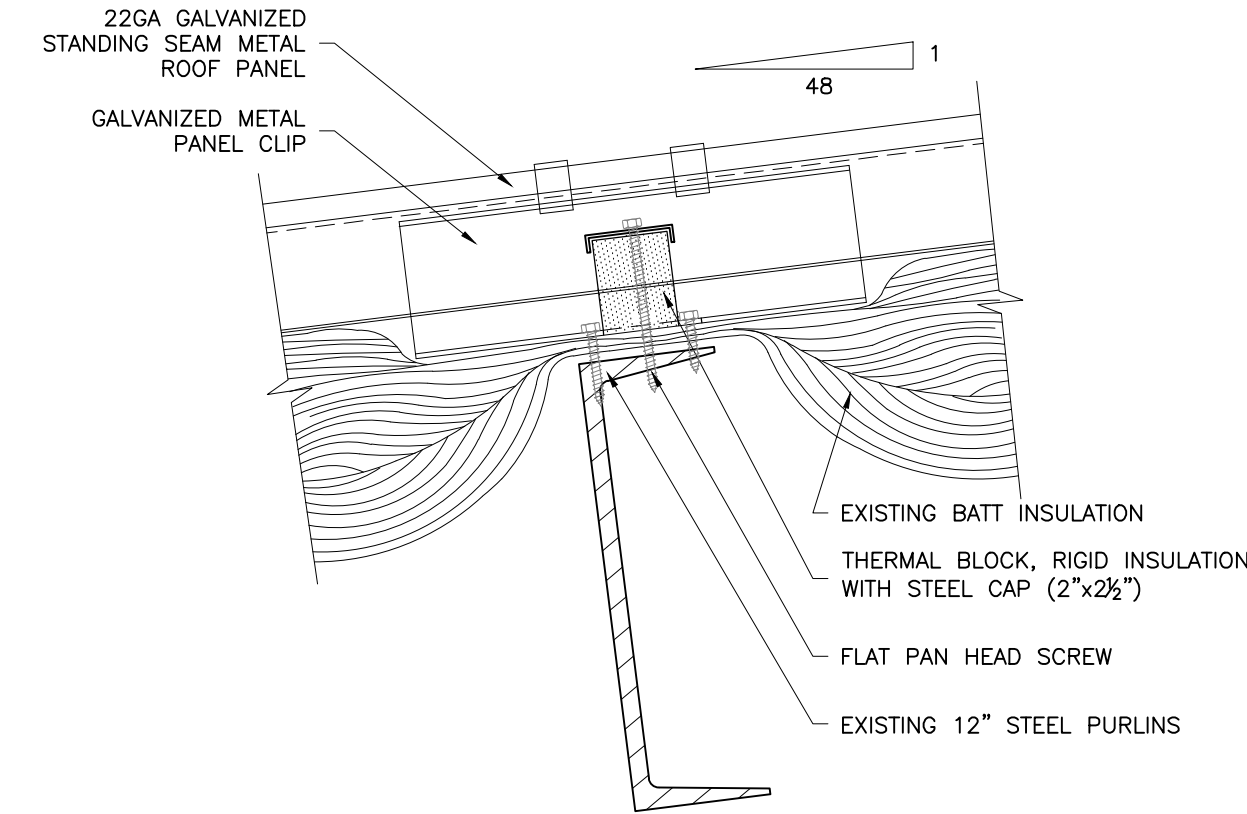
3  
R1  
TYPICAL TAPE SEAL INSTALLATION AT STANDING SEAM  
SCALE: 1:2



4  
R1  
TYPICAL TAPE SEAL INSTALLATION AT END LAPS  
SCALE: 1:2



TYPICAL EXISTING/ NEW ROOF PANEL  
SECUREMENT AND REPAIR - ISOMETRIC  
SCALE: 1:16



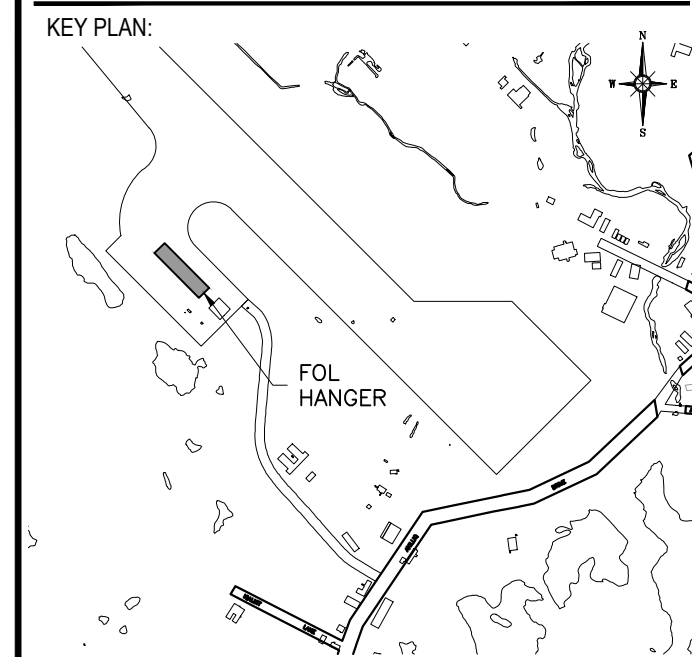
TYPICAL EXISTING ROOF PANEL SECUREMENT DETAIL  
SCALE: 1:5

GENERAL NOTES:

- REFER TO DRAWING R2 FOR PHOTO REFERENCES.
- ALL WORK SHALL CONFORM TO THE NATIONAL BUILDING CODE OF CANADA, LATEST EDITION WITH AMENDMENTS.
- ALL WORK TO BE PERFORMED IN ACCORDANCE WITH APPLICABLE LEGISLATION AND REGULATIONS INCLUDING, BUT NOT LIMITED TO, OCCUPATIONAL HEALTH AND SAFETY ACT AND W.S.C.C. (NUNAVUT) REGULATIONS.
- THE CONTRACTOR SHALL AS PART OF THEIR WORK, CHECK AND VERIFY ALL DIMENSIONS AND ELEVATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.
- SCOPE OF WORK SHALL INCLUDE, BUT NOT LIMITED TO:
  - REMOVAL AND REPLACEMENT OF EXISTING DESIGNATED METAL ROOF PANELS (SEE ROOF PLAN ON DRAWING R1)
  - INSTALLATION OF NEW PRE-FINISHED METAL FASTENERS AND FLEXIBLE TAPE SEALS AT ALL END LAPS JOINTS IN THE METAL ROOF DECK. SEE DETAIL 4/R1.
  - INSTALLATION OF NEW PRE-FINISHED METAL FASTENERS AND FLEXIBLE TAPE SEALS AROUND THE PERIMETER OF THE METAL ROOF SYSTEM ALONG GRID LINES A, H, 1 AND 6. SEE DETAIL 3/R1 AND 4/R1.
  - ALL EXPOSED FASTENERS TO BE PRE-FINISHED WITH NEOPRENE WASHERS.
  - REMOVE AND REPLACE ALL END LAP SECUREMENT STRAPS LOCATED ALONG GRIDLINES "A" AND "H".
  - REMOVE AND REPLACE MISSING AND DAMAGE GUTTER SUPPORT BRACKETS ALONG GRIDLINES "A" AND "H".

NO.	REVISION	DATE
1	ISSUED FOR TENDER	JUNE 07, 2016
2		
3		
4		
5		
6		
7		

NOTES:  
CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR REPORTING ALL DISCREPANCIES TO OWNER AND/OR CONSULTANT PRIOR TO TENDER CLOSING.  
LATEST APPROVED DRAWINGS ONLY TO BE USED FOR CONSTRUCTION.  
PRINTS ARE NOT TO BE SCALED.  
ALL DIMENSIONS INDICATED ARE IN MILLIMETRES (mm) UNLESS OTHERWISE NOTED.



- LEGEND:
- EXHAUST STACK
  - EXHAUST VENT
  - LIGHTNING ARREST SYSTEM (CABLE AND RODS)
  - GRAVEL PILE
  - END LAP STANDING SEAM METAL ROOF DECK
  - PHOTOGRAPH REFERENCE

PERMIT TO PRACTICE  
Concentric Associates International Inc.  
Signature:   
Date: NOV/27/15  
PERMIT NUMBER: P 492  
The Association of Professional Engineers, Geologists and Geophysicists of the NWT / NU



**CONCENTRIC**  
CLIENT-CENTRIC CHALLENGE DRIVEN

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<b>IQALUIT</b> Tel. 1-867-979-3300 Toll Free 1-866-919-4533	<b>SASKATOON</b> Tel. 1-306-343-5500 Toll Free 1-866-919-8899
<b>WINNIPEG</b> Tel. 1-204-783-1276 Toll Free 1-866-919-4531	<b>MISSISSAUGA</b> Tel. 1-905-286-1100

CLIENT NAME:  
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

PROJECT ADDRESS:  
HANGAR 6M- FORWARD OPERATION LOCATION, IQALUIT NUNAVUT

PROJECT NAME:  
ROOF REPAIR, FOL HANGAR IQALUIT

DRAWING TITLE:  
ROOF PLAN AND DETAILS

DESIGN: WRS	SCALE: AS SHOWN
DRAWN: STM	DATE: NOV/2015
APPVD: STP	FILE No: R.072866.001

SHEET No.

R1





PHOTO\_1: VIEW OF METAL ROOF DECK (SOUTH)



PHOTO\_3: TYPICAL EXHAUST STACK (QTY 8)



PHOTO\_5: TYPICAL END LAP WITH ASPHALT MASTIC



PHOTO\_7: TYPICAL EXHAUST HOOD (QTY 4)



PHOTO\_9: TYPICAL STONE PILE ON ROOF DECK (4 LOCATIONS)



PHOTO\_2: TYPICAL METAL ROOF DECK AT END LAP LAYOUT



PHOTO\_4: TYPICAL END LAP WITH ALUMINUM PAINT

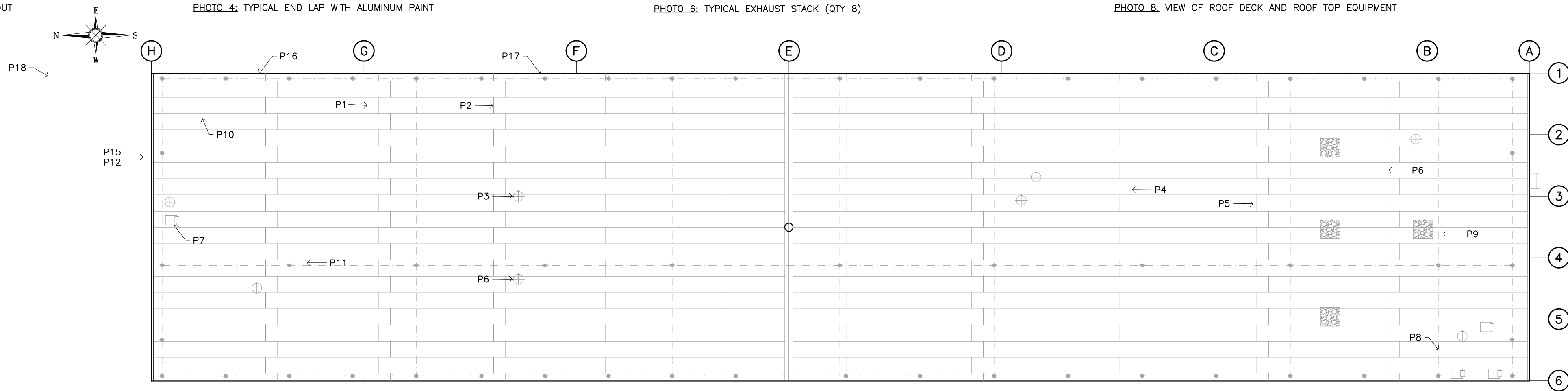


PHOTO\_6: TYPICAL EXHAUST STACK (QTY 8)



PHOTO\_8: VIEW OF ROOF DECK AND ROOF TOP EQUIPMENT

- NOTES:
- PHOTOS ARE INTENDED TO CONVEY SCOPE AND TYPICAL CONDITIONS ON SITE. CONDITIONS WILL VARY AT INDIVIDUAL END LAP AND ROOF PENETRATIONS (MECHANICAL EQUIPMENT) LOCATIONS.



NO.	REVISION	DATE
1	ISSUED FOR TENDER	JUNE 07, 2016
2		
3		
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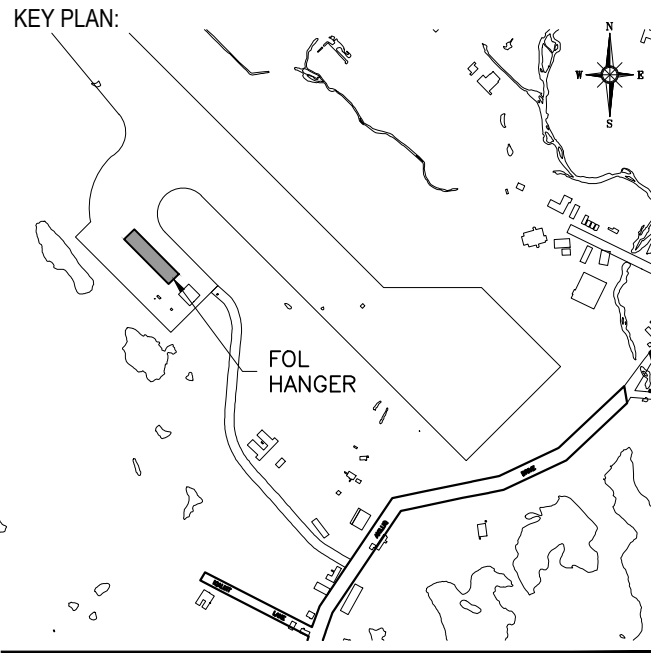
NOTES:

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR REPORTING ALL DISCREPANCIES TO OWNER AND/OR CONSULTANT PRIOR TO TENDER CLOSING.

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- LEGEND:
- EXHAUST STACK
  - EXHAUST VENT
  - LIGHTNING ARREST SYSTEM (CABLE AND RODS)
  - GRAVEL PILE
  - END LAP, STANDING SEAM METAL ROOF DECK
  - PHOTOGRAPH REFERENCE

PERMIT TO PRACTICE  
Concentric Associates International Inc.  
Signature:   
Date: NOV/27/15  
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**MISSISSAUGA**  
Tel. 1-905-286-1100



PHOTO\_10: AREA OF DAMAGED ROOF DECK, NORTH EAST CORNER OF ROOF DECK



PHOTO\_12: TYPICAL RAIN GUTTER SUPPORT BRACKET, NOTE DAMAGE AT TOP OF STANDING SEAM



PHOTO\_15: VIEW OF DAMAGED GUTTER TEMPORARY REPAIR



PHOTO\_17: TYPICAL ROOF INSTALLATION AT (EAST/WEST SIDE) PERIMETER OF ROOF DECK. SEE DETAIL 2/R1



PHOTO\_19: UNDERSIDE OF DAMAGED CORNER OF ROOF DECK AT NORTH/EAST CORNER OF ROOF SYSTEM



PHOTO\_11: TYPICAL LIGHTNING ARREST SYSTEM



PHOTO\_13: TYPICAL ROOF DECK CORROSION



PHOTO\_14: VIEW OF EXISTING PANEL CLIP FROM THE UNDERSIDE OF THE ROOF SYSTEM



PHOTO\_16: TYPICAL ROOF INSTALLATION AT (SIDE) PERIMETER OF ROOF DECK. SEE 2/R1.



PHOTO\_18: VIEW OF NORTH ELEVATION OF BUILDING



PHOTO\_20: TYPICAL VIEW OF ROOF SYSTEM UNDERSIDE

CLIENT NAME:

PUBLIC WORKS AND GOVERNMENT SERVICES  
CANADA

PROJECT ADDRESS:

HANGAR 6M- FORWARD OPERATION LOCATION,  
IQALUIT NUNAVUT

PROJECT NAME:

ROOF REPAIR, FOL HANGAR IQALUIT

DRAWING TITLE:

PHOTOS OF EXISTING CONDITIONS

DESIGN: WRS  
DRAWN: STM  
APPVD: STP

SCALE: AS SHOWN  
DATE: NOV/2015  
FILE No: R.072866.001

SHEET No.

R2