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| <u>1.1 TAXES</u> | .1 | Pay all taxes properly levied by law (including Federal, Provincial and Municipal). |
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| <u>1.2 FEES, PERMITS, AND CERTIFICATES</u> | .1 | Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction. |
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| <u>1.3 CONSTRUCTION PROGRESS SCHEDULE</u> | .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 | Other projects will be in construction on site at the same time as this project. Departmental Representative will define work areas on site. Do not trespass to other working areas. |
| | .3 | Carry and work during "regular hours", Monday to Friday from 7:00 to 18:00 hours. Allow for after hour/weekend work for chilled/condenser water valve replacement. |
| | .4 | Construction activities related to other projects may restrict access to the parking area and in particular to the designated storage areas for five (5) random days during the execution of this project. For each such restriction the contractor will be provided with 48 hrs. notice. Accommodate this access restriction in the overall schedule. |
| | .5 | Give the Departmental Representative 48 hours notice for work to be carried out during "off hours". |
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| <u>1.4 REGULATORY REQUIREMENTS</u> | .1 | References and Codes: |
| | .1 | Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC) and all applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement shall apply. |
| | .2 | Building Smoking Environment: |
| | .1 | Smoking is not permitted in the Building. Obey smoking restrictions on building property. |
| | .3 | Carry out work during "regular hour" Monday to Friday from 07:00 to 18:00 hours. |
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| <u>1.5 FIRE SAFETY REQUIREMENTS</u> | .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. |
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**1.5 FIRE SAFETY
REQUIREMENTS
(Cont'd)**

- .1 (Cont'd)
 - .2 The National Fire Code (NFC):(Cont'd)
 - .4 The establishment of fire safety plans.
 - .5 Fire safety at construction and demolition sites.
- .2 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 - Standards
 - .4 Retain all fire safety documents and standards on site.
- .3 Welding and cutting:
 - .1 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.
 - .2 "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.

**1.6 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, installing carpet or using adhesives and other materials, that cause off gassing.
- .4 Contractor to be responsible for removals of lead based paint for demolition and new work. Refer to Section 01 14 25 - Designated Substances Report for identification and safety procedures of lead based paint.

**1.7 TEMPORARY
UTILITIES**

- .1 Existing services required for the work, may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing additional loads. Connect and disconnect at own expense and responsibility.
- .2 Notify the Departmental Representative and utility companies of intended interruption of services, obtain requisite permission.
- .3 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.

**1.8 CONSTRUCTION
FACILITIES**

- .1 Access Scaffold:
 - .1 Scaffolding: in accordance with CSA Z797 - Code of Practice for Access Scaffold.
 - .2 Provide design drawings, signed and sealed by qualified Professional Engineer licensed in the province of Ontario, where prescribed.
 - .3 Additions or modifications to scaffolding must be approved by Professional Engineer in writing.
- .2 Site Storage:
 - .1 The Departmental Representative will assign storage space that shall be equipped and maintained by the Contractor.
 - .2 Do not unreasonably encumber site with materials or equipment.
 - .3 Move stored products or equipment that interfere with operations of Departmental Representative or other contractors.
 - .4 Obtain and pay for use of additional storage or work areas needed for operations.
 - .5 Do not load or permit to load any part of work with weight or force that will endanger work.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Execute work with least possible interference or disturbance to the normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .5 Maintain existing services to building and provide for personnel and vehicle access.
- .6 Where security is reduced by work provide temporary means to maintain security.
- .7 Do not block exterior access routes and emergency exits. If the access route and/or emergency exits have to be temporarily blocked for the purpose of moving materials, provide a written notice to Departmental Representative and obtain appropriate written approval at least 72 hours in advance.
- .8 Closures: Protect work temporarily until permanent enclosures completed.
- .9 Construction Parking:
 - .1 Make arrangement and pay for parking elsewhere.

**1.9 TEMPORARY
BARRIERS AND
ENCLOSURES**

- .1 Maintain existing services to building and provide for personnel and vehicle access.
- .2 Hoarding:
 - .1 Provide temporary portable metal fence barriers around construction site.
- .3 Dust Control:
 - .1 Provide dust tight screens or partitions to localize and contain dust generating activities, and for protection of workers and other areas of work.
 - .2 Maintain and relocate protection until such work is complete.
 - .3 Protect all immediately adjacent equipment (chillers, control panels, motors, etc.) within work area with 0.102 mm thick polyethylene film during construction. Remove film during non- construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.
- .4 Construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.9 TEMPORARY BARRIERS AND ENCLOSURES <u>(Cont'd)</u>	.5	Protection: .1 Contractor to provide protection plan for new work. Protection plan to include hoarding details, materials uses, access and execution. Hoarding shall not disrupt operation and access to the existing systems. Departmental Representative to review and approve protection plan prior to commencement of work. .2 Protect work against damage until take-over. .3 Protect adjacent work against the spread of dust and dirt beyond the work areas. .4 Protect operatives and other users of site from all hazards.
1.10 EXAMINATION AND PREPARATION <u></u>	.1	Examine site and conditions likely to affect work and be familiar and conversant with existing conditions.
	.2	Before commencing work, establish location and extent of services lines in area of work and notify Departmental Representative of findings.
	.3	Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.
1.11 FIELD QUALITY CONTROL <u></u>	.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 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.
1.12 REMOVED MATERIALS <u></u>	.1	Unless otherwise specified, materials for removal become the Contractor's property and shall be taken from site.
1.13 CUT, PATCH AND MAKE GOOD <u></u>	.1	Cut existing surfaces as required to accommodate new work.
	.2	Remove all items so shown or specified.
	.3	Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.
1.14 ACCESS AND EGRESS <u></u>	.1	Construct and maintain temporary "access to" and "egress from" work areas, including stairs, ramps, scaffolds or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

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| <u>1.15 HOISTING</u> | .1 | Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists. |
| | .2 | Load bearing points on existing structure used for rigging and hoisting operation must be reviewed by professional structural engineer licensed in the province of Ontario. All concerns regarding the structural integrity of existing structure as it effects safe hoisting procedures must be indicated to Departmental Representative prior to commencement of work. |
| | .3 | Hoists and cranes to be operated by qualified operator. Contractor to certify the on site cranes at the beginning and end of the project. |
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| <u>1.16 GUARANTEES AND WARRANTIES</u> | .1 | Before completion of work collect all manufacturer's guarantees and warranties and deposit with Departmental Representative. |
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| <u>1.17 CLEANING</u> | .1 | Clean up work area as work progresses. At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally. |
| | .2 | Upon completion remove scaffolding, temporary protection and surplus materials. Make good defects noted at this stage. |
| | .3 | Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative. |
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| <u>1.18 SECURITY CLEARANCES</u> | .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. |
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| <u>1.19 SECURITY ESCORT</u> | .1 | All personnel employed on this project shall be escorted when executing work at all times. |
| | .2 | Submit an escort request to Departmental Representative at least 4 days before the service is needed. For requests submitted within the time mentioned above, the costs of the security escort will be paid for by the Departmental Representative. 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 the day before the scheduled time of the escort before 13:30. 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 eight hours per day for a late service request and of four hours for late cancellations. |
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1.20 COST BREAKDOWN N1

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 cost breakdown will be used as the basis of progress payments.

1.21 PRECEDENCE .1

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

PART 1 – GENERAL

1.1 REGULATORY REQUIREMENTS

.1 An investigation into the presence of designated substances for the Cooling System Upgrade Project at the Pearkes Building, 101 Colonel By Drive, Ottawa, Ontario was performed in order to meet the requirements of the Canada Labour Code under Part II, section 124 which stipulates that every employer shall ensure that the health and safety at work of every person employed by the employer is protected and those employees are made aware of every “known or foreseeable health or safety hazard” in the work environment. Also, it was performed to meet the requirements of Section 30 of the *Ontario Occupational Health and Safety Act, Revised Statutes of Ontario, 1990, Chapter 0.1*. By having a Designated Substances Report (DSR) conducted, the Departmental Representative will be able to inform his or her employees, contractors, and tenants of any designated substances that may be present and possibly disturbed throughout the duration of the project. The informed Departmental Representative will then be able to impose appropriate health and safety precautions for all applicable personnel as required.

.2 The designated substances identified in the *Occupational Health and Safety Act* and its corresponding regulations are:

- .1 **Acrylonitrile:** “Designated Substance – Acrylonitrile” O.Reg 835 (as amended by O.Reg 490/09)
- .2 **Arsenic:** “Designated Substance – Arsenic” O.Reg 836 (as amended by O.Reg 490/09)
- .3 **Asbestos**
 - .1 “The Regulation Respecting Asbestos” O.Reg 837 (as amended by O.Reg 490/09)
 - .2 “General – Waste Management” O.Reg 347 (as amended by O.Reg 337/09)
 - .3 “Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations” O.Reg 278/05 (as amended by O.Reg 493/09)
 - .4 PWGSC Departmental Policy DP 057 – “Asbestos Management”
- .4 **Benzene:** “Designated Substance – Benzene” O.Reg 839 (as amended by O.Reg 490/09)
- .5 **Coke Oven Emissions:** “Designated Substance – Coke Oven Emissions” O.Reg 840 (as amended by O.Reg 490/09)

- .6 **Ethylene Oxide:** "Designated Substance – Ethylene Oxide" *O.Reg 841* (as amended by *O.Reg 490/09*)
- .7 **Isocyanates:** "Designated Substance – Isocyanates" *O.Reg 842* (as amended by *O.Reg 490/09*)
- .8 **Lead:**
 - .1 "Designated Substance – Lead" *O.Reg 843* (as amended by *O.Reg 490/09*)
 - .2 "General – Waste Management" *O.Reg 347* (as amended by *O.Reg 337/09*)
 - .3 Hazardous Products Act's *Regulations Amending the Surface Coating Materials Regulations* SOR/2010-224
- .9 **Mercury:**
 - .1 "Designated Substance – Mercury" *O.Reg 844* (as amended by *O.Reg 490/09*)
 - .2 "General – Waste Management" *O.Reg 347* (as amended by *O.Reg 337/09*)
- .10 **Silica:** "Designated Substance – Silica" *O.Reg 845* (as amended by *O.Reg 490/09*)
- .11 **Vinyl Chloride:** "Designated Substance – Vinyl Chloride" *O.Reg 846* (as amended by *O.Reg 490/09*)
- .3 All contractors requesting tenders from subcontractors shall furnish this report to subcontractors.

1.2 VALIDITY DATE

- .1 El Houcine Faouzi, Environmental Analyst of the Environmental Services Directorate of the Real Property Branch, PWGSC, conducted the on-site survey for this report on 2013/02/20.
- .2 The work area is located at the Pearkes Building, 101 Colonel By Drive Ottawa, Ontario. The scope of the work proposed consists of upgrading the existing cooling system component in the basement loading dock area and roof of the North Tower.
 - .1 The scope of work for this report involved a visual inspection of building materials and contents for the presence of suspected designated substances in the project area.

- .2 From the visual inspection suspect materials were sampled and analyzed, where appropriate, for the above substances. On the basis of this inspection, three (3) bulk samples of suspected lead-containing paint were collected.
- The samples were then submitted for analysis to the EXOVA Laboratory (an accredited CAEAL lab) located at 146 Colonnade Road, Nepean, Ontario, K2E 7Y1.
- The lead analysis of the paint samples was completed using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) in accordance with U.S. EPA Method 6010-C.
- .3 The visual inspection and sampling was limited to readily accessible areas. Destructive testing was not included in the investigation, but is recommended prior to any major demolition. Due to the nature of building construction, some inherent limitations exist as to the possible thoroughness of the designated substance survey. No confined space was accessed for the purpose of this report.
- .4 It is possible that the designated substances aforementioned are present in non-accessible areas and concealed spaces (i.e., wall and ceiling cavities), or confined spaces. No other areas outside the defined work boundaries have been assessed.
- .5 Prior to beginning work, it must be confirmed with the Departmental Representative that no additional designated substances have been brought to the project area.
- .6 In addition, the survey refers to PCBs and halocarbons; however, it does not refer to other substances that may be present in the day-to-day usage for specialized equipment or areas in buildings (i.e. lead shields, fume hoods, etc.).
- .7 There is a possibility that materials which could not be reasonably identified within the scope of this assessment or which were not apparent during previous site visits may exist. Should any designated substance be encountered in the course of demolition, work must be stopped, preventative measures taken, and the Departmental Representative must be notified immediately.

PART 2 - DESIGNATED SUBSTANCES

2.1 SURVEY RESULTS

- .1 **ACRYLONITRILE:** Not Identified
- .2 **ARSENIC:** Not Identified
- .3 **ASBESTOS:** Not Identified
- .4 **BENZENE:** Not Identified
- .5 **COKE OVEN EMISSIONS:** Not Identified
- .6 **ETHYLENE OXIDE:** Not Identified
- .7 **ISOCYANATES:** Not Identified
- .8 **LEAD: Identified**

Lead is a naturally occurring metal. It was used primarily in paint prior to the 1980's to increase the drying process. Lead in paint becomes a danger when it is old or damaged, as it creates lead dust and chips. Lead can also be found in soldered joints installed on piping up to the mid 1990s and in older cast iron bell and spigot joints.

- .1 According to the Hazard Products Act's *Regulations Amending the Surface Coating Materials Regulations* SOR/2010-224 allowable concentration of lead in surface coatings is 0.009 percent by weight (weight of lead to weight of paint), which is equivalent to 90 parts per million (ppm).
- .2 Even at very low concentrations, there may be potential for exposure to very high levels of lead depending on the activities performed that disturb the lead-containing materials. At low lead concentrations, conducting a risk assessment to assess the potential for exposure is required to determine the need to follow precautionary measures.
- .3 Representative beige paint samples, taken on 2013/02/20 from the project area, have been analyzed for lead content. Analytical results indicate that the beige paint on the pipe chase wall on the 14th floor of the North Tower and the green paint on the condenser water supply piping in the project area have a lead content above the 90ppm threshold outlined in the Hazardous Products Act's *Surface Coating Materials Regulations* SOR/2005-109. The results are shown in Table 1 below.

Table 1: Lead Sample Results

Sample ID	Description	Location	Lead Content (ppm)
NDQHCS-Pb-1	Green paint	From condenser water supply piping, chiller room, loading dock	<140
NDQHCS-Pb-2	Beige paint	From wall, 14 th Floor pipe chase, North Tower	770
NDQHCS-Pb-3	Green paint	From condenser water supply piping, 14 th Floor Roof, North Tower	2860

.9 **MERCURY: Identified**

Mercury-containing thermometers were identified within the project area.

.10 **SILICA: Not Identified**

.11 **VINYL CHLORIDE MONOMER: Not Identified**

.12 **POLYCHLORINATED BIPHENYLS (PCBs): Not Identified**

.13 **HALOCARBONS: Not Identified**

2.2 RECOMMENDATIONS

1. LEAD

If lead-containing materials are disturbed (i.e. during dry sanding, grinding, polishing and sawing operations), then proper precautions, as outlined under "Designated Substances" *O.Reg 490/09*, as amended, of the Occupational Health and Safety Act, must be followed.

Under Ontario Regulation 490/09, as amended of the Occupational Health and Safety Act, regulatory limits have been established for occupational exposure limits to airborne lead that may be present in a workplace. The Time Weighted Average Exposure Values to airborne lead dust or fumes should not exceed the Ministry of Labour's 0.05 milligram per cubic metre (mg/m³) limit during the removal of paints and products containing any concentration of lead. The TWAEV represents the time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects.

Contractors performing work that requires disturbance of lead-containing materials are responsible to ensure that the workers are not exposed to airborne lead dust levels in excess of the time-weighted average and Maximum Exposure Concentration for lead-containing paints. It should

be noted that the use of mechanically-powered tools or torches on lead-containing materials increases the concentration of airborne lead dust or fumes and thereby requiring more stringent respiratory protection and controlled work procedures.

.1 Ontario Ministry of Labour (MoL) has published the document entitled "*Guideline: Lead on Construction Projects*". This document classifies all disturbances of lead-containing materials as Type 1, Type 2a, Type 2b, Type 3a or Type 3b work, based on presumed airborne concentrations of lead generated during the work each of which will have defined work practices. Although this document is not a regulation, Ministry of Labour Inspectors use it as guidance during site inspections.

.2 The disposal of construction waste containing lead is controlled by "General – Waste Management" *O.Reg 347/09, as amended*, under the *Ontario Environmental Protection Act*. The classification of the waste is dependent upon the result(s) of leachate test(s). The waste can be classified as "hazardous", "non-hazardous" or "registerable solid waste", depending on the results of the leachate test.

Prior to disposal, the concentration of leachable lead must be determined for waste materials with elevated lead contents following the Toxicity Characteristic Leaching Procedure (TCLP).

2. MERCURY

.1 Mercury is governed by "Designated Substance – Mercury" *O.Reg 844* (as amended by *O.Reg 490/09*), under the Occupational Health and Safety Act. The regulation provides requirements for allowable exposure levels.

.2 In addition, mercury waste is considered a hazardous waste under "General – Waste Management" *O.Reg 347* (as amended by *O.Reg 337/09*) of the *Ontario Environmental Protection Act*.

3. CONTRACTORS DUTIES

The contractor must review the designated substance report and take the necessary precautions to protect the health and safety of the workers and the environment. As per Section 30(4) of the *Ontario Occupational Health and Safety Act*, the party hiring the contractor (i.e. Departmental Representative) shall ensure that the contractor and subcontractor (if any) for the project has received a copy of the designated substance report prior to entering a binding contract for the supply of work on

the project. As per Section 27(2) (a, b, and c) of the *Ontario Occupational Health and Safety Act*, while onsite, the contractor supervisor shall exercise every reasonable precaution for the protection of a worker. If you have any questions about the designated substance report, please contact the Departmental Representative.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
REQUIREMENTS**

- .1 Section 02 41 19 - Selective Demolition.
- .2 Section 23 05 05 - Installation of Pipework.
- .3 Section 23 05 23.05 - Butterfly Valves.
- .4 Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

1.2 ADMINISTRATIVE

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

**1.3 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.

1.3 SHOP DRAWINGS
AND PRODUCT DATA
(Cont'd)

- .3 Allow 7 days for Departmental Representative's review of each submission.
- .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .6 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .7 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .8 After Departmental Representative's review, distribute copies.
- .9 Submit an electronic copy of shop drawings via e-mail for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .10 Delete information not applicable to project.
- .11 Supplement standard information to provide details applicable to project.
- .12 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, shop drawings copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- 1.3 SHOP DRAWINGS AND PRODUCT DATA (Cont'd) .13 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that the Departmental Representative 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.

- 1.4 CERTIFICATES AND TRANSCRIPTS .1 Immediately after award of Contract, submit Workers' Compensation Board status.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

<u>1.1 SECTION INCLUDES</u>	.1	Health and safety considerations required to ensure that PWGSC shows due diligence towards health and safety on construction sites, and meets the requirements laid out in PWGSC/RPB Departmental Policy DP 073 - Occupational Health and Safety - Construction.
<u>1.2 RELATED REQUIREMENTS</u>	.1	Section 01 00 10 - General Instructions.
<u>1.3 REFERENCES</u>	.1	Health Canada/Workplace Hazardous Materials Information System (WHMIS) .1 Material Safety Data Sheets (MSDS).
	.2	Province of Ontario .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, April 2009 Edition.
<u>1.4 SUBMITTALS</u>	.1	Make submittals in accordance with Section 01 00 10 - General Instructions.
	.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.
	.3	Submit electronic copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
	.4	Submit electronic copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
	.5	Submit electronic copies of incident and accident reports.
	.6	Submit WHMIS MSDS - Material Safety Data Sheets.
	.7	Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 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.

<u>1.5 FILING OF NOTICE</u>	.1	File Notice of Project with Provincial authorities prior to beginning of Work.
<u>1.6 SAFETY ASSESSMENT</u>	.1	Perform site specific safety hazard assessment related to project.
<u>1.7 MEETINGS</u>	.1	Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
<u>1.8 PROJECT/SITE CONDITIONS</u>	.1	Work at site will involve contact with: .1 Fibreglass insulation.
<u>1.9 GENERAL REQUIREMENTS</u>	.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.
<u>1.10 RESPONSIBILITY</u>	.1	Be responsible and assume the role of "Constructor" as described in the Ontario Occupational Health & Safety Act and Regulations for Construction Projects.
	.2	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.
	.3	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.
<u>1.11 COMPLIANCE REQUIREMENTS</u>	.1	Comply with Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
<u>1.12 UNFORSEEN HAZARDS</u>	.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.

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| <u>1.13 POSTING OF DOCUMENTS</u> | .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. |
| <u>1.14 CORRECTION OF NON-COMPLIANCE</u> | .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. |
| <u>1.15 BLASTING</u> | .1 | Blasting or other use of explosives is not permitted. |
| <u>1.16 WORK STOPPAGE</u> | .1 | Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work. |

PART 1 - GENERAL

- 1.1 REFERENCES AND CODES .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.
- 1.2 HAZARDOUS MATERIAL DISCOVERY .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.
- .2 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.
- 1.3 BUILDING SMOKING ENVIRONMENT .1 Comply with smoking restrictions and municipal by-laws.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

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| <u>1.1 RELATED REQUIREMENTS</u> | .1 | Section 23 05 17 - Welding. |
| <u>1.2 INSPECTION</u> | .1 | Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress. |
| | .2 | Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work. |
| | .3 | If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work. |
| | .4 | Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement. |
| <u>1.3 ACCESS TO WORK</u> | .1 | Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants. |
| | .2 | Co-operate to provide reasonable facilities for such access. |
| <u>1.4 PROCEDURES</u> | .1 | Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made. |
| | .2 | Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work. |
| | .3 | Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples. |
| <u>1.5 REJECTED WORK</u> | .1 | Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents. |
| | .2 | Make good other Contractor's work damaged by such removals or replacements promptly. |
| | .3 | If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by |

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- 1.5 REJECTED WORK .3 (Cont'd)
(Cont'd) Contract Documents, amount of which will be determined by Departmental Representative.
- 1.6 REPORTS .1 Submit 4 copies of inspection and test reports to Departmental Representative.
.2 Provide copies to subcontractor of work being inspected or tested.

PART 1 - GENERAL

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| <u>1.1 REFERENCES</u> | <p>.1 Within text of each specifications section, reference may be made to reference standards.</p> <p>.2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.</p> <p>.3 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.</p> |
| <u>1.2 QUALITY</u> | <p>.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.</p> <p>.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.</p> <p>.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.</p> <p>.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.</p> <p>.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.</p> |
| <u>1.3 STORAGE, HANDLING AND PROTECTION</u> | <p>.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.</p> <p>.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.</p> <p>.3 Store products subject to damage from weather in weatherproof enclosures.</p> <p>.4 Store cementitious products clear of earth or concrete floors, and away from walls.</p> <p>.5 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.</p> <p>.6 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.</p> |

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- 1.4 TRANSPORTATION .1 Transport all materials to the job site. Protect materials from damage during transportation.
- .2 Pay costs of transportation of products required in performance of Work.
- 1.5 MANUFACTURER'S INSTRUCTIONS .1 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.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.
- 1.6 QUALITY OF WORK .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.
- 1.7 CO-ORDINATION .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- 1.8 REMEDIAL WORK .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.
- 1.9 PROTECTION OF WORK IN PROGRESS .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 00 10 - General Instructions.
- 1.2 SUBMITTALS .1 Submittals: in accordance with Section 01 00 10 - General Instructions.
- .2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.
- .3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.
- 1.3 MATERIALS .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section. 01 00 10 - General Instructions.
- 1.4 PREPARATION .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.
- 1.5 EXECUTION .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Remove and replace defective and non-conforming Work.

1.5 EXECUTION
(Cont'd)

- .4 Remove samples of installed Work for testing,
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

PART 1 - GENERAL

<u>1.1 RELATED REQUIREMENTS</u>	.1	Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
<u>1.2 PROJECT CLEANLINESS</u>	.1	Maintain Work in tidy condition, free from accumulation of waste products and debris.
	.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	Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
	.4	Provide on-site containers for collection of waste materials and debris.
	.5	Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
	.6	Store volatile waste in covered metal containers, and remove from premises at end of each working day.
	.7	Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
	.8	Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
<u>1.3 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

<u>2.1 NOT USED</u>	.1	Not Used.
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PART 3 - EXECUTION

3.1 NOT USED _____ .1 Not Used.

PART 1 - GENERAL

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| <u>1.1 WASTE MANAGEMENT GOALS</u> | <ul style="list-style-type: none">.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals..2 PWGSC's Waste Management Goal 75 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced..3 Accomplish maximum control of solid construction waste..4 Preserve environment and prevent pollution and environment damage. |
| <u>1.2 RELATED SECTIONS</u> | <ul style="list-style-type: none">.1 Section 01 00 10 - General Instructions. |
| <u>1.3 DEFINITIONS</u> | <ul style="list-style-type: none">.1 Class III: non-hazardous waste - construction renovation and demolition waste..2 Demolition Waste Audit (DWA): relates to actual waste generated from project..3 Inert Fill: inert waste - exclusively asphalt and concrete..4 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation..5 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse..6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products..7 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste..8 Reuse: repeated use of product in same form but not necessarily for same purpose.
Reuse includes:<ul style="list-style-type: none">.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects..2 Returning reusable items including pallets or unused products to vendors..9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling..10 Separate Condition: refers to waste sorted into individual types..11 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste. |

1.3 DEFINITIONS (Cont'd)	.12	Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.
	.13	Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
	.14	Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).
1.4 DOCUMENTS	.1	Maintain at job site, one copy of following documents: <ul style="list-style-type: none">.1 Waste Audit..2 Waste Reduction Workplan..3 Material Source Separation Plan..4 Schedules A, B & C completed for project.
1.5 SUBMITTALS	.1	Submittals in accordance with Section 01 00 10 - General Instructions.
	.2	Prepare and submit following prior to project start-up: <ul style="list-style-type: none">.1 Submit 2 copies of completed Waste Audit (WA): Schedule A..2 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B..3 Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule C.
	.3	Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/ disassembly material audit form. <ul style="list-style-type: none">.1 Failure to submit could result in hold back of final payment..2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of..3 For each material reused, sold or recycled from project, include amount in tonnes quantities by number, type and size of items and the destination..4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.
1.6 WASTE AUDIT (WA)	.1	Conduct WA prior to project start-up.
	.2	Prepare WA: Schedule A.
	.3	Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.
1.7 WASTE REDUCTION WORKPLAN (WRW)	.1	Prepare WRW prior to project start-up.
	.2	WRW should include but not limited to: <ul style="list-style-type: none">.1 Destination of materials listed..2 Deconstruction/disassembly techniques and sequencing..3 Schedule for deconstruction/disassembly..4 Location.

1.7 WASTE REDUCTION.2
WORKPLAN (WRW)
(Cont'd)

- (Cont'd)
- .5 Security.
 - .6 Protection.
 - .7 Clear labelling of storage areas.
 - .8 Details on materials handling and removal procedures.
 - .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
-
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
 - .4 Describe management of waste.
 - .5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
 - .6 Post WRW or summary where workers at site are able to review content.
 - .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
 - .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.8 DEMOLITION
WASTE AUDIT (DWA)

- .1 Prepare DWA prior to project start-up.
- .2 Complete DWA: Schedule C.
- .3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

1.9 STORAGE,
HANDLING AND
PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.

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| <u>1.9 STORAGE, HANDLING AND PROTECTION (Cont'd)</u> | .9 | Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.
.3 Provide waybills for separated materials. |
| <u>1.10 DISPOSAL OF WASTES</u> | .1 | Do not bury rubbish or waste materials. |
| | .2 | Do not dispose of waste, volatile materials mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers. |
| | .3 | Keep records of construction waste including:
.1 Number and size of bins.
.2 Waste type of each bin.
.3 Total tonnage generated.
.4 Tonnage reused or recycled.
.5 Reused or recycled waste destination. |
| | .4 | Remove materials from deconstruction as deconstruction/disassembly Work progresses. |
| | .5 | Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit. |
| <u>1.11 USE OF SITE AND FACILITIES</u> | .1 | Execute work with least possible interference or disturbance to normal use of premises. |
| | .2 | Maintain security measures established by existing facility provide temporary security measures approved by Departmental Representative. |
| <u>1.12 SCHEDULING</u> | .1 | Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work. |

PART 2 - PRODUCTS

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| <u>2.1 NOT USED</u> | .1 | Not Used. |
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PART 3 - EXECUTION

- 3.1 SELECTIVE DEMOLITION .1 Reuse of Building Elements: this project has been designed to result in end of project rates for reuse of building elements as follows: do not demolish building elements beyond what is indicated on Drawings without approval by Departmental Representative's.
- 3.2 APPLICATION .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
- 3.3 CLEANING .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.
- 3.4 DIVERSION OF MATERIALS .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
- .1 Mark containers or stockpile areas.
- .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged recovered reusable recyclable materials is not permitted.
- .3 Demolition Waste:
- | Material Type | Recommended Diversion % | Actual Diversion % |
|-----------------------|-------------------------|--------------------|
| Metals | 100 | |
| Rubble | 100 | |
| Wood (uncontaminated) | 100 | |
| Other | | |
- .4 Construction Waste:
- | Material Type | Recommended Diversion % | Actual Diversion % |
|-----------------------|-------------------------|--------------------|
| Cardboard | 100 | |
| Plastic Packaging | 100 | |
| Rubble | 100 | |
| Steel | 100 | |
| Wood (uncontaminated) | 100 | |
| Other | | |

3.5 WASTE AUDIT (WA)

.1 Schedule A - Waste Audit (WA):

(1) Material Category Unit	(2) Material Quantity	(3) Estimated Waste % of Waste	(4) Total Quantity Point (unit)	(5) Genera- tion	(6) % Recycled	(7) % Reused
Wood and Plastics Material Descrip- tion Off-cuts Warped Pallet Forms Plastic Packag- ing Card- board Packag- ing						
Other Doors and Windows Material Descrip- tion Painted Frames Glass Wood Metal Other						

3.6 WASTE REDUCTION.1 WORKPLAN (WRW)

Schedule B:

(1) Material Category	(2) Person(s) Respons- ible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Project- ed	Actual	(5) Recycled Amount (unit) Project- ed	Actual	(6) Material(s) Destination
Wood and Plastics Material Descrip- tion Chutes Warped Pallet							

3.6 WASTE REDUCTION.1 Schedule B:(Cont'd)
WORKPLAN (WRW)
(Cont'd)

Forms
Plastic
Packag-
ing
Card-
board
Packag-
ing
Other

3.7 DEMOLITION WASTE AUDIT (DWA) .1 Schedule C - Demolition Waste Audit (DWA):

(1) Material Descrip- tion	(2) Quantity	(3) Unit	(4) Total	(5) Volume (cum)	(6) Weight (cum)	(7) Remarks and Assump- tions
Wood						
Wood						
Stud						
Plywood						
Baseboard						
Regular						
Wood						

PART 1 - GENERAL

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| <u>1.1 RELATED REQUIREMENTS</u> | .1 | Section 01 45 00 - Quality Control. |
| | .2 | All sections of Div. 23. |
| | | |
| <u>1.2 SUBMITTALS</u> | .1 | Submittals: in accordance with Section 01 00 10 - General Instructions. |
| | .2 | Prepare instructions and data using personnel experienced in maintenance and operation of described products. |
| | .3 | Copy will be returned after final inspection, with Departmental Representative's comments. |
| | .4 | Revise content of documents as required prior to final submittal. |
| | .5 | Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English. |
| | .6 | Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work. |
| | .7 | Furnish evidence, if requested, for type, source and quality of products provided. |
| | .8 | Defective products will be rejected, regardless of previous inspections. Replace products at own expense. |
| | .9 | Pay costs of transportation. |
| | | |
| <u>1.3 FORMAT</u> | .1 | Organize data as instructional manual. |
| | .2 | Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets. |
| | .3 | When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine. |
| | .4 | Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents. |
| | .5 | Arrange content by systems, under Section numbers and sequence of Table of Contents. |
| | .6 | Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment. |
| | .7 | Text: manufacturer's printed data, or typewritten data. |
| | .8 | Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages. |
| | .9 | Provide 1:1 scaled CAD files in dwg format on CD. |

**1.4 CONTENTS - EACH
VOLUME**

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

**1.5 AS-BUILTS AND
SAMPLES**

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

**1.6 RECORDING
ACTUAL SITE
CONDITIONS**

- .1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

<u>1.6 RECORDING ACTUAL SITE CONDITIONS (Cont'd)</u>	<p>.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:</p> <ul style="list-style-type: none">.1 Field changes of dimension and detail..2 Changes made by change orders..3 Details not on original Contract Drawings..4 References to related shop drawings and modifications. <p>.5 Specifications: mark each item to record actual construction, including:</p> <ul style="list-style-type: none">.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. <p>.6 Other Documents: maintain, inspection certifications, field test records, required by individual specifications sections.</p>
<u>1.7 FINAL SURVEY</u>	<p>.1 Submit final site survey certificate in accordance with applicable sections, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.</p>
<u>1.8 EQUIPMENT AND SYSTEMS</u>	<p>.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.</p> <p>.2 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, and checking instructions.</p> <p>.3 Include manufacturer's printed operation and maintenance instructions.</p> <p>.4 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.</p> <p>.5 Additional requirements: as specified in individual specification sections.</p>
<u>1.9 WARRANTIES AND BONDS</u>	<p>.1 Develop warranty management plan to contain information relevant to Warranties.</p> <p>.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.</p> <p>.3 Warranty management plan to include required actions and documents to assure that Client receives warranties to which it is entitled.</p> <p>.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.</p> <p>.5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.</p>

1.9 WARRANTIES AND BONDS
(Cont'd)

- .6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Include information contained in warranty management plan as follows:
- .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
 - .3 Procedure and status of tagging of equipment covered by extended warranties.
 - .4 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in a timely manner to oral or written notification of required construction warranty repair work.
- .10 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.10 PRE-WARRANTY CONFERENCE

- .1 Meet with Departmental Representative, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Departmental Representative.
- .2 Departmental Representative will establish communication procedures for:
- .1 Notification of construction warranty defects.
 - .2 Determine priorities for type of defect.
 - .3 Determine reasonable time for response.

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| 1.10 PRE-WARRANTY
CONFERENCE
<u>(Cont'd)</u> | .3 | Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue 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. |

PART 1 - GENERAL

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| <u>1.1 RELATED REQUIREMENTS</u> | .1 | Section 01 33 00 - Submittal Procedures. |
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| <u>1.2 ADMINISTRATIVE REQUIREMENTS</u> | .1 | Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance. |
| | .2 | Owner will provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times. |
| | .3 | Preparation: <ul style="list-style-type: none">.1 Verify conditions for demonstration and instructions comply with requirements..2 Verify designated personnel are present..3 Ensure equipment has been inspected and put into operation in accordance with specification and drawings..4 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational. |
| | .4 | Demonstration and Instructions: <ul style="list-style-type: none">.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location..2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction..3 Review contents of manual in detail to explain aspects of operation and maintenance..4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions. |
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| <u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Provide submittals in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval. |
| | .3 | Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed. |
| | .4 | Give time and date of each demonstration, with list of persons present. |
| | .5 | Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions. |

- 1.4 QUALITY ASSURANCE .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
- .1 Instruct Owner's personnel.
 - .2 Provide written report that demonstration and instructions have been completed.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

**1.1 RELATED
SECTIONS**

- .1 All Div. 23, 25 & 26 sections.

1.2 INTENT

- .1 This section specifies general requirements common to all start-up and performance verification (PV) of mechanical & electrical components, equipment and systems specified elsewhere in the specification and must be read in conjunction with said specifications. The testing, verification, & commissioning indicated in the specification forms part of commissioning requirements.
- .2 Responsibility for the satisfactory completion of the building and demonstration that the requirements of commissioning are satisfied rests with the Contractor, who will employ and pay for any specialist supervision, inspection and testing as required to complete the work described.
- .3 Provide all labour and material to plan, organize and implement the commissioning process for mechanical & electrical systems and equipment. Carry out initial season commissioning and follow-up seasonal commissioning which could not be carried out during initial season.
- .4 Coordinate commissioning activities with all trades affected by this exercise.

1.3 TIMING

- .1 Except where otherwise specified, complete all start-up and testing prior to acceptance and hand-over of the project.

1.4 SCHEDULING

- .1 Provide start-up schedule for all equipment and systems in advance of commissioning activities.

**1.5 STARTING AND
TESTING**

- .1 Cleanliness:
.1 Before start-up, clean all equipment and systems and verify same to be free from all contaminants.
.2 After testing, protect equipment and systems from construction activities.
- .2 Conceal equipment & systems only after inspection, testing is completed and approved by Departmental Representative.
- .3 Assume all liabilities and costs for starting, testing, commissioning and adjusting, including supply of testing equipment.
- .4 Witnessing of starting and testing:
.1 Prior to start-up, prepare schedule for specified testing and review with Departmental Representative.
.2 Provide sufficient notice (at least 7 days) prior to commencement.
.3 Departmental Representative may witness all or any portion of start-up and testing at his discretion.

<u>1.5 STARTING AND TESTING (Cont'd)</u>	.4	Witnessing of starting and testing:(Cont'd) .4 Contractor to be present at all tests performed by sub-trades, suppliers, equipment manufacturers and at tests of other relevant Divisions, namely electrical & controls Divisions.
<u>1.6 CONFLICTS</u>	.1	If requirements of this or other sections of construction or commissioning specifications conflict, report to Departmental Representative before start-up and obtain clarification.
<u>1.7 PREPARATION</u>	.1	Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during starting process.
	.2	The Contractor, his suppliers, and/or manufacturers shall submit the qualification and experience of testing personnel, and/or agencies conducting factory and field testing, including evidence in support of their competence to the Departmental Representative 12 weeks after approval of shop drawings, or earlier if required to meet the requirements of Contract.
<u>1.8 AUTHORITIES HAVING JURISDICTION</u>	.1	Where specified start-up, testing or commissioning procedures duplicate authority's verification requirements, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
	.2	Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction. Provide copies to Departmental Representative.
<u>1.9 COMMISSIONING MEETINGS</u>	.1	As part of the regular construction progress meeting Commissioning shall be dialogued as part of the agenda.
	.2	These meetings will begin at the start of construction and will continue on a bi-weekly basis until the Interim Certificate of Completion as issued.
	.3	The Departmental Representative to put forward the agenda, chair the meeting as well as record and distribute the minutes.
	.4	Based on the requirements of the agenda the attendees shall include but not be limited to: .1 Contractor's representatives: Contractor's site superintendent, mechanical and electrical subcontractors, Controls sub-subcontractor and when so requested by the Departmental Representative, sub-subcontractors, suppliers and their parties involved in the Work. Contractor's representatives shall be qualified and authorized to act on behalf of the party each represents. .2 Inspection and testing company representatives.
	.5	Meetings will introduce, monitor progress, and resolve any issues of deficiencies relating to the Commissioning progress.

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| <u>1.10 VERIFICATION FORMS</u> | <p>.1 The Contractor will develop project specific verification forms. Fully completed forms, with the exception of verification results data, is to be completed and submitted from the Contractor to the Departmental Representative within 10 weeks of approval of shop drawings, or as specified.</p> <p>.2 The component forms shall be completed as follows:</p> <ul style="list-style-type: none">.1 The Specified requirements shall be completed by the Contractor, and reviewed by Departmental Representative..2 The Shop Drawing information shall be completed by the Contractor and reflect the approved shop drawings. This shall be completed by hand..3 The installed information shall be completed by the Contractor from nameplates on installed equipment. This shall be completed by hand..4 The Contractor shall provide the required shop drawing information and verify the correct installations and operation of each item. This to include information such as equipment/component code, location and nameplate data..5 The systems verification cannot take place before all related components have been verified as correct..6 Integrated systems verification cannot take place before all related systems have been verified as correct..7 Verification forms will be provide for information and convenience to the Contractor and will not relieve the Contractor of responsibility for verification of components, systems, or integrated systems not included on the verification forms..8 A verification form is to be completed for each integrated system in a category requiring verification..9 Integrated system verification forms are to be completed by the Contractor..10 Where additional forms are required, but are not available from the Departmental Representative, develop appropriate verification forms and submit them to the Departmental Representative for approval prior to use. These additional forms will include, but not be limited to, work defined in the following sections:<ul style="list-style-type: none">.1 All Div. 23, 25 & 26 sections. |
| <u>1.11 DEFICIENCIES</u> | <p>.1 Correct deficiencies found during start-up and testing to satisfaction of Departmental Representative.</p> |
| <u>1.12 COMPLIANCE WITH SPECIFIED PROCEDURES</u> | <p>.1 Failure to follow specified start-up procedures may result in re-evaluation of equipment by independent testing agency selected by Departmental Representative.</p> <p>.2 Should results reveal that equipment start-up was not in accordance with specified requirements, equipment may be rejected and must immediately thereafter be removed from site and replaced with new which will also be subject to specified start-up procedures.</p> |
| <u>1.13 OWNER'S PERFORMANCE TESTING</u> | <p>.1 Performance testing of any equipment or system by Owner shall not relieve Contractor from compliance with specified start-up and testing procedures.</p> |
| <u>1.14 TESTING INSTRUMENTS</u> | <p>.1 Provide 2-way radios, ladders, other equipment as required to complete work. Provide measuring instruments as required.</p> <p>.2 Provide safety equipment for start-up and testing personnel.</p> |
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1.14 TESTING
INSTRUMENTS
(Cont'd)

- .3 Provide list of equipment and instruments to be used in start-up, testing for review and approval by Departmental Representative.

1.15 SYSTEM
DEMONSTRATION AND
TESTING

- .1 Prior to issuance of interim certification of completion, hold instructional seminars or training sessions as directed by the Contract Documents on all equipment and systems to demonstrate the complete operation, function, care and maintenance of equipment and materials to Departmental Representative's designated personnel. Arrange with the Departmental Representative for time of training. Training shall consist of live training sessions conducted in the building and shall consist of primary sessions with follow up sessions for each training session.

1.16 SEMINAR
CONTENT

- .1 Design Philosophy:
.1 Contractor shall explain design philosophy of each system and include following information:
.1 An overview of how the system is intended to operate.
.2 Description of the system operation strategies.
.3 Information to help in identifying and trouble-shooting system problems.
- .2 Equipment:
.1 Contractor shall present information dealing with equipment. Include following in presentations:
.1 Explanation of how equipment operates.
.2 Recommended preventative and routine maintenance.
- .3 Submittals:
.1 Submit report within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed with appropriate comments/feedback of questions.
.2 Include in reports time and date of each demonstration, and a list of persons present.
.3 Wherever possible avoid scheduling beyond a maximum of three (3) consecutive days.
- .4 Conditions and Demonstrations:
.1 Equipment has been inspected and put into operation.
.2 Testing, adjusting and balancing has been performed in accordance with appropriate section and equipment and systems are fully operational.
.3 Provide copies of pertinent operation and maintenance manuals for use in demonstrations and instructions.
- .5 Preparation:
.1 Verify that conditions for demonstration and instructions comply with requirements.
.2 Verify that designated personnel are present.
- .6 Demonstration and Instructions:
.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, scheduled and preventative maintenance, and shut-down of each item of equipment at agreed upon times, at the equipment location.
.2 Instruct designated personnel in all phases of operation and maintenance manuals as the basis of instruction.
.3 Review contents of manual in detail to explain all aspects of operation and maintenance.

1.16 SEMINAR CONTENT (Cont'd)	.6	Demonstration and Instructions:(Cont'd)
	.4	Prepare and insert additional data in operation and maintenance manuals when the need for additional data becomes apparent during instructions.
1.17 FOLLOW-UP SEMINARS	.1	Follow-up seminar, or seminars as required will be conducted before Final Certificate of Completion. These seminars will deal with any clarifications the Departmental Representative may require as a result of initial operating experiences.
1.18 MAINTENANCE OF EQUIPMENT	.1	After start-up of equipment the Contractor shall maintain equipment as directed by product manufacturer.
	.2	The Contractor shall develop a written maintenance program. The product manufacturer shall endorse the maintenance program for each piece of equipment.
	.3	The maintenance program once established shall be presented to the Departmental Representative for review.
	.4	Once the written maintenance program appears to be in general conformance with the contract documents and is returned to the Contractor, the Contractor shall implement the program until the Final Certificate of Completion for the Project has been issued.
1.19 COMMISSIONING MANUAL	.1	Compile test reports, Verification forms, and certificates, by Division, by specification Section, into one Commissioning Manual. Submit draft manual for review and approval of the Departmental Representative two (2) weeks prior to application for Interim Acceptance of the Project. Submit four (4) copies of approved manual prior to Interim acceptance of the Project.

PART 2 - PRODUCTS

2.1 NOT USED	.1	Not used.
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PART 3 - EXECUTION

3.1 GENERAL	.1	Thoroughly overhaul and restore to new condition all equipment which has been operated by the Contractor during the construction phase.
	.2	Permanently mark all final settings in such a manner that they cannot be eradicated or obliterated in any way.
	.3	Record all final settings and record drawings.
	.4	Verify the implementation of all identification procedures as specified in the Contract Documents.

3.1 GENERAL
(Cont'd)

- .5 Some systems may have to be tested after the facility has been handed over, accepted, and during the warranty Period.
- .1 If necessary, occupancy shall be coordinated so as to avoid interference with, or interruption of, any integrated systems testing activities.

3.2 RESPONSIBILITIES

- .1 Departmental Representative's Responsibilities:
- .1 For ensuring that commissioning activities are carried out in accordance with commissioning plan.
- .2 The Departmental Representative will:
- .1 Assemble commissioning team and ensure co-ordination of activities with team in carrying out commissioning plan.
- .2 Chair and arrange commissioning meeting.
- .3 Witness equipment start-up on a selective basis, and review all manufacturer's start-up reports.
- .4 Witness testing and balancing measurements and procedures as necessary.
- .5 Witness all functional tests and initial all documents at time of test.
- .6 Co-sign off, as witness, all systems verification and test forms.
- .7 Co-ordinate building operators training in accordance with approved training plan.
- .8 Ensure that the commissioning documents are completed and signed off by the appropriate commissioning team members as and when required.
- .9 Review and comment on the Commissioning Plan prepared by the Contractor.
- .10 Review and comment on the Training Plan submitted by the Contractor.
- .11 Review and comment on the O&M documentation prepared by the Contractor.
- .2 The General Contractor's Responsibilities:
- .1 Co-operate fully with Departmental Representative in the execution of commissioning plan. At completion of commissioning, provide a written statement affirming that building systems are operating properly in accordance with requirements of performance specification and design intent of contract drawings and specifications.
- .2 Arrange and provide all necessary labour and materials in order to implement commissioning.
- .3 Prepare and provide:
- .1 A commissioning plan and commissioning schedule.
- .2 All testing procedures, functional tests and performance verification recording forms.
- .3 Schematics and flow diagrams necessary for commissioning.
- .4 Start-up reports.
- .5 An interim commissioning report which contains all required commissioning information except for that remaining to be done as seasonal or deferred commissioning work.
- .6 Seasonal commissioning requirements.
- .7 Submit final commissioning report to Departmental Representative.
- .8 Arrange for provision of additional training where required.
- .9 Turn over completed interim and final commissioning reports to Departmental Representative.
- .3 Mechanical Contractor's Responsibilities:
- .1 Attend all commissioning activities as required.
- .2 Deliver O&M data to the Builder for inclusion in O&M documentation.
- .3 Ensure participation by major equipment manufacturers as required in building operator training.

3.2 RESPONSIBILITIES
(Cont'd)

- .3 (Cont'd)
- .4 Performs all tests as identified in the Commissioning Plan and contract documents.
- .4 Electrical Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required.
 - .2 Deliver O&M data to the Builder for inclusion in O&M documentation.
 - .3 Ensure participation by major equipment manufacturers as required in building operator training.
 - .4 Performs all tests as identified in the Commissioning Plan and contract documents.
- .5 Control Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required.
 - .2 Deliver O&M data to the Builder for inclusion in O&M documentation.
 - .3 Ensure participation by major equipment manufacturers as required in building operator training.
 - .4 Performs all tests as identified in the Commissioning Plan and contract documents.
- .6 Testing, Adjusting and Balancing Contractor's Responsibilities:
 - .1 Attend all commissioning activities as required by Departmental Representative.
 - .2 Performs all tests identified in the Commissioning Plan and contract documents.

3.3 INTEGRATED SYSTEM TESTING

- .1 Ensure integrated system operations conform with design documents providing required and performance with proper interaction between related systems.
- .2 Verify performance of systems operating in conjunction with one another under all conditions and modes of operation. Each system is to be operated for as long as required to complete commissioning.
- .3 Reported results of testing and procedures are checked and verified to be correct with stated tolerances. If inconsistencies appear between reported results and demonstrated values, the relevant testing procedures are repeated and adjustments made until satisfactory results are obtained.

3.4 FINAL ACCEPTANCE

- .1 Final acceptance is not achieved until the requirements of the Commissioning Plan have been achieved, documented and accepted by the Departmental Representative.