

PROJECT TITLE: Living Units Duct Cleaning – Warkworth Institution

PROJECT NUMBER: R033222.001

PROJECT DATE: 2013-05-28

SPECIFICATIONS

<u>DIVISION</u>	<u>SECTION</u>	<u>NO. OF PAGES</u>
DIVISION 01	01 11 00 - Summary of Work	4
	01 11 01 - General Instructions Minor Work	13
	01 14 00 - Work Restrictions	3
	01 33 00 - Submittal Procedures	4
	01 35 13 - Special Project Procedures for Correctional Service Canada Security Requirements	9
	01 35 29.06 - Health and Safety Requirements	4
	01 56 00 - Temporary Barriers and Enclosures	2
	01 74 11 - Cleaning	2
	01 77 00 - Closeout Procedures	2
	01 78 00 - Closeout Submittals	4
DIVISION 23	23 05 00 - Common Work Results for HVAC	2
	23 01 31 - Air Duct Cleaning for HVAC Systems	9
	23 05 93 - Testing, Adjusting and Balancing for HVAC	6
	23 33 00 - Air Duct Accessories	4
	23 37 13 - Diffusers, Registers and Grilles	4
APPENDIX 1	Designated Substances and Hazardous Materials Survey	96

DRAWINGS

GENERAL

G401	Cover Page, Key Plan & Drawing List
------	-------------------------------------

MECHANICAL

M401	Mechanical Legend
M402	Building WW05 Floor 1 and Attic Existing HVAC Layout
M403	Building WW06 Floor 1 and Attic Existing HVAC Layout
M404	Buildings WW; 08, 09, 10 & 11 Lower Level and Floor 1 Existing HVAC Layout
M405	Buildings WW; 08, 09, 10 & 11 Floor 2 Existing HVAC Layout
M406	Buildings WW; 08, 09, 10 & 11 Upper Mechanical Room and Attic Space Existing HVAC Layout

END OF SECTION

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises cleaning of the supply, return and exhaust ductwork systems of living units WW05, WW06, WW08, WW09, WW10 and WW11, located at Warkworth Institution; and further identified as 15847 County Road, Campbellford, Ontario.

1.2 CONTRACT METHOD

- .1 Perform Work under lump sum contract.

1.3 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.
- .2 Coordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.4 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Departmental Representative's continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Departmental Representative Occupancy during construction.
- .3 Required stages:
 - .1 Conduct work on a building by building basis, according to schedule approved by Director.
 - .2 Conduct work on a system by system basis so that the entire system or at least one entire side (supply side or return side) is completely cleaned and returned to service by the end of one working shift.
- .4 Maintain fire access/control.

1.5 CONTRACTOR USE OF PREMISES

- .1 Restricted use of site until Substantial Performance.
 - .2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
-

- .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .5 At completion of operations under this Contract, condition of existing work shall be equal to or better than that which existed before new work started.

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 Use only elevators or stairs existing in building for moving workers and material.
 - .1 Accept liability for damage, safety of equipment and overloading of existing equipment.

1.7 EXISTING SERVICES

- .1 Notify Departmental Representative of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative at least 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 Departmental Representative with minimum disturbance to facility operations.
- .3 Construct barriers in accordance with Section 01 56 00.

1.8 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda and Amendments.
 - .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

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 MINIMUM STANDARDS

- .1 Execute work to meet or exceed:
 - .1 National Building Code of Canada 2010, National Fire Code of Canada 2010, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date. Provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
 - .2 Rules and regulations of authorities having jurisdiction.
 - .3 Federal Fire Commissioner, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
 - .4 Treasury Board of Canada Secretariat, Fire Protection Standard, April 1, 2010.
 - .5 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
 - .6 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.

1.2 AUTHORITIES HAVING JURISDICTION

- .1 The Federal Fire Commissioner is the sole authority having jurisdiction over this project with regards to fire standards.

1.3 HAZARDOUS MATERIAL DISCOVERY

- .1 Stop work immediately when material resembling spray or trowel-applied asbestos, Polychlorinated Biphenyl (PCB), mould or other designated substance is encountered during demolition work.
- .2 Take preventative measures and promptly notify Departmental Representative.
- .3 Do not proceed until written instructions have been received from Departmental Representative.

1.4 TAXES

- .1 Pay applicable Federal, Provincial, and Municipal taxes.
-

1.5 FEES, PERMITS, CERTIFICATES AND LETTERS

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates, permits and letters required.
- .3 Furnish certificates, permits and letters when requested.

1.6 COST BREAKDOWN

- .1 Within 48 hours of notification of acceptance of bid, furnish a cost breakdown by Section aggregating contract price.
- .2 Show separately the cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax licence number.
- .3 Within 48 hours of acceptance of bid, submit a list of subcontractors.
- .4 Before submitting first progress claim, submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating the Contract Amount. After approval by Departmental Representative, the cost breakdown will be used as the basis of progress payments.

1.7 CONSTRUCTION PROGRESS SCHEDULE

- .1 Schedule and execute Work with least possible interference or disturbance to the normal use of premises.
- .2 On award of contract, submit Gantt chart construction schedule for work, indicating anticipated progress stages within time of completion. When the Departmental Representative has reviewed schedule, take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

1.8 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental representative of findings.

1.9 DOCUMENTS

- .1 Keep one copy of contract documents and shop drawings on the site.
-

1.10 ELECTRONIC SUBMITTALS

- .1 Submit in electronic format as pdf files on one CD.

1.11 FIRE SAFETY REQUIREMENTS

- .1 Comply with both the National Building Code of Canada 2010 and the National Fire Code of Canada 2010 for safety of persons in buildings in the event of a fire and the protection of buildings from the effects of fire, as follows:
 - .1 The National Building Code (NBC): for fire safety and fire protection features that are required to be incorporated in a building during construction.
 - .2 The National Fire Code (NFC):
 - .1 The on-going maintenance and use of the fire safety and fire protection features incorporated in buildings.
 - .2 The conduct of activities that might cause fire hazards in and around buildings.
 - .3 Limitations on hazardous contents in and around buildings.
 - .4 The establishment of fire safety plans.
 - .5 Fire safety at construction and demolition sites.
 - .3 Comply with Human Resources and Skills Development Canada (HRSDC), Fire Commissioner of Canada Standards:
 - .1 FC 301, Standard for Construction Operations, June 1982 - Standards.
 - .2 FC 302, Standard for Welding and Cutting, June 1982 - Standards.
 - .3 FC 374, Fire Protection Standard for General Storage (Indoor and Outdoor), September 1994 - Standard.
 - .4 Retain all fire safety documents and standards on site.
 - .4 Welding and cutting:
 - .1 Before welding, soldering, grinding and/or cutting work, obtain a permit from the Fire Prevention Unit as directed by the Departmental Representative. Store flammable liquids in approved CSA containers inspected by the Fire Prevention Unit. No open flame shall be used unless authorized by the Fire Prevention Unit.
 - .2 At least 48 hours prior to commencing cutting, welding or soldering procedure, provide to Departmental Representative:
 - .1 Notice of intent, indicating devices affected, time and duration of isolation or bypass.
 - .2 Completed welding permit as defined in FC 302.
 - .3 Return welding permit to Departmental Representative immediately upon completion of procedures for which permit was issued.
 - .3 "Fire Watchers" as described in FC 302 shall be assigned when welding or cutting operations are carried out in areas where combustible materials within 10m may be ignited by conduction or radiation.

- .5 Where work requires interruption or cause activation of fire alarms or fire suppression, extinguishing or protection systems:
 - .1 Provide "Watchman Service" as described in FC 301; In general, watchman service is defined as an individual conversant with "Fire Emergency Procedures", performing fire picket duty within an unprotected and unoccupied (no workers) area once per hour.
 - .2 Retain services of manufacturer for fire protection systems on daily basis or as approved by Departmental Representative, to isolate and protect all devices relating to:
 - .1 Modification of fire alarms, fire suppression, extinguishing or protection systems; and/or,
 - .2 Cutting, welding, soldering or other construction activities that might activate fire protection systems.
 - .3 Immediately upon completion of work, restore fire protection systems to normal operation and verify that all devices are fully operational.
 - .4 Inform fire alarm system monitoring agency and local Fire Department immediately prior to isolation and immediately upon restoration of normal operation.

1.12 QUALITY CONTROL

- .1 Testing Laboratory Services:
 - .1 Departmental Representative will appoint and pay for costs of inspection and testing services, unless indicated otherwise.
 - .2 Provide safe working areas and assist with testing procedures, including provisions for materials or services and co-ordination, as required by testing agency and as authorized by Departmental Representative.
 - .3 Where tests indicate non-compliance with specifications, contractor to pay for initial test and all subsequent testing of work to verify acceptability of corrected work.

1.13 DESIGN DATA, TEST REPORTS, CERTIFICATES, MANUFACTURER'S INSTRUCTIONS, MANUFACTURER'S FIELD REPORTS

- .1 Prior to submission check and certify as correct each submission. Issue to Departmental Representative each submission at least 14 days before reviewed submission will be needed.
- .2 Submit three (3) white print copies of each item requested.
- .3 For products bearing the 'Ecologo' of the Environmental Choice Program, Environment Canada, Canadian Environmental Protection Act, Environmental Choice Product Guidelines:
 - .1 Submit two copies of the licensing criteria statements and the verification of compliance with Sections 3(a) and 3(b) of the ECP to the Departmental Representative. For adhesives, paints, primers and sealants, cleaners and degreasers, floor polishes, water borne surface coatings, indicate VOC in g/l.

- .2 Alternatively, material in original containers bearing the 'Ecologo' or products bearing the 'Ecologo' will satisfy this requirement.
- .4 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

1.14 ADDITIONAL DRAWINGS

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

1.15 PROTECTION

- .1 Protect existing work from damage.
- .2 Replace damaged existing work with material and finish to match original.
- .3 Cover furniture and fittings prior to commencing work.
- .4 Remove coverings and clean following completion of each work period.
- .5 Provide temporary partitions in compliance with Section 01 56 00 between occupied and work areas. Maintain access to fire exits and washroom facilities. Remove partition on completion of work.

1.16 EXISTING SERVICES

- .1 Maintain existing services in occupied areas.
- .2 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .3 Use existing water and electrical services at no cost.

1.17 TEMPORARY UTILITIES

- .1 Give the Departmental Representative 48 hours' notice related to each necessary interruption of any mechanical or electrical service throughout the course of the work. Keep duration of these interruptions to a minimum. Carry out all interruptions after normal working hours of the occupants, preferably on weekends.

1.18 TEMPORARY FACILITIES AND SERVICES

- .1 Provide and maintain temporary facilities and services required to carry out work.
 - .2 Remove temporary facilities and services on completion of work.
-

- .3 Provide and maintain temperature and enclosure required to prevent frost damage to facility.

1.19 CONSTRUCTION FACILITIES

- .1 See section 01 35 13.
- .2 Existing Elevators:
 - .1 Coordinate use with Departmental Representative.
 - .2 Protect from damage, safety hazards and overloading of existing equipment.
- .3 Site Storage:
 - .1 Do not unreasonably encumber site with materials or equipment.
 - .2 Move stored products or equipment which interferes with operations of Departmental Representative.
 - .3 Obtain and pay for use of additional storage or work areas needed for operations.
- .4 Where security is reduced by work, provide temporary means to maintain security.
- .5 Sanitary facilities: will be assigned for Contractor's personnel. Others shall not be used. Keep facilities clean.
- .6 Signage:
 - .1 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etcetera, in both official languages or by the use of commonly understood graphic symbols and to approval of the Departmental Representative.
 - .2 No advertising will be permitted on this project.
 - .3 Maintain approved signs and notices in good condition for duration of project and dispose of offsite, on completion of project or earlier, as directed by Departmental Representative.

1.20 COMMON PRODUCT REQUIREMENTS

- .1 Quality of Work:
 - .1 Carry out work using qualified licensed workers or apprentices in accordance with Provincial Act, respecting manpower vocational training and qualification.
 - .2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers.
 - .3 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.
- .2 Storage, Handling and Protection:
 - .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions.

- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove packaging or bundling until required in work.
- .3 Manufacturer's Instructions: unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

1.21 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
- .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

1.22 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.
- .3 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.

1.23 CUTTING AND REMEDIAL WORK

- .1 Co-ordinate work to keep cutting and remedial work to a minimum.
 - .2 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, ducts, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Departmental Representative prior to cutting or drilling.
 - .3 Do not cut, puncture or drill any member of ceiling system which forms part of an integrated assembly with mechanical or electrical components.
 - .4 Use specialists in affected material to execute cutting and remedial work.
 - .5 Match work to adjoining construction and finishes.
 - .6 Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.
-

- .7 After patching wall, ceiling or other painted surfaces, paint the entire wall or area up to the next change in plane or direction as directed by Departmental Representative.

1.24 CO-ORDINATION AND CO-OPERATION

- .1 Building will be occupied during execution of work.
- .2 Execute work with minimum disturbance to occupants, public and normal use of site building and work area.
- .3 Maintain access and exits.
- .4 Where security has been reduced by work of contract, provide temporary means to maintain security.

1.25 HAZARDOUS MATERIALS

- .1 Hazardous Materials: product, substance, or organism that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .2 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS) acceptable to Human Resources and Skills Development Canada (HRSDC), Labour Program.
- .3 For work in occupied buildings, give the Department Representative 48 hours' notice for work involving designated substances (Ontario Bill 208), hazardous substances (Canada Labour Code Part II Section 10), and before painting, caulking, or using adhesives and other materials that cause off gassing.

1.26 INSPECTION AND TESTING

- .1 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.

1.27 SCHEDULING

- .1 On award of contract, submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.
 - .2 Carry out work Monday to Friday from 7:30 a.m. to 4:00 p.m.
-

1.28 EXECUTION

- .1 Cut, Patch, and Make Good:
 - .1 Cut existing surfaces as required to accommodate Work.
 - .2 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.
- .2 Firestop and smoke seal systems: in accordance with CAN-ULC S115-05 - Standard Method of Fire Test of Firestop Systems. Install around pipe, ductwork, cables, and other objects penetrating fire separations to provide fire resistance not less than the fire resistance rating of surrounding floor, ceiling, and wall assembly.
- .3 Unless otherwise specified, materials for removal become the Contractor's property and shall be taken from site.

1.29 CLEANING

- .1 Refer to Section 01 74 11.

1.30 ASBESTOS DISCOVERY

- .1 If during alteration work existing asbestos material is discovered (e.g. fireproofing, acoustic or thermal insulation, pipe, duct or tank covering) stop work and immediately notify Departmental Representative. Do not remove any existing material containing asbestos fibres.

1.31 DESIGNATED SUBSTANCES

- .1 The project site work area has been surveyed for the presence of designated substances referred to in the Occupational Health and Safety Act and Regulations for Construction Projects, O.Reg. 213/91 as amended. The Designated substances report is included with the specifications.

1.32 SECURITY CHECK

- .1 All personnel employed on this project will be subject to security check. Obtain requisite clearance, as instructed, for each individual required to enter the premises.
- .2 Personnel will be checked daily at start of work shift and given a pass, which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.33 SECURITY ESCORT

- .1 All personnel employed on this project shall be escorted when executing work in non-public areas during normal working hours. Personnel shall be escorted in all areas after normal working hours.

- .2 Submit an escort request to Departmental Representative at least 14 days before the service is needed. For requests submitted within the time mentioned above, the Departmental Representative will pay for the costs of the security escort. The cost incurred by a late request will be charged to the Contractor.
- .3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 24 hours before the scheduled time of the escort. The cost incurred by a late cancellation will be charged to the Contractor.
- .4 The calculation of costs will be based on the average hourly rate of a security officer for a minimum of 8 hours per day for a late service request and 4 hours for late cancellations.

1.34 HALOCARBONS

- .1 Comply with Federal Halocarbon Regulations 2003 under the Canadian Environmental Protection Act 1999, EPAM and PWGSC Ontario Region Halocarbon Information Sheet dated March 2010.

1.35 SPECIAL PROTECTION AND PRECAUTIONS

- .1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to HRSDC - Labour Program.

1.36 IAQ – INDOOR AIR QUALITY

- .1 Comply with CSA Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings.

1.37 POLLUTION CONTROL

- .1 Spills of deleterious substances:
 - .1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
 - .2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.
 - .3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

1.38 PRECEDENCE

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.
-

1.39 PROJECT MEETINGS

- .1 Be present at project meetings every two (2) weeks.
- .2 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
- .3 Notify participants of meetings.

1.40 OPSS AND OPSD

- .1 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at <http://www.ragsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 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, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work, provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Use only elevators, and stairs existing in building for moving workers and material.
 - .1 Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 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, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

- .1 Notify 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, provide 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. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

- .1 Carry out noise generating Work only during time permitted by Departmental Representative.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.
- .4 Refer to Section 01 35 13 for delivery of materials.

1.6 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:
 - .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will be required to enter premises.
 - .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
 - .3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
 - .4 Contractor's personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.
- .3 Security escort:
 - .1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
 - .2 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.

- .3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 24 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.
- .4 Calculation of costs will be based on average hourly rate of security officer for minimum of 8 hours per day for late service request and of 4 hours for late cancellations.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 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 and product data 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 that 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 by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 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 five (5) days for Departmental Representative's review of each submission.
 - .4 Adjustments made on shop drawings by Departmental Representative are not intended to change the Contract Price. If adjustments affect the 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 Setting or erection details.
 - .3 Capacities.
 - .4 Performance characteristics.
 - .5 Standards.
 - .6 Relationship to adjacent work.
 - .8 After Departmental Representative's review, distribute copies.
 - .9 Submit electronic copies 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 accordance with specified requirements.
 - .2 Testing must have been within three (3) years of date of contract award for project.
 - .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .13 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.
 - .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, the electronic copy 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.
 - .15 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 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 requirements of construction and Contract Documents.
 - .2 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 sub-trades.
-

1.3 PHOTOGRAPHIC AND VIDEO DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.
- .2 Submit electronic copy of colour digital video media in wmv format at frequency specified in other sections.
- .3 Project identification: name and number of project and date of exposure indicated.
- .4 Frequency of photographic documentation: monthly, and upon completion of Work, as directed by Departmental Representative.

1.4 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 PURPOSE

- .1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

1.2 DEFINITIONS

- .1 "Contraband" means:
 - .1 An intoxicant, including alcoholic beverages, drugs and narcotics.
 - .2 Tobacco or associated tobacco products.
 - .3 An igniting device, lighter or matches.
 - .4 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.
 - .5 An explosive or a bomb or a component thereof.
 - .6 Currency over any applicable prescribed limit, when possessed by an inmate without prior authorization.
 - .7 Any item not described in paragraphs 1.3.1.1 to 1.3.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
 - .2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.
 - .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.
 - .4 "CSC" means Correctional Service Canada.
 - .5 "Director" means Director, Warden or Superintendent of the Institution as applicable.
 - .6 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
 - .7 "Departmental Representative" means the project manager from Public Works and Government Services Canada.
 - .8 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.
-

- .9 "Construction Limits" means the area as shown on the contract drawings that the Contractor will be allowed to work". This area may or may not be isolated from the security area of the Institution.

1.3 PRELIMINARY PROCEEDINGS

- .1 Prior to the commencement of work, the Contractor shall meet with the Director or his/her representative to:
- .1 Discuss the nature and extent of all activities involved in the Project.
 - .2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
- .2 Contractor shall:
- .1 Ensure that all Construction Employees are aware of the security requirements.
 - .2 Ensure that a copy of the security requirements is always prominently on display at the job site.
 - .3 Co-operate with institutional personnel in ensuring that security requirements are observed by all Construction Employees.

1.4 CONSTRUCTION EMPLOYEES

- .1 Submit to the Director a list of the names with date of birth of all Construction Employees to be employed on the construction site and a security clearance form for each employee.
- .2 Allow two (2) weeks for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC Institutions are not valid at this Institution.
- .3 The Director may require that facial photographs be taken of Construction Employees and these photographs may be displayed at appropriate locations in the Institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all Construction Employees. ID cards will then be left at the designated entrance to be picked upon arrival at the institution and shall be displayed prominently on the Construction Employees clothing at all time while Construction Employees are in the institution.
- .4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.
- .5 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:
- .1 Appear to be under the influence of alcohol, drugs or narcotics
 - .2 Behave in an unusual or disorderly manner.
 - .3 Are in possession of contraband.
-

- .4 Smoking is prohibited everywhere on CSC property.

1.5 VEHICLES

- .1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle.
- .2 The Director may limit at any time the number and type of vehicles allowed within the Institution.
- .3 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The Director may require that these vehicles be escorted by Institutional Staff or Commissionaires while in the Institution.
- .4 If the Director permits trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter shall be locked when not in use.

1.6 PARKING

- .1 Parking area(s) to be used by Construction Employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.

1.7 SHIPMENTS

- .1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the Institution's own shipments. The Contractor must have his/her own employees on site to receive any deliveries or shipments. CSC staff will NOT accept receipt of deliveries or shipments of any material, equipment or tools.

1.8 TELEPHONES

- .1 There will be no installation of telephones, facsimile machines and computers with internet connections permitted within the perimeter of the Institution unless prior approval of the Director is received.
 - .2 The Director will ensure that approved telephones, facsimile machine and computers with internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an internet connection to unauthorized personnel.
-

- .3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, BlackBerries, telephone used as 2-way radios, are not permitted within the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.
- .4 The Director may approve but limit the use of two way radios.

1.9 WORK HOURS

- .1 Work hours within the Institution are: Monday to Friday 07:30 a.m. to 4:00 p.m.
- .2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven (7) days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

1.10 OVERTIME WORK

- .1 No overtime work will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as the completion of a concrete pour or work to make the construction safe and secure, the Contractor shall advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to the Crown for such events may be attributed to the Contractor.
- .2 When overtime work, weekend, or statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his/her designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.

1.11 TOOLS AND EQUIPMENT

- .1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.
 - .2 Throughout the construction project, maintain up-to-date the list of tools and equipment specified above.
 - .3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.
 - .4 Store all tools and equipment in approved secure locations.
 - .5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the Contractor. Scaffolding shall be secured and locked when not
-

erected and when erected, will be secured in a manner agreed upon with the Institutional designate.

- .6 All missing or lost tools or equipment shall be reported immediately to the Director.
- .7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
 - .1 At the beginning and conclusion of every construction project.
 - .2 Weekly, when the construction project extends longer than a one week period.
 - .3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.
- .8 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The Contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day.
- .9 If torches or grinders are required tools to perform Work, Contractor must complete a Hot Work Permit as supplied by CSC. Completed original form(s) are copied and posted on the work site in a conspicuous location. Original documents are to remain with the Institutional Fire Chief.

1.12 KEYS

- .1 Security Hardware Keys:
 - .1 The Contractor shall arrange with the security hardware supplier/installer to have the keys for the security hardware to be delivered directly to Institution, specifically the Security Maintenance Officer (SMO).
 - .2 The Contractor will provide a copy of the above-mentioned receipt to the Departmental Representative.
- .2 Other Keys:
 - .1 The Contractor will use standard construction cylinders for locks for his/her use during the construction period.
 - .2 The Contractor will issue instructions to his/her employees and sub-trades, as necessary, to ensure safe custody of the construction set of keys.
 - .3 Upon completion of each phase of the construction, the CSC representative will, in conjunction with the lock manufacturer:
 - .1 Prepare an operational keying schedule.
 - .2 Accept the operational keys and cylinders directly from the lock manufacturer.
 - .3 Arrange for removal and return of the construction cores and install the operational core in all locks.
- .3 Upon putting operational security keys into use, the CSC construction escort shall obtain these keys as they are required from the Security Maintenance Officer

(SMO) and open doors as required by the Contractor. The Contractor shall issue instructions to his/her employees advising them that all security keys shall always remain with the CSC construction escort.

1.13 SECURITY HARDWARE

- .1 Turn over all removed security hardware to the Director of the Institution for disposal or for safekeeping until required for re-installation.

1.14 PRESCRIPTION DRUGS

- .1 Employees of the Contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one day supply only into the Institution.

1.15 SMOKING RESTRICTIONS

- .1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.
- .2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any smoking items and, if they persist, will be directed to leave the institution.
- .3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Director.

1.16 CONTRABAND

- .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on Institutional Property.
 - .2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Director.
 - .3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.
 - .4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.
-

1.17 SEARCHES

- .1 All vehicles and persons entering Institutional property may be subject to search.
- .2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of Contraband or unauthorized items, he/she may order that person to be searched.
- .3 All employees entering the Institution may be subject to screening of personal effects for traces of Contraband drug residue.

1.18 ACCESS TO AND REMOVAL FROM INSTITUTION PROPERTY

- .1 Construction personnel and commercial vehicles will not be admitted to the Institution after normal working hours, unless approved by the Director.

1.19 MOVEMENT OF VEHICLES

- .1 Escorted commercial vehicles will be allowed to enter or leave the Institution through the vehicle access gate during the following hours:
 - .1 07:45 a.m. to 11:00 a.m.
 - .2 1:00 p.m. to 3:30 p.m.
 - .2 Construction vehicles shall not leave the Institution until an inmate count is completed.
 - .3 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC Staff or Commissionaires working under the authority of the Director.
 - .4 Commercial Vehicles will only be allowed access to Institutional Property when their contents are certified by the Contractor or his/her representative as being strictly necessary to the execution of the construction project.
 - .5 Vehicles shall be refused access to Institutional Property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.
 - .6 Private vehicles of Construction Employees will not be allowed within the security wall or fence of medium or maximum security Institutions without the permission of the Director.
 - .7 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.
-

- .8 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

1.20 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY

- .1 Subject to the requirements of good security, the Director will permit the Contractor and his/her employees as much freedom of action and movement as is possible.
- .2 However, notwithstanding paragraph above, the Director may:
 - .1 Prohibit or restrict access to any part of the Institution.
 - .2 Require that in certain areas of the Institution, either during the entire construction project or at certain intervals, Construction Employees only be allowed access when accompanied by a member of the CSC security staff.
- .3 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room.

1.21 SURVEILLANCE AND INSPECTION

- .1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.
- .2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among Construction Employees and maintained throughout the construction project.

1.22 STOPPAGE OF WORK

- .1 The Director may request at any time that the Contractor, his/her employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The Contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.
- .2 The Contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.

1.23 CONTACT WITH INMATES

- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any

employee doing any of the above will be removed from the site and his/her security clearance revoked.

- .2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this Contract.

1.24 COMPLETION OF CONSTRUCTION PROJECT

- .1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

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)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
 - .2 Submit site-specific Health and Safety Plan: Within 7 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 one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
 - .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .5 Submit copies of incident and accident reports.
 - .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00.
 - .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within ten (10) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.
 - .8 Departmental Representative's 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 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to
-

commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

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

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 11 00.

1.7 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Possible toxic or hazardous materials within ductwork.

1.8 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 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 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, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Regulations, 1996.
- .2 Comply with Occupational Health and Safety Act, General Safety Regulations, O.I.C.
- .3 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 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 Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with work described in the bid documents.
 - .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 site supervisor.

1.13 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 Province having jurisdiction, and in consultation with Departmental Representative.

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
-

- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.16 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Director.

1.17 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

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

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 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.
- .2 Apply plywood panels vertically flush and butt jointed.

1.4 DUST TIGHT SCREENS

- .1 Provide dust tight screens or partitions to localize dust generating activities, and protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

1.5 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 Confirm with Departmental Representative locations and installation schedule three (3) days prior to installation.
 - .4 Be responsible for damage incurred due to lack of or improper protection.
-

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .4 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .5 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .7 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 other than that caused by others, 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 times or dispose of as directed by Departmental Representative.
 - .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
 - .6 Vacuum clean and dust building interiors, behind grilles, louvers and screens.
-

- .7 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .8 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and fully operational.
 - .4 Certificates required by Fire Commissioner: submitted.
 - .5 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
 - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Commencement of Lien and Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance to 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:

.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.2 When Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one (1) week prior to contract completion with Contractor's representative and Departmental Representative, to:
 - .1 Verify Project requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .3 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 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.
 - .1 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 systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate system, with typed description and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each system:
 - .1 Provide reports as required in Section 23 01 31.
 - .2 Provide TAB reports as required in Section 23 05 93.
- .3 Drawings: supplement to illustrate relations of component parts of equipment and systems, to show flow diagrams.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one (1) record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings and product data.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
 - .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 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.
-

- .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Actual final airflow quantities.
- .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.
- .6 Provide digital photos and video of each ductwork system after completion of ductwork cleaning for site records.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 23 05 31 - Air Duct Cleaning for HVAC Systems.
- .2 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00.
- .2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario, Canada.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
- .4 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Certification of compliance to applicable codes.
- .5 In addition to transmittal letter referred to in Section 01 33 00: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .6 Closeout Submittals:
 - .1 Provide post cleaning inspection report and video survey in compliance with Section 23 01 31.
 - .2 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.

1.3 MAINTENANCE

- .1 Extra Stock Materials: Provide in compliance with Section 23 01 31.
-

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PAINTING REPAIRS AND RESTORATION

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Perform in compliance with Section 23 01 31.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 23 01 31 and submit report as described in the same Section.
 - .1 Post-cleaning inspection after performance of air duct cleaning.

3.4 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .2 Section 23 33 00 - Air Duct Accessories.

1.2 REFERENCES

- .1 Definitions:
 - .1 HVAC System: complete air duct system from outside air intake louvers to furthest air supply terminal unit and including:
 - .1 Rigid supply and return ductwork;
 - .2 Flexible ductwork;
 - .3 Mixing plenum boxes;
 - .4 Return air plenums including ceiling plenums;
 - .5 Cooling and heating coils and compartments;
 - .6 Condensate drain pans, eliminator blades and humidifiers;
 - .7 Fans, fan blades and fan housing;
 - .8 Filter housing and frames;
 - .9 Acoustically insulated duct linings;
 - .10 Diffusers, registers and terminal units;
 - .11 Dampers and controls.
- .2 Reference Standards:
 - .1 National Air Duct Cleaners Association (NADCA)
 - .1 ACR 2006: Assessment, Cleaning and Restoration of HVAC Systems.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Site Evaluation: conduct site visit two (2) weeks before start of Work to establish a project-specific video survey and cleaning plan. Plan shall take into account the protection of facility and HVAC systems during cleaning operations.
 - .1 Organize and lay out a plan for video survey and identify camera and cleaning apparatus insertion points.
 - .2 Plan shall identify sequence and schedule of survey and cleaning operations for each individual HVAC system and for complete facility.
 - .1 Take account of elbows, bends, turning vanes, dampers, transitions, take-offs and other internal features.
 - .3 Departmental Representative to review video survey and cleaning plan a minimum of one (1) week prior to start of work.

- .1 Proceed with survey and cleaning work only after receiving written approval from Departmental Representative.
- .2 Project Co-ordination: assign Project Co-ordinator to oversee air duct cleaning processes.
 - .1 Provide Departmental Representative with contact information of Project Co-ordinator including: name, telephone number, and cell phone number.
- .3 Security: Refer to Section 01 14 00.
- .4 Damaged or broken equipment and components found during initial testing and inspection will be repaired or replaced by Departmental Representative.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Submit pre-cleaning video survey and cleaning plan developed during site evaluation.
 - .1 Ensure plan includes work sequence plan, identification of camera and cleaning apparatus insertion points and schedule for work.
- .3 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for antimicrobial agents and include product characteristics, performance criteria and limitations.
 - .2 Provide two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 for antimicrobial agents or coatings.

1.5 CLOSEOUT SUBMITTALS

- .1 Provide submittals in accordance with Section 01 78 00 .
 - .2 Post Cleaning Inspection Report: submit four (4) copies of Final Inspection Report, including data collected, observations and recommendations as well as following information:
 - .1 Name and address of facility;
 - .2 Name and address of HVAC cleaning contractor;
 - .3 Description of HVAC systems with drawings identifying systems cleaned;
 - .4 Identification scheme for location points in systems that were inspected with accompanying notes describing methods of inspection or tests used;
 - .5 Identification of points where samples were collected and type of analysis used for each collection;
 - .6 Identification of each sample collected;
 - .7 Comments complete with photographs of each sampling location and other observed system features;
 - .8 Identify systems tested, observations, actions taken and recommendations for future maintenance.
-

- .3 Record post cleaning video survey: submit two (2) copies of video survey DVD media, and include on video survey following:
 - .1 Areas tested for particulate analysis or microbial growth evaluation;
 - .2 Areas of special interest and location;
 - .3 Special internal features;
 - .4 Problems such as broken or damaged controls or components;
 - .5 Ensure system tested, locations, observations, actions taken and recommendations are clearly identified in English on video using text or voice over.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Supply four (4) extra filters for each HVAC System cleaned.
 - .2 Ensure filters are correct match, size, type and configuration of existing HVAC Systems.

1.7 QUALITY ASSURANCE

- .1 Contractor: verification of membership in NADCA and verification of five (5) years minimum experience in work similar to or exceeding work of this Section..
- .2 Project Co-ordinator: Air System Cleaning Specialist (ASCS) certified by NADCA on full time basis and verification of five (5) years minimum experience in work similar to or exceeding work of this Section.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND PANELS

- .1 Refer to Section 23 33 00.

2.2 ANTIMICROBIAL AGENT

- .1 Use antimicrobial agents registered with US EPA-40 CFR.

2.3 SYSTEM FILTERS

- .1 Supply and install new filters for each HVAC System cleaned.
- .2 Filters shall be of same type and efficiency as existing.

2.4 AIR DUCT CLEANING EQUIPMENT

- .1 Manually propelled full contact brushes:
-

- .1 Ensure brushes are specifically manufactured and shaped to fit individual ducts, equipment and components of HVAC system.
 - .1 Ensure brushes are sized to fit various duct sizes in HVAC system.
- .2 Ensure brushes make scrubbing motion and full contact with HVAC system interior surfaces to be cleaned.
- .2 Brushes: manually propelled with integrally-mounted drive and nylon, polypropylene, or other non-metallic material bristles.
 - .1 Ensure drive has capacity to continue to push brush after bristles are distorted.
 - .2 Replace worn and ineffective brushes when required.

2.5 MULTI-FUNCTIONAL ROBOTIC CLEANING SYSTEM

- .1 Self-propelled remote controlled, track or wheeled drive, equipped with: camera and halogen lights: rotating or reciprocating brushes, air supply nozzle, vacuum and spraying system attachment.
 - .1 Ensure brushes are specifically manufactured and shaped to fit individual ducts, equipment and components of HVAC system.
 - .2 Ensure brushes make scrubbing motion and full contact with HVAC system interior surfaces.
 - .3 Replace worn and ineffective brushes when required.
- .2 Camera: fully rotational remote control focus and dustproof digital with 480 lines of resolution, capable of storing four (4) hours of recorded media.
 - .1 Camera Light: 2 x 20 watt Halogen with dimmer

2.6 HEPA FILTER EVACUATION FAN

- .1 Evacuation Fan: includes fan, HEPA filter, flexible hose and motor capable of maintaining debris and particulates airborne in airstream until they reach evacuation fan and maintaining system under negative pressure.
 - .1 Ensure HEPA filters are clean and maintain evacuation fan and HEPA filter to run efficiently.

2.7 HEPA VACUUM UNIT

- .1 Vacuum Unit: includes vacuum fan, integral HEPA filter, suction hose and vacuum head, capable of maintaining HVAC System debris and particulates airborne in air stream until they reach vacuum unit and maintaining system under negative pressure.
 - .1 Ensure HEPA filters are clean and maintain vacuum unit and HEPA filter to run efficiently.
-

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Close down HVAC system.
- .2 Locate and identify externally visible HVAC system features which may affect cleaning process including:
 - .1 Control devices;
 - .2 Fire and smoke control dampers;
 - .3 Balancing dampers: indicate and record positions for resetting;
 - .4 Air volume control boxes: indicate and record positions for resetting;
 - .5 Fire alarm devices;
 - .6 Monitoring devices and controls;
- .3 Cut openings in equipment panels and ductwork for access to system interior.
 - .1 Square or rectangular opening sizes: 200 mm minimum each side.
 - .2 Circular opening sizes: 200 mm minimum diameter.
- .4 Installation of Access Doors and Panels: install access doors and panels for equipment where required to facilitate system inspection and cleaning. Obtain Departmental Representative approval prior to installing access doors and panels.
 - .1 Install access doors and panels for inspection and cleaning of equipment as follows:
 - .1 Heating and cooling coils;
 - .2 Fan units;
 - .3 Filters;
 - .4 Dampers;
 - .5 Sensors.
 - .2 Access door installation is not permitted in flexible ductwork.
 - .1 Inspect flexible ductwork only by disconnecting from main duct and inspecting from open end.
- .5 When acoustically lined duct is cut for access, repair cut edges of acoustic lining using self-adhesive fibre glass tape and water based duct sealer.
 - .1 Adhere new acoustic lining to match existing to inside of access panel or door to ensure continuity of acoustic properties of system.

3.2 EXAMINATION / PRE-CLEANING INSPECTION

- .1 Verification of Conditions:
 - .1 Make visual inspection of interior of HVAC system using remote controlled robotic camera.
 - .2 Insert camera at pre-established strategic locations to evaluate condition and cleanliness of HVAC systems and components.
-

- .2 Evaluation and Assessment:
 - .1 Identify location and type of internal components.
 - .2 Identify extent of potential problems.
 - .3 If toxic or hazardous materials or deposits are suspected after initial inspection, immediately stop work and inform Departmental Representative.
 - .1 Do not proceed further with inspection operations until written approval from Departmental Representative.

3.3 PARTICULATE COLLECTION

- .1 Before starting duct cleaning, identify locations for sample collection and collect particulate samples.
- .2 Take samples from interior surfaces of HVAC system using sterile wipes for submission to independent testing laboratory.
- .3 For each HVAC system, collect four (4) samples from each HVAC unit as follows:
 - .1 Sample 1: collect from inside ventilation unit downstream of air filters but before fan discharge;
 - .2 Sample 2: collect downstream of fan discharge and one (1) metre maximum downstream in first horizontal branch;
 - .3 Sample 3: collect at junction of last horizontal branch and start of low-pressure duct;
 - .4 Sample 4: collect at junction of last air terminal unit and supply duct.

3.4 LABORATORY ANALYSIS

- .1 Ensure independent testing laboratory has demonstrated experience in work associated with air duct cleaning.
- .2 Ensure Super Electron Microscope (SEM) is used for analyzing and determining components of particulate collection samples:
 - .1 Identify components by grade and size;
 - .2 Report findings including percentage concentration of components to Departmental Representative.
- .3 Proceed with HVAC System Cleaning only after laboratory analysis test results have been received.
- .4 Ensure cleaning technicians have safety equipment appropriate for toxic or hazardous conditions identified by laboratory analysis before proceeding with cleaning operations.

3.5 DUCT CLEANING

- .1 Do duct cleaning in accordance with NADCA ACR Standard.
-

- .2 Isolate and clean sections in zones to ensure that dirt deposits and debris from zone being cleaned do not pass through other zones which have already been cleaned.
 - .1 Isolate zone of duct using closed-cell polyurethane foam or air inflated zone bag before cleaning.
- .3 Ensure vacuum units and evacuation fans are securely in place before starting cleaning operation of isolated section of HVAC air duct system.
- .4 Install HEPA filter evacuation fan at one end of zone section and insert full contact brushes at other end.
- .5 Clean HVAC supply air duct system and components where particulate sample collected from surfaces is greater than 75 mg of particulate per 0.01 square metres.
- .6 Clean exhaust, return, transfer ductwork and plenums, equipment and components where particulate sample collected from surfaces is greater than 75 mg of particulate per 0.01 square metres.
- .7 Energize brushes to travel from insertion point to HEPA filter evacuation fan.
 - .1 Pass brushes through sections as often as necessary to achieve required cleanliness.
 - .2 Change brush sizes as required to ensure positive contact with duct and component interiors.
 - .3 Clean corners and pockets where dirt and debris can accumulate.
- .8 Clean equipment, components and other features in isolated zone before moving to next zone of HVAC air duct system.
- .9 Clean diffusers, registers, louvers, and other terminal units.
- .10 Advise Departmental Representative 72 hours minimum before deactivation of fire alarm and smoke detectors for duct cleaning operations.
 - .1 Departmental Representative will pay for costs of deactivation of fire alarm and smoke detector system.

3.6 COMPONENTS AND EQUIPMENT CLEANING

- .1 Brush and vacuum coils, humidifiers, air handling unit enclosures, and heat exchanger surfaces to achieve required cleanliness.
 - .2 When cleaning equipment and components by brushing and vacuuming is inappropriate or insufficient, dismantle and remove equipment or component and move to area designated by Departmental Representative for cleaning.
 - .1 Pressure wash with water and cleaning solution until required cleanliness is achieved.
 - .2 Clean equipment and components in place only if there is no hazard to adjacent materials.
-

- .3 Floor mounted supply registers shall be removed, sandblasted and primer coated. Lubricate damper blades.
- .3 Proceed to next section in cleaning sequence only after written approval from Departmental Representative.
- .4 Compressed air and manual cleaning is acceptable only for cleaning individual components and small areas as follows and only after written approval from Departmental Representative:
 - .1 Fan blades;
 - .2 Dampers;
 - .3 Turning vanes;
 - .4 Controls;
 - .5 Sensor bulbs;
 - .6 Fire alarms;
 - .7 Smoke detectors.

3.7 ANTI MICROBIAL APPLICATION

- .1 Apply antimicrobial agents where unacceptable levels of fungal contamination have been verified through testing.
- .2 Apply antimicrobial agents after removal of surface deposits and debris.
 - .1 Verify air duct interiors are free from deposits and debris by visual inspection.
 - .2 Report findings to Departmental Representative.
 - .3 Proceed with application of antimicrobial agents after written approval from Departmental Representative.
- .3 Apply antimicrobial agents in accordance with manufacturer's written instructions and US EPA 40 CFR registration and listing.
- .4 Manual or Robotic spray antimicrobial agents directly onto interior surfaces of HVAC air duct system.
 - .1 Do not use fog mist for downstream surfaces.

3.8 FIELD QUALITY CONTROL/FINAL INSPECTIONS

- .1 Post Cleaning Inspection: carry out final inspection using robotic camera and other visual inspection methods after final cleaning has been completed.
 - .1 Carry out video survey as directed by Departmental Representative.
 - .2 Include in final survey areas inspected by Contractor prior to cleaning.
 - .3 Identify on HVAC system record drawings access points used for inspection and cleaning.
 - .4 Re-collect and analyze particulates collected at same locations where original samples were collected before cleaning.
 - .5 Reset components including dampers and sensors, which have been disturbed during cleaning operations.

3.9 SYSTEM STARTUP

- .1 Install new system filters after cleaning operations are completed.
- .2 Cover each inspection opening with access door or panel and secure in place after inspection and cleaning are completed.
- .3 Restart each HVAC system.

3.10 CLEANING

- .1 Clean in accordance with Section 01 74 11.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.
- .2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

1.2 REFERENCES

- .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.
- .2 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems-1998.
- .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing-2002

1.3 QUALIFICATIONS OF TAB PERSONNEL

- .1 Submit names of personnel to perform TAB to Departmental Representative within 90 days of award of contract.
 - .2 Provide documentation confirming qualifications, successful experience.
 - .3 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:
 - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.
 - .2 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems-1998.
 - .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing-2002.
 - .4 Recommendations and suggested practices contained in the TAB Standard: mandatory.
 - .5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
-

- .6 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.
- .7 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .8 TAB Standard quality assurance provisions such as performance guarantees form part of this contract.
 - .1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist. Where new procedures, and requirements, are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC), requirements and recommendations contained in these procedures and requirements are mandatory.

1.4 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads
- .2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

1.5 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.

1.6 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.7 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Departmental Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.
-

- .2 Review specified standards and report to Departmental Representative in writing proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

1.8 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Division 23.

1.9 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Departmental Representative for verification of TAB reports.

1.10 START OF TAB

- .1 Notify Departmental Representative 7 days prior to start of TAB.
- .2 Start TAB when building is essentially completed, including:
- .3 Installation of ceilings, doors, windows, other construction affecting TAB.
- .4 Application of weather-stripping, sealing, and caulking.
- .5 Pressure, leakage, other tests specified elsewhere in Division 23.
- .6 Provisions for TAB installed and operational.
- .7 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:
 - .1 Proper thermal overload protection in place for electrical equipment.
 - .2 Air systems:
 - .1 Filters in place, clean.
 - .2 Duct systems clean.
 - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
 - .4 Correct fan rotation.
 - .5 Fire, smoke, volume control dampers installed and open.
 - .6 Coil fins combed, clean.
 - .7 Access doors, installed, closed.
 - .8 Outlets installed, volume control dampers open.

1.11 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
 - .1 HVAC systems: plus 5%, minus 5%.

1.12 ACCURACY TOLERANCES

- .1 Measured values accurate to within plus or minus 2% of actual values.

1.13 INSTRUMENTS

- .1 Prior to TAB, submit to Departmental Representative list of instruments used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Departmental Representative.

1.14 SUBMITTALS

- .1 Submit, prior to commencement of TAB:
 - .1 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.15 PRELIMINARY TAB REPORT

- .1 Submit for checking and approval of Departmental Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
 - .1 Details of instruments used.
 - .2 Details of TAB procedures employed.
 - .3 Calculations procedures.
 - .4 Summaries.

1.16 TAB REPORT

- .1 Format in accordance with referenced standard.
 - .2 TAB report to show results in SI units and to include:
 - .1 Project record drawings.
 - .2 System schematics.
 - .3 Submit 6 copies of each TAB Report to Departmental Representative for verification and approval, in English in D-ring binders, complete with index tabs.
-

1.17 VERIFICATION

- .1 Reported results subject to verification by Departmental Representative.
- .2 Provide personnel and instrumentation to verify up to 30 % of reported results.
- .3 Number and location of verified results as directed by Departmental Representative.
- .4 Pay costs to repeat TAB as required to satisfaction of Departmental Representative.

1.18 SETTINGS

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions and ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

1.19 COMPLETION OF TAB

- .1 TAB considered complete when final TAB Report received and approved by Departmental Representative.

1.20 AIR SYSTEMS

- .1 Standard: TAB to most stringent of this section or TAB standards of AABC.
- .2 Do TAB of the following systems:
 - .1 All HVAC systems undergoing duct cleaning in all buildings addressed under this contract.
- .3 Qualifications: personnel performing TAB current member in good standing of AABC.
- .4 Quality assurance: perform TAB under direction of supervisor qualified by to standards of AABC.
- .5 Measurements: to include as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
- .6 Locations of equipment measurements: to include as appropriate:
 - .1 Inlet and outlet of dampers, filter, coil, humidifier, fan, other equipment causing changes in conditions.
 - .2 At controllers, controlled device.

- .7 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 23 05 31 - Air Duct Cleaning for HVAC Systems.
- .2 Section 23 37 17 - Diffusers, Registers, and Grilles.

1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
 - .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible, 2005.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
 - .1 Duct access doors.
 - .2 Tamper-evident sealant.
 - .3 Tamper-resistant fasteners
- .3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Certification of ratings: catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00.

1.4 QUALITY ASSURANCE

- .1 Pre-Installation Meetings:
-

- .1 Convene pre-installation meeting one (1) week prior to beginning work of this Section and on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation conditions.
 - .3 Review manufacturer's installation instructions and warranty requirements.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06.

PART 2 - PRODUCTS

2.1 GENERAL

- .1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 ACCESS DOORS IN DUCTS

- .1 Equipment Access Doors and Panels: construct from same materials as equipment panelling complete with sealing gasket and positive locking device.
 - .1 Size access doors and panels in equipment to allow for inspection and cleaning.
- .2 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 1.27 mm thick complete with sheet metal angle frame.
 - .1 Ensure access door is 25 mm greater in every dimension than access opening.
 - .2 Access door size 200 mm x 200 mm minimum.
 - .3 Secure access doors with sheet metal screws on 75 mm centres minimum. Ensure 3 screws per side minimum.
- .3 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 1.27 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.
 - .1 Ensure access door is 25 mm greater in every dimension than access opening.
 - .2 Access door size 200 mm x 200 mm minimum.
 - .3 Secure access doors with sheet metal screws on 75 mm centres minimum. Ensure 3 screws per side minimum.
- .4 Gaskets: neoprene.
- .5 Hardware:
 - .1 Up to 300 x 300 mm: two sash locks complete with safety chain.
 - .2 301 to 450 mm: four sash locks complete with safety chain.

- .3 451 to 1000 mm: piano hinge and minimum two sash locks.
- .4 Doors over 1000 mm: piano hinge and two handles operable from both sides.

2.3 TAMPER-EVIDENT SEALANT

- .1 Epoxy security sealant: interior.
 - .1 Pick-proof gunned flexible epoxy joint filler: two component 100% solids, gun-grade epoxy joint filler with flexible, pick-proof properties for sloped areas.
 - .1 Shore A hardness: 90±5
 - .2 Shore D hardness: 50
 - .3 Elongation: 50%
 - .4 Tensile Strength: 6.2 MPa ±0.07 MPa (900 pounds per square inch ±10 pounds per square inch
 - .5 Slant shear strength: 6.0 MPa (865 pounds per square inch) to ASTM C882/C882M-05e1
 - .6 Mixing ratio: 1 to 1 by volume
 - .7 Pot Life: 40 to 55 minutes at 24°C (75°F)
 - .8 Cure time foot traffic: 4 hours
 - .9 Cure time vehicular traffic: 24 hours
 - .10 Application temperature: minimum 13°C (55°F)

2.4 TAMPER-RESISTANT FASTENERS

- .1 Tamper-resistant fasteners for mechanical system components to inhibit tampering.
 - .1 Zinc plated steel construction
 - .2 Head style and shaft type to be compatible with devices
 - .3 Tampruf style head

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Access Doors and Viewing Panels:
-

- .1 Size:
 - .1 200 x 200 mm minimum for servicing entry.
- .2 Locations:
 - .1 As required for work in Section 23 01 31
 - .2 Elsewhere as indicated.
- .2 Tamper-Evident Sealant:
 - .1 Apply a bead of sealant in order to render installation tamper-evident.
 - .2 Locations:
 - .1 All fasteners, either new or existing, installed or tightened as part of this project located within the regularly occupied spaces. Regularly occupied spaces include all spaces within the facility except mechanical, electrical, and storage rooms.
- .3 Tamper-Resistant Fasteners:
 - .1 Install new tamper-resistant fasteners to inhibit tampering.
 - .2 Locations:
 - .1 All existing fasteners removed and re-installed and all new fasteners located within regularly occupied spaces shall meet the specifications herein. Regularly occupied spaces include all spaces within the facility except mechanical, electrical, and storage rooms.

3.3 CLEANING

- .1 Perform cleaning operations as specified in Section 01 74 11 and in accordance with manufacturer's recommendations.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 23 33 00 - Air Duct Accessories.

1.2 REFERENCES

- .1 ASTM D1654-08, Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- .2 ASTM D610-08 (2012), Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
- .3 ASTM D714-02 (2009), Standard Test method for Evaluating Degree of Blistering of Paints

1.3 SYSTEM DESCRIPTION

- .1 Performance Requirements:
 - .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00.
 - .2 Indicate following:
 - .1 Capacity;
 - .2 Throw and terminal velocity;
 - .3 Noise criteria;
 - .4 Pressure drop;
 - .5 Neck velocity.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00.
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00.

- .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .2 Instructions: submit manufacturer's installation instructions.
 - .1 Departmental Representative will make available 1 copy of systems supplier's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.7 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00.
 - .2 Include:
 - .1 Keys for volume control adjustment.
 - .2 Keys for air flow pattern adjustment.

PART 2 - PRODUCTS

2.1 GENERAL

- .1 Contractor is to allow for replacement of 10% of all supply and return grilles. Grilles are to be replaced if damaged beyond cleaning and/or repair, and their replacement shall be approved by the Departmental Representative. Contractor is to provide credit for all supply and return grilles not used.
 - .2 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.
 - .3 Frames:
 - .1 Compatible with existing mounting conditions.
 - .4 Concealed manual volume control damper operators for supply air grilles.
 - .5 Colour: Standard white.
-

2.2 MANUFACTURED UNITS

- .1 Grilles, registers and diffusers of same generic type, products of one manufacturer.

2.3 SUPPLY GRILLES AND REGISTERS

- .1 Type SA: Maximum Security Supply Register.
 - .1 Grilles shall be 25mm angle 45 degree deflection fixed louver type with blades spaced on 6mm centers. Vertical mullions shall be 44mm and 2.1mm thick gauge hot rolled steel bars. The grille is to be attached to a wall sleeve of 5mm hot rolled steel with a rear mounting frame for a concealed secure fastening. The grille shall be painted with a powder coat process and be finished in white. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering in accordance with ASTM D610 and ASTM D714.
 - .2 Provide volume control damper of the opposed blade type and constructed of cold rolled steel. The damper shall be compatible with installation conditions. For floor mounting, the damper is not accessible from behind for operation from the rear of the register.
- .2 Type SB: Medium Security Supply Register.
 - .1 Grilles shall be 45 degree deflection fixed louver type with blades spaced 10mm on center supported by 1.6mm thick vertical support mullions located on 150mm centers with a 2.6mm thick wire mesh. The face frame shall be 1.3mm thick hot rolled steel. Blades shall run parallel to the short dimension for the grille. The grille is to be attached to a steel wall sleeve with a rear mounting frame for a concealed and secure fastening. The grille shall be painted with a powder coat process and be finished in white. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering in accordance with ASTM D610 and ASTM D714.
 - .2 Provide volume control damper of the opposed blade type and constructed of cold rolled steel. The damper shall be compatible with installation conditions.

2.4 RETURN AND EXHAUST GRILLES AND REGISTERS

- .1 Type RA: Maximum Security Return and Exhaust Grille.
 - .1 Grilles shall be 25mm angle 45 degree deflection fixed louver type with blades spaced on 6mm centers. Vertical mullions shall be 44mm and 2.1mm thick hot rolled steel bars. The grille is to be attached to a wall sleeve of 5mm hot rolled steel with a rear mounting frame for a concealed secure fastening. The grille shall be painted with a powder coat process and be finished in white. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and

1000 hours with no rusting or blistering in accordance with ASTM D610 and ASTM D714.

- .2 Type RB: Medium Security Return and Exhaust Grille.
 - .1 Grilles shall be 45 degree deflection fixed louver type with blades spaced 10mm on center supported by 1.6mm thick gauge vertical support mullions located on 150mm centers with a 2.6mm thick wire mesh. The face frame shall be 1.3mm thick hot rolled steel. Blades shall run parallel to the short dimension for the grille. The grille is to be attached to a steel wall sleeve with a rear mounting frame for a concealed and secure fastening. The grille shall be painted with a powder coat process and be finished in white. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering in accordance with ASTM D610 and ASTM D714.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install Maximum Security grilles and registers in all cells. Install Medium Security grilles in registers in all other locations.
- .2 Verify mounting compatibility with existing conditions prior to releasing order.
- .3 Install in accordance with manufacturer's instructions.
- .4 Install with tamper-resistant screws as specified in Section 23 33 00.
- .5 After installation, apply a bead of tamper-evident sealant as specified in Section 23 33 00.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 11.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION