

PART 1 - GENERAL

- |   |    |   |
|---|----|---|
| <u>1.1 Minimum Standards</u>                              | .1 | Material shall be new and work shall conform to the standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC), National Fire Code of Canada 2010(NFC), all applicable Provincial and Municipal Codes. In the case of conflict or discrepancy the most stringent requirement shall apply.   |
| <u>1.2 Shop Drawings<br/>Samples and Product<br/>Data</u> | .1 | Submit for the Departmental Representative's review, copies of each shop drawing as per Section 01 33 00 - Submittal Procedures.  |
|   | .2 | The review is for the sole purpose of ascertaining conformance with the general design concept, and does not mean approval of the design details inherent in the shop drawings, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. |
|   | .3 | Do not commence manufacture or order materials before shop drawings are reviewed.   |
| <u>1.3 Taxes</u>  | .1 | Pay all taxes properly levied by law (including Federal, Provincial and Municipal).   |
| <u>1.4 Fees,Permits and<br/>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.   |
| <u>1.5 Fire Safety<br/>Requirements</u>                   | .1 | Comply with the National Building Code of Canada 2010 (NBC) for fire safety in construction and the National Fire Code of Canada 2010 (NFC) for fire prevention, firefighting and life safety in building in use.<br>.1 Retain all fire safety documents and standards on site.   |
|   | .2 | Welding and cutting:  |

1.5 Fire Safety  
Requirements  
(Cont'd)

- .2 (Cont'd)
  - .1 Before welding, soldering, grinding and/or cutting work, obtain a permit as directed by the Departmental Representative and as addressed in NBC 2010 and NFC 2010. Store flammable liquids in approved CSA containers. No open flame shall be used unless authorized by the Departmental Representative.
  - .2 At least 1 week 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,
  - .3 A fire watcher shall be assigned when welding or cutting operations are carried out in areas where combustible materials within 15m may be ignited by conduction or radiation.
- .3 Where work requires interruption of fire alarms or fire suppression, extinguishing or protection systems:
  - .1 Provide watchman service; In general, watchman service is defined as an individual conversant with Fire Emergency Procedures, performing fire picket duty within an unprotected and unoccupied (no workers) area once per hour.
  - .2 Retain and pay all cost for services of manufacturer/service company for fire protection systems to protect all devices relating to:
    - .1 Modification or by pass of fire alarms, fire suppression, extinguishing or protection systems; when performing cutting, welding, soldering or other construction activities which might activate fire protection systems.

1.6 Field Quality Control

- .1 Carry out Work using qualified licensed workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification.
  - .1 Submit lists of personnel involved in project and copy of professional trade licenses
- .2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers
- .3 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.
- .4 Any work on a halocarbon containing system that may result the release of a halocarbon (installation, servicing, leak testing or charging) must be conducted by a certified person as defined in the Federal halocarbon Regulations, 2003.

- 
- 1.7 Hazardous Materials
- .1 Comply with the requirements of the Workplace Hazardous Material Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS).
  - .2 For work in occupied buildings give the Departmental Representative 1 week notice for work involving designated substances (Ontario Bill 208), hazardous substances and before painting, caulking, installing carpet or using adhesives.
- 1.8 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 Temporary services required for work may be available without charge where there is capacity to do so, and at the discretion of the Departmental Representative. Mechanical and Electrical connections in accordance with applicable codes. Connections and disconnections to/from services shall be at the contractors expense and responsibility.
  - .3 Notify the Departmental Representative and utility companies of intended interruption of services, obtain requisite permission.
  - .4 Give the Departmental Representative 1 week 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.
- 1.9 Removed Materials
- .1 Unless otherwise specified materials for removal become the Contractor's property and shall be taken from site.
  - .2 Remove and dispose equipment selected by Departmental representative.
- 1.10 Protection
- .1 Protect finished work against damage until take-over.
  - .2 Protect adjacent work against the spread of dust and dirt beyond the work areas.
-

1.10 Protection  
(Cont'd)

- .3 Protect operatives and other users of site from all hazards.

1.11 Use of Site and  
Facilities

- .1 Execute work with least possible interference or disturbance to the normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated. Refer to article 1.27 Scheduling below for work that must be done during "off hours".
- .1 During "off hours" work, isolate area of construction facility with dust tight barrier to protect all adjacent surfaces and equipment. Upon completion of the work remove enclosures, vacuum the work area, wet clean and disinfect to food preparation facility standards. The cleanup has to be completed before leaving the premise. Keep digital photography record "before" and "after" condition for every day and each area affected by this project.
- .1 During "full" access period activity (Phase III), removal of barriers and cleanup is required by the end of work period.
- .2 During "off hours" work all workers shall wear white disposable overalls and hair nets.
- .1 During "full" access period activity (Phase III) disposable overalls are recommended.
- .3 Use smoke-filtering devices to eliminate smell of fumes. The building is used as Food Production Facility and any environmental influence is not acceptable.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Where elevators, dumbwaiters, conveyors or escalators exist Contractor may use these at Departmental Representative's discretion. Protect from damage, safety hazards and overloading of existing equipment.
- .5 Sanitary facilities are to be provided by Departmental Representative. Maintain clean environment after use.
- .6 Contractor to provide waste dumpsters for collection of construction waste and make provision for periodic removal of waste from the site during construction.
- .7 Closures: Protect work temporarily until permanent enclosures completed.

---

<u>1.12 Deliveries</u>	.1	Provide schedule of deliveries to Departmental Representative at least five days in advance, schedule to comply with security control measures.
<u>1.13 Site Storage</u>	.1	The Departmental Representative will assign storage space adjacent to the building site. Contractor shall obtain and pay for lockable weatherproof sheds for storage of tools, equipment and materials which shall be equipped and maintained by the Contractor.
	.2	Do not unreasonably encumber site with materials or equipment.
	.3	Move stored products or equipment, which interfere with operations of Departmental Representative.
	.4	Obtain and pay for use of additional storage or work areas needed for operations.
<u>1.14 Cut, Patch and Make Good</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.
	.4	Install firestops and smoke seals in accordance with ULC-S115-2005 around pipe, ductwork, cables, and other objects penetrating fire separations to provide fire resistance not less than the fire resistance rating of surrounding floor, ceiling, and wall assembly.
<u>1.15 Sleeves, Hangers and Inserts</u>	.1	Co-ordinate setting and packing of sleeves and supply and installation of hangers and inserts. Obtain Departmental Representative's approval before cutting into structure.
<u>1.16 Examination</u>	.1	Examine site and conditions likely to affect work and be familiar and conversant with existing conditions.

---

- 
- |  |    |   |
|--|----|---|
| <u>1.16 Examination<br/>(Cont'd)</u>     | .2 | Be aware of high complexity of the building structure and layout, mechanical and electrical system layout and congestion as well as building function and operation. Allow for 2 x 6hr session for all contractor's personnel employed on this project to get familiar with building layout and services affected by this contract location.                  |
| <br>                                     |    |   |
| <u>1.17 Signs</u>                        | .1 | Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etc., in both official languages or by the use of commonly-understood graphic symbols to the Departmental Representative's approval.  |
|  | .2 | No advertising will be permitted on this project.   |
| <br>                                     |    |   |
| <u>1.18 Access and Egress</u>            | .1 | Design, 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.  |
|  | .2 | The building must remain operational during construction. The contractor shall agree to install proper site separation and identification in order to maintain "Time and Space" at all time throughout the life of the project and when PWGSC Building Operations staff requires access to equipment to operate the building, proper coordination must exist. |
| <br>                                     |    |   |
| <u>1.19 Scaffolds Work<br/>Platforms</u> | .1 | Design, install, and inspect scaffolds and work platforms required for work in accordance with relevant municipal, provincial and other regulations.  |
|  | .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.   |
| <br>                                     |    |   |
| <u>1.20 Waste Management</u>             | .1 | Comply with the Environment Protection Act, Ontario Regulations O.Reg 102/94 and O.Reg 103/94 for waste management program on construction and demolition projects.   |
-

1.20 Waste Management  
(Cont'd)

- .2 Waste management according to Section 01 74 21  
Construction/Demolition Waste Management And Disposal.

1.21 Operations and  
Maintenance Manuals

- .1 Two (2) weeks prior to any scheduled training, submit to  
Departmental Representative six (6) copies of approved  
Operations Data and Maintenance Manual in both official  
languages, compiled as follows:
- .1 Bind data in vinyl hard cover 3 "D" ring type loose leaf  
binders for 212 x 275mm size paper. Binders must not exceed 75  
mm thick or be more than 2/3 full.
  - .2 Enclose title sheet labelled "Operation Data and  
Maintenance Manual," project name, date and list of contents.  
Project name must appear on binder face and spine.
  - .3 Organize contents into applicable sections of work to  
parallel project specifications breakdown. Mark each section by  
labelled tabs protected with celluloid covers fastened to hard paper  
dividing sheets.
- .2 Include following information plus data specified.
- .1 Maintenance instruction for finished surface and materials.
  - .2 Copy of hardware and paint schedules.
  - .3 Description: Operation of the equipment and systems  
defining start-up, shut-down and emergency procedures, and any  
fixed or adjustable set points that affect the efficiency of the  
operation. Include nameplate information such as make, size,  
capacity and serial number.
  - .4 Maintenance: Use clear drawings, diagrams or  
manufacturer's literature which specifically apply and detail the  
following:
    - .1 Lubrication products and schedules.
    - .2 Trouble shooting procedures.
    - .3 Adjustment techniques.
    - .4 Operational checks.
    - .5 Supplier's names, addresses and telephone numbers  
and components supplied by them must be included in this  
section. Components must be identified by a description and  
manufacturers part number.
  - .5 Guarantees showing:
    - .1 Name and address of projects.
    - .2 Guarantee commencement date (date of Interim  
Certificate of Completion).
    - .3 Duration of guarantee.
    - .4 Clear indication of what is being guaranteed and what  
remedial action will be taken under guarantee.
    - .5 Signature and seal of Guarantor.

<u>1.21 Operations and Maintenance Manuals (Cont'd)</u>	.2	(Cont'd)
	.5	(Cont'd)
	.6	Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
	.3	Spare parts: List all recommended spares to be maintained on site to ensure optimum efficiency. List all special tools appropriate to unique application. All parts/tools detailed must be identified as to manufacturer, manufacturer part number and supplier (including address)
	.4	Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.
<u>1.22 Records</u>	.1	As work progresses, maintain accurate records to show deviations from contract drawings. Just prior to Departmental Representative's inspection for issuance of final certificate of completion, supply to the Departmental Representative one (1) set of white prints with all deviations neatly inked in. The Departmental Representative will provide two sets of clean white prints for this purpose.
<u>1.23 Guarantees and Warranties</u>	.1	Provide labour and material warranty for all material purchased and all services installed under this contract. Submit Letter of Warranty with O&M Manuals.
<u>1.24 Clean up</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, dust barriers and surplus materials. Make good defects noted at this stage.
	.3	Vacuum the work area and adjacent space affected by traffic or construction activity. Wash with mild soap solution walls, floors and hardware. Clean manufactured articles in accordance with manufacturer's directions.



- 
- |  |    |   |
|--|----|---|
| <u>1.24 Clean up<br/>(Cont'd)</u>        | .4 | Disinfect work area and adjacent space with scent free bacteriological solution approved for Food Production Facility.  |
|  | .5 | Clean areas under contract to a similar condition to that previously existing and to approval of Departmental Representative.   |
| <br>                                     |    |   |
| <u>1.25 Building Smoking Environment</u> | .1 | Smoking is not permitted in the Building. Obey smoking restrictions on building property.   |
| <br>                                     |    |   |
| <u>1.26 Dust Control</u>                 | .1 | Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public.  |
|  | .2 | Maintain and relocate protection until such work is complete.   |
|  | .3 | Protect all furnishings 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.  |
| <br>                                     |    |   |
| <u>1.27 Scheduling</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. |
|  | .1 | See drawings for project Phases and completion time.  |
|  | .2 | For Phase II carry out the following work during "off hours", defined as Friday from 21:00 to Saturday 15:00 hours only.  |
|  | .1 | Work within an occupied area required for equipment installation preparation, electrical and mechanical rough-ins. Work shall be assessed as non obstructive and subject to easy and thorough post work cleanup and space disinfected.  |
|  | .2 | Work within a ceiling spaces outside of Food Production Areas, still subject to final cleanup upon completion of work period.   |
|  | .3 | All work on the roof excluding roof cutting.  |
|  | .3 | For Phase III and IV, carry out work on 24/7 basis. The allocated time in the schedule for this work cannot be extended.  |
-

- 
- |   |    |   |
|---|----|---|
| <u>1.27 Scheduling</u><br><u>(Cont'd)</u> | .4 | Give the Departmental Representative 48 hours notice for work to be carried out during "off hours".   |
|   | .5 | Give the Departmental Representative 7 days notice for any shutdowns. Do not proceed with the work without written approval.  |
|   | .6 | During the construction activity inside the facility the following shall apply: <ul style="list-style-type: none"><li>.1 Corridor 134 must remain accessible and secured at all time to access units 126, 125, 124, 123 &amp; 122.</li><li>.2 Receiving area 116 to remain accessible and secured to shipping/receiving employees</li><li>.3 2nd fl. offices to remain accessible and secured at all time</li><li>.4 Contractor will be able to utilize the shipping dock 157</li></ul> |
| <br>                                      |    |   |
| <u>1.28 Cost Breakdown</u>                | .1 | 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  |
| <br>                                      |    |   |
| <u>1.29 Precedence</u>                    | .1 | Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.   |
| <br>                                      |    |   |
| <u>1.30 Security Requirements</u>         | .1 | The contractor must comply to the Security Requirement Check List (SRCL) and provide proof that all personnel who must access the building, either for interior or exterior work, have up to date security levels, in this case, a minimum of Site Access security level clearance, in order to bid on this project.  |

## PART 2 - PRODUCTS

- 
- |                     |    |           |
|---------------------|----|-----------|
| <u>2.1 Not Used</u> | .1 | Not Used. |
|---------------------|----|-----------|
-

PART 3 - EXECUTION

3.1 Not Used .1 Not used.



## PART 1 - GENERAL

- |  |    |   |
|--|----|---|
| <u>1.1 Related Sections</u>  | .1 | Section - 01 00 10 - General Instructions.  |
| <u>1.2 Use of Site and Facilities</u>                              | .1 | Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.                                |
|  | .2 | Maintain existing services to building and provide for personnel and vehicle access.  |
| <u>1.3 Alternations, Additions or Repairs to Existing Building</u> | .1 | Execute work with least possible interference or disturbance to building operations and occupants and normal use of premises. Arrange with Departmental Representative to facilitate execution of work. |
| <u>1.4 Security</u>  | .1 | Where security has been reduced by Work of Contract, provide temporary means to maintain security.  |
|  | .2 | Security clearances:  |
|  | .1 | Personnel employed on this project will be subject to security check. Obtain clearance for each individual who will require to enter premises.  |
|  | .2 | Obtain requisite clearance for each individual required to enter premises.  |
|  | .3 | Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.                    |
|  | .4 | Contractor's personnel will require satisfactory to the Canadian Industrial Security Directorate (CISD) initiated security screening in order to complete Work in premises and on site.                 |
|  | .3 | Security escort:  |
|  | .1 | Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.            |

- 1.4 Security .3 (Cont'd)  
(Cont'd)
- .2 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.
- .3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 4 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.
- .4 Calculation of costs will be based on average hourly rate of security officer for minimum of 8 hours per day for late service request and of 4 hours for late cancellations.

## PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

## PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

## 1 **GENERAL**

### 1.1 REFERENCES

#### 1. Federal Legislation

1. *Canada Labour Code, Part II, section 124 and 125. Canada Occupational Health and Safety Regulations*
2. *Transportation of Dangerous Goods Act, 1992 (TDGA)*
3. *Canada Consumer Product Safety Act*
  1. *Surface Coating Materials Regulations SOR/2005-109.*
4. *Canadian Environmental Protection Act, 1999 (CEPA)*
  1. *PCB Regulations (SOR/2008-273)*
  2. *Federal Halocarbon Regulations, 2003 (SOR/2003-289)*

#### 2. Provincial Legislation

1. *Ontario Occupational Health and Safety Act, R.S.O. 1990, 2010 edition.*
  1. *Ontario Regulation 490/09 – Designated Substances (O.Reg. 490/09).*
  2. *Ontario Regulation 278/05 – Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations, (O.Reg. 278/05).*
  3. *Ontario Regulation 213/91 for Construction Projects (O.Reg. 213/91)*
2. *Ontario Environmental Protection Act, R.R.O. 1990,*
  1. *Ontario Regulation 347/09, General – Waste Management (O.Reg. 347/09).*
  2. *Ontario Regulations 362/90 – Waste Management, PCBs (O.Reg. 362/90)*
  3. *Ontario Regulation 463/10, Ozone Depleting Substances and Other Halocarbons (O.Reg. 463/10).*

#### 3. *Canadian General Standards Board (CGSB).*

#### 4. *Canadian Standards Association (CSA International). CAN/CSA-Z94.4-11 Respiratory Protection*

#### 5. Underwriters' Laboratories of Canada (ULC).

### 1.2 DEFINITIONS

HEPA vacuum: High Efficiency Particulate Arrestor filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

Time-weighted average exposure limit (TWael): the time-weighted average airborne concentration of a biological or chemical agent to which a worker may be exposed in a work day or work week as prescribed by O.Reg. 490/09 Designated Substances, as amended.

### 1.3 RELATED SECTIONS

Not used

## 1.4 DESIGNATED SUBSTANCES

Refer to the following "*Designated Substances Report, Refrigeration Bypass Installation Project, 1170 Algoma Road, Ottawa, Ontario*" dated February 5<sup>th</sup>, 2016.

The scope of work consists of installing a completely independent new refrigeration bypass for emergency relief at the Food Processing Facility, 1170 Algoma Road, Ottawa, Ontario.

Confirm with the Departmental Representative that no additional designated substances have been brought to the project area prior to beginning work.

Additional designated substances and hazardous materials may exist outside the accessible survey area but are beyond the scope of this project.

Should any additional material, suspected to be a designated substance, be encountered within the project area, any disturbance of such material must be stopped, precautionary measures taken, and the Departmental Representative must be notified immediately. Do not proceed until written instructions have been received.

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: Traces amounts identified**

Based on the results of the grey paint sample collected in 2012 from the room 109 at the Food Processing Facility, and the beige-yellow paint bulk sample collected in 2014 from the chilled water pipe in room 001, the lead contents are both below the method detection limit and also below the 90 ppm threshold as outlined in the *Canada Consumer Product Safety Act's Surface Coating Materials Regulations SOR/2005-109 (as amended)*. These paints are not considered to be lead containing paints.

9. MERCURY: Not Identified

### **10. SILICA: Identified**

Free crystalline silica is present in concrete, and drywall within the project areas.

11. VINYL CHLORIDE MONOMER: Not Identified
12. POLYCHLORINATED BIPHENYLS (PCBS): Not Identified
13. OZONE DEPLETING SUBSTANCES (ODS): Not Identified

## 1.5 RECOMMENDATIONS

### **1. SILICA**



1. Comply with Ontario Regulations *O.Reg. 490/09* when performing works that may disturb silica-containing materials.
2. Follow recommendations provided in the Ontario Ministry of Labour Guideline entitled "*Guideline: Silica on Construction Projects*". This document classifies all silica disturbances as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification.

2    **PRODUCTS**

Not used

3    **EXECUTION**

Not used

**END OF SECTION**



PART 1 - GENERAL

- 1.1 Administrative
- .1 Attend project meetings throughout the progress of the work at the call of Departmental Representative.
  - .2 The Departmental Representative will provide physical space and make arrangements for meetings.
  - .3 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
  - .4 Departmental Representative will chair meeting and prepare and distribute minutes.
- 1.2 Pre-Construction Meeting
- .1 Within 5 days after award of Contract, at the request of the Departmental Representative, attend meeting to discuss and resolve administrative procedures and responsibilities.
  - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
  - .3 Agenda to include:
    - .1 Appointment of official representative of participants in the Work.
    - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
    - .3 Schedule of submission of shop drawings, samples, and colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
    - .4 Delivery schedule of specified equipment.
    - .5 Site security.
    - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
    - .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
    - .8 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
    - .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
    - .10 Monthly progress claims, administrative procedures, hold backs.

- |  |    |   |
|--|----|---|
| <u>1.2 Pre-Construction Meeting (Cont'd)</u> | .3 | (Cont'd)<br>.11 Appointment of inspection and testing agencies or firms.<br>.12 Insurances, transcript of policies.   |
| <br>   |    |   |
| <u>1.3 Progress Meetings</u>                 | .1 | Attend progress meetings throughout the progress of the Work at the call of Departmental Representative. Allow time to attend 12 meetings as requested by Departmental Representative.  |
|  | .2 | Contractor, major subcontractors, Departmental Representative are to be in attendance.  |
|  | .3 | Agenda to include the following:<br>.1 Review, approval of minutes of previous meeting.<br>.2 Review of Work progress since previous meeting.<br>.3 Field observations, problems, conflicts.<br>.4 Problems which impede construction schedule.<br>.5 Review of off-site fabrication delivery schedules.<br>.6 Corrective measures and procedures to regain projected schedule.<br>.7 Revision to construction schedule.<br>.8 Progress schedule, during succeeding work period.<br>.9 Review submittal schedules: expedite as required.<br>.10 Maintenance of quality standards.<br>.11 Review proposed changes for affect on construction schedule and on completion date.<br>.12 Other business. |

## PART 2 - PRODUCTS

- |                     |    |           |
|---------------------|----|-----------|
| <u>2.1 Not Used</u> | .1 | Not Used. |
|---------------------|----|-----------|

## PART 3 - EXECUTION

- |                     |    |           |
|---------------------|----|-----------|
| <u>3.1 Not Used</u> | .1 | Not Used. |
|---------------------|----|-----------|

## PART 1 - GENERAL

### 1.1 Definitions

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity duration are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system
- .3 Baseline: original approved plan (for project, work package, or activity) plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission. There are seven days per work week.
- .5 Duration: number of work periods (not including holidays or other non-working periods) required to complete activity or other project element. Usually expressed as workdays or work weeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.
- .10 Week: Monday to Friday, inclusive, will provide five day week.

- 
- |                               |    |   |
|-------------------------------|----|---|
| <u>1.2 Requirements</u>       | .1 | Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.  |
|                               | .2 | Plan to complete Work in accordance with prescribed milestones and time frame.  |
|                               | .3 | Limit activity duration to maximum of approximately 5 working days, to allow for progress reporting.  |
| <br>                          |    |   |
| <u>1.3 Submittals</u>         | .1 | Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.  |
|                               | .2 | Submit to Departmental Representative within 5 weekdays of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress. |
|                               | .3 | Submit Project Schedule to Departmental Representative within 5 weekdays of receipt of acceptance of Master Plan.   |
| <br>                          |    |   |
| <u>1.4 Project Milestones</u> | .1 | Project milestones from interim targets for Project Schedule. Mobilization on site completed within 15 weekdays of award of Contract date.                                |
| <br>                          |    |   |
| <u>1.5 Master Plan</u>        | .1 | Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).  |
|                               | .2 | Departmental Representative will review and return revised schedules within 5 weekdays.   |
|                               | .3 | Revise impractical schedule and resubmit within 5 weekdays.   |
|                               | .4 | Accepted revised schedule will become Master Plan and be used as baseline for updates.  |
| <br>                          |    |   |
| <u>1.6 Project Schedule</u>   | .1 | Develop detailed Project Schedule derived from Master Plan.   |
|                               | .2 | Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:   |
|                               | .1 | Award   |
|                               | .2 | Shop Drawings, Samples  |
-

- |                                      |        |   |
|--------------------------------------|--------|---|
| <u>1.6 Project Schedule (Cont'd)</u> | .2     | (Cont'd)  |
|                                      | .3     | Permits   |
|                                      | .4     | Mobilization  |
|                                      | .5     | Mechanical work   |
|                                      | .6     | Electrical  |
|                                      | .7     | Controls  |
|                                      | .8     | Testing and Commissioning.  |
|                                      | .9     | Material deliveries.  |
|                                      | .10    | Supplied equipment long delivery items.   |
| <br><u>1.7 Project Schedule</u>      | <br>.1 | <br>Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.   |
|                                      | .2     | Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.  |
| <br><u>1.8 Project Meetings</u>      | <br>.1 | <br>Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule. |

## PART 2 - PRODUCTS

- |                     |    |           |
|---------------------|----|-----------|
| <u>2.1 Not Used</u> | .1 | Not Used. |
|---------------------|----|-----------|

## PART 3 - EXECUTION

- |                     |    |           |
|---------------------|----|-----------|
| <u>3.1 Not Used</u> | .1 | Not used. |
|---------------------|----|-----------|





PART 1 - GENERAL

1.1 Administrative

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, 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.

1.2 Shop Drawings and  
Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 When indicated, submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.
- .3 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.
- .4 Allow 5 weekdays for Departmental Representative's review of each submission.
- .5 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.
- .6 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.
- .7 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.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Identification of submission by Section and specific element of Work.

1.2 Shop Drawings and  
Product Data  
(Cont'd)

- .8 (Cont'd)
  - .5 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .6 Details of appropriate portions of Work as applicable:
    - .1 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.
- .9 Shop Drawings that do not meet submission requirements or are not reviewed by the Contractor will be returned without review.
- .10 Submit 6 prints or 1 electronic copy in Adobe Reader pdf format:
  - .1 Shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
  - .2 Product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
  - .3 Test reports for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
    - .2 Testing must have been within 3 years of date of contract award for project.
  - .4 Certificates for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
    - .2 Certificates must be dated after award of project contract complete with project name.
  - .5 Manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.

1.2 Shop Drawings and  
Product Data  
(Cont'd)

- .10 (Cont'd)
- .5 (Cont'd)
- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .6 Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .7 Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .11 All Data to be job specific.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 Maintain blank area 75 mm x 75 mm for Departmental Representative's review stamp and comments.
- .15 Ensure submissions are capable of being copied or faxed without loss of legibility or detail.
- .16 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency or copies or electronic copy will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .17 After Departmental Representative's review, distribute copies.

1.3 Samples

- .1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address site office.

- |                                 |    |  |
|---------------------------------|----|--|
| <u>1.3 Samples<br/>(Cont'd)</u> | .3 | Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.   |
|                                 | .4 | Where colour, pattern or texture is criterion, submit full range of samples.   |
|                                 | .5 | Adjustments made on samples 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. |
|                                 | .6 | Make changes in samples which Departmental Representative may require, consistent with Contract Documents.   |
|                                 | .7 | Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.  |

- |   |    |   |
|---|----|---|
| <u>1.4 Certificates and<br/>Transcripts</u> | .1 | Immediately after award of Contract, submit Worker's Compensation Board status. |
|---|----|---|

## PART 2 - PRODUCTS

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

## PART 3 - EXECUTION

- |                     |    |           |
|---------------------|----|-----------|
| <u>3.1 NOT USED</u> | .1 | Not Used. |
|---------------------|----|-----------|



## PART 1 - GENERAL

### 1.1 References

- .1 Province of Ontario
  - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990,c .0.1-2010 Edition.

### 1.2 Action and Informational Submittals

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 5 weekdays after Award of Contract date and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Municipal Health and Safety inspectors.
- .5 Submit 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 5 weekdays after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 weekdays after receipt of comments from Departmental Representative and prior to commencing Work.
- .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.

<u>1.2 Action and Information Submittals (Cont'd)</u>	.10	On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations and ensure integration with Industry Canada Emergency Plan and Procedures. Departmental Representative will provide copy of Industry Canada Emergency Plan and Procedures.
<u>1.3 Filing of Notice</u>	.1	File Notice of Project with Provincial authorities prior to beginning of Work.
<u>1.4 Safety Assessment</u>	.1	Perform site specific safety hazard
<u>1.5 Meetings</u>	.1	Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
<u>1.6 Project/Site Conditions</u>	.1	Work at site may involve contact with designated substances. Refer to Section 01 14 25 - Designated Substances Report if applicable.
<u>1.7 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. Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan must be submitted to Departmental Representative in writing. Departmental Representative will respond in writing, either accepting or requesting improvements.



---

<u>1.8 Responsibility</u>	.1	Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
	.2	Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
<u>1.9 Compliance Requirements</u>	.1	Comply with Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
<u>1.10 Unforeseen Hazards</u>	.1	When unforeseen or peculiar safety related factor, hazard or conditions occur during performance of Work, follow procedures in place for Employee Right To Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
<u>1.11 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 Ontario, and in consultation with Departmental Representative.
<u>1.12 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>1.13 Powder Actuated Devices</u>	.1	Use powder actuated devices only after receipt of written permission from Departmental Representative.

---

<u>1.14 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 2 - PRODUCTS

<u>2.1 Not used</u>	.1	Not used.
---------------------	----	-----------

## PART 3 - EXECUTION

<u>3.1 Not Used</u>	.1	Not used.
---------------------	----	-----------

## PART 1 - GENERAL

- 1.1 Cutting or Alterations .1 Submittals: in accordance with Section 01 33 00 Submittal Procedures.
- .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 Departmental Representative 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 Departmental Representative or separate contractor
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.
- 1.2 Materials .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
- 1.3 Preparation .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .1 Any cutting into existing walls, floors, ceilings, roof shall be done after site review to establish any existing services will not be affected. When visual inspection is not adequate perform X-ray scanning.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

1.3 Preparation  
(Cont'd)

- .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.

1.4 Execution

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetrations of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping and smoke seal material, full thickness of the construction element.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

- |  |    |  |
|--|----|--|
| <u>1.5 Waste Management and Disposal</u> | .1 | Unless otherwise specified, all materials removed become the property of the Contractor. Remove from site. |
|  | .2 | Separate waste materials for reuse and recycling.  |

PART 2 - PRODUCTS

- |                     |    |           |
|---------------------|----|-----------|
| <u>2.1 Not Used</u> | .1 | Not Used. |
|---------------------|----|-----------|

PART 3 - EXECUTION

- |                     |    |           |
|---------------------|----|-----------|
| <u>3.1 Not Used</u> | .1 | Not Used. |
|---------------------|----|-----------|



PART 1 - GENERAL

1.1 Project Cleanliness

- .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. 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 dump containers for collection of waste materials and debris.
- .5 Provide and use marked separate bins for recycling.
- .6 For Phase II Clean interior areas prior to leaving the site and maintain areas free of dust and other contaminants during finishing operations. Disinfect all surfaces to Food Production Facility standards. Provide digital record of "before" and "after" conditions.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

<u>1.2 Final Cleaning (Cont'd)</u>	.3	Prior to final review remove surplus products, tools, construction machinery and equipment.
	.4	When affected by the Work, clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
	.5	Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors and ceilings.
	.6	Clean lighting reflectors, lenses, and other lighting surfaces.
	.7	Vacuum clean and dust building interiors, behind grilles, louvres and screens.
	.8	Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
	.9	Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
	.10	Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
<u>1.3 Waste Management and Disposal</u>	.1	Separate waste materials for reuse and recycling.

## PART 2 - PRODUCTS

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

## PART 3 - EXECUTION

<u>3.1 NOT USED</u>	.1	Not Used.
---------------------	----	-----------



## PART 1 - GENERAL

- |  |    |   |
|--|----|---|
| <u>1.1 Regulations</u>                     | .1 | Comply with the Environmental Protection Act, Ontario Regulations O. Reg. 102/04 and O. Reg. 103/94 for waste management programs on construction and demolition projects.  |
| <u>1.2 Definitions</u>                     | .1 | Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors which contribute to waste.                            |
|  | .2 | Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.   |
| <u>1.3 Waste Audit (WA)</u>                | .1 | Conduct a "waste audit" to determine the waste generated during demolition or construction operations, prepare written "waste reduction workplan" and implement procedures to reduce, reuse and recycle materials to the extent possible. |
| <u>1.4 Waste Reduction Workplans (WRW)</u> | .1 | Within ten days of Award of Contract, submit for review by the Departmental Representative a detailed "Waste Reduction Workplan" for the project. Include procedures for disposal of demolition and construction waste materials.         |
| <u>1.5 Source Separation Program</u>       | .1 | Provide a "source separation program" to disassemble and collect in an orderly fashion the materials identified in the "waste audit" that were designated for "alternative disposal" from "general waste" stream.                         |
-

- |  |    |  |
|--|----|--|
| <u>1.6 Construction<br/>Personnel Briefing</u> | .1 | All construction personnel shall be fully briefed on the waste management workplan and shall be required to conform to it for all aspects of the work. The contractor shall be responsible for the enforcement of this requirement. The Departmental Representative reserves the right to require the dismissal from the site personnel who fail to comply with the requirements of the waste management workplan.   |
| <u>1.7 Storage Handling and<br/>Protection</u> | .1 | Place materials defined as hazardous or toxic in designated containers.  |
|  | .2 | Ensure emptied containers are sealed and stored safely.  |
| <u>1.8 Records</u>                             | .1 | Submit complete records of all removals from the site to the Departmental Representative for both "materials designated for alternative disposal" and "general waste" including: <ul style="list-style-type: none"><li>.1 Time and date of removal</li><li>.2 Description of material and quantities by weight in kilograms.</li><li>.3 Proof that materials have been received at an Approved Waste Processing Site or certified Waste Disposal Site as required.</li></ul> |
| <u>1.9 Waste Management<br/>and Disposal</u>   | .1 | Separate waste materials for reuse and recycling.  |

## PART 2 - PRODUCTS

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

## PART 3 - EXECUTION

- |                        |    |  |
|------------------------|----|--|
| <u>3.1 Application</u> | .1 | Work in compliance with WRW.   |
|                        | .2 | Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes. |

PART 1 - GENERAL

1.1 Submittals

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 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, three final hard copies and one electronic copy of operating and maintenance manuals in English and French.
- .6 Ensure all documents required under the Federal Halocarbon Regulations are included in O&M Manuals.
- .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.

1.2 Maintenance Manual

- .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.

<u>1.2 Maintenance Manual (Cont'd)</u>	.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 drawing information on CD in dxf, dwg and pdf file formats.
<u>1.3 Contents Each Volume</u>	.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.
	.6	Training: refer to Section 01 79 00 - Demonstration and Training.
<u>1.4 As-builds and Samples</u>	.1	Maintain, at site for Departmental Representative one record copy of: .1 Contract Drawings. .2 Specifications. .3 Addenda. . .4 Change Orders and other modifications to Contract. .5 Site and Supplemental Instructions.

- |                                       |  |
|---------------------------------------|--|
| 1.4 As-builds and Samples<br>(Cont'd) | <ul style="list-style-type: none"> <li>.1 (Cont'd) <ul style="list-style-type: none"> <li>.6 Reviewed shop drawings, product data, and samples.</li> <li>.7 Field test records.</li> <li>.8 Inspection certificates.</li> <li>.9 Manufacturer's certificates.</li> </ul> </li> <li>.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.</li> <li>.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.</li> <li>.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.</li> <li>.5 Keep record documents and samples available for inspection by Departmental Representative.</li> </ul>  |
| 1.5 Recording Actual Site Conditions  | <ul style="list-style-type: none"> <li>.1 Record information on set of black line opaque drawings, provided by Departmental Representative.</li> <li>.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.</li> <li>.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.</li> <li>.4 Contract Drawings and shop drawings: mark each item to record actual construction, including: <ul style="list-style-type: none"> <li>.1 Measured depths of elements of foundation in relation to finish first floor datum.</li> <li>.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.</li> <li>.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.</li> <li>.4 Field changes of dimension and detail.</li> <li>.5 Changes made by change orders.</li> <li>.6 Details not on original Contract Drawings.</li> <li>.7 References to related shop drawings and modifications.</li> </ul> </li> <li>.5 Specifications: mark each item to record actual construction, including:</li> </ul> |

1.5 Recording Actual Site Conditions (Cont'd)	.5	(Cont'd) .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items. .2 Changes made by Addenda and change orders.
	.6	Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
1.6 Equipment and Systems	.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.
	.2	Panel board circuit directories: provide electrical service characteristics, controls, and communications.
	.3	Include installed colour coded wiring diagrams.
	.4	Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
	.5	Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
	.6	Provide servicing and lubrication schedule, and list of lubricants required.
	.7	Include manufacturer's printed operation and maintenance instructions.
	.8	Include sequence of operation by controls manufacturer.
	.9	Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
	.10	Provide installed control diagrams by controls manufacturer.
	.11	Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

1.6 Equipment and  
Systems  
(Cont'd)

- .12 Include test reports as specified in 01 91 13 - General Commissioning (Cx) Requirements.
- .13 Additional requirements: as specified in individual specification sections.

1.7 Materials and  
Finishes

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Additional Requirements: as specified in individual specifications sections.

1.8 Maintenance  
Materials

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Operations and Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.9 Special Tools

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.

- 
- |  |    |   |
|--|----|---|
| <u>1.9 Special Tools<br/>(Cont'd)</u>            | .4 | Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Operations and Maintenance Manual.   |
| <br>   |    |   |
| <u>1.10 Storage, Handling<br/>and Protection</u> | .1 | Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.   |
|  | .2 | Store in original and undamaged condition with manufacturer's seal and labels intact.   |
|  | .3 | Store components subject to damage from weather in weatherproof enclosures.   |
|  | .4 | Store paints and freezable materials in a heated and ventilated room.   |
|  | .5 | Remove and replace damaged products at own expense and to satisfaction of Departmental Representative   |
| <br>   |    |   |
| <u>1.11 Warranties</u>                           | .1 | Before completion of work collect all manufacturer's warranties and deposit with Departmental Representative.   |
|  | .2 | Assemble warranty information in binder and submit upon acceptance of work. Organize binder as follows:<br>.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.<br>.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.<br>.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten weekdays after completion of applicable item of work.<br>.4 Verify that documents are in proper form, contain full information, and are notarized.<br>.5 Co-execute submittals when required.<br>.6 Retain warranties and bonds until time specified for submittal.<br>.7 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until Interim Completion determined |
|  | .3 | Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, with Departmental Representative.  |
-



1.11 Warranties <u>(Cont'd)</u>	.4	Respond in a timely manner to written notification of required construction warranty repair work.
------------------------------------	----	---

PART 2 - PRODUCTS

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

PART 3 - EXECUTION

<u>3.1 NOT USED</u>	.1	Not Used.
---------------------	----	-----------



PART 1 - GENERAL

- |   |    |  |
|---|----|--|
| <u>1.1 Description</u>                  | .1 | Demonstrate scheduled operation and maintenance of equipment and systems to Departmental Representative two days prior to date of interim completion.  |
|   | .2 | Departmental Representative will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.  |
|   |    |  |
| <u>1.2 Quality Control</u>              | .1 | When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Departmental Representative's personnel, and provide written report that demonstration and instructions have been completed. |
|   |    |  |
| <u>1.3 Submittals</u>                   | .1 | 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 work 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.  |
|   |    |  |
| <u>1.4 Condition for Demonstrations</u> | .1 | Equipment has been inspected and put into operation.   |
|   | .2 | Testing, adjusting, and balancing have been performed and equipment and systems are fully operational.   |
|   | .3 | Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.  |
-

- |  |    |  |
|--|----|--|
| <u>1.5 Preparation</u>                     | .1 | Verify that conditions for demonstration and instructions comply with requirements.  |
|  | .2 | Verify that designated personnel are present.  |
| <u>1.6 Demonstration and Instructions</u>  | .1 | Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon 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 need for additional data becomes apparent during instructions.   |
| <u>1.7 Time Allocated for Instructions</u> | .1 | Allow for the following:<br>.1 Two (2) sessions of 3 hr long for operation, maintenance and trouble shooting for refrigeration equipment.<br>.2 Two (2) sessions of 3 hr long for operation and trouble shooting for control system. |

## PART 2 - PRODUCTS

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

## PART 3 - EXECUTION

- |                     |    |           |
|---------------------|----|-----------|
| <u>3.1 NOT USED</u> | .1 | Not Used. |
|---------------------|----|-----------|

## PART 1 - GENERAL

- 1.1 General .1 CX is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. CX is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
- .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
  - .2 Ensure appropriate documentation is compiled into the O&M manuals.
  - .3 Effectively train O&M staff.
- .2 Contractor shall arrange and pay for the services of the Refrigeration Equipment manufacturer's representative to assist the contractor in CX process, operating equipment and systems, troubleshooting and making adjustments as required.
- .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
  - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Commissioning process shall include, but is not be limited to:
- .1 Condensers, Evaporators, Control.
  - .2 All equipment and systems provided under Division 26.
- .4 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.
- .5 Acronyms:
- .1 CX - Commissioning.
  - .2 O&M - Operation and Maintenance.
  - .3 PI - Product Information.
  - .4 PV - Performance Verification.
  - .5 TAB - Testing, Adjusting and Balancing.
- 1.2 Commissioning Overview .1 CX to be performed by independent company, employed and paid by the Contractor.

- 
- |   |    |   |
|---|----|---|
| <u>1.2 Commissioning Overview (Cont'd)</u>                          | .1 | (Cont'd)<br>.1 Refrigeration Equipment representative must be included in commissioning process. Arrange for Refrigeration Equipment Manufacturer's representative presence, pay all costs.<br><br>.2 CX to be a line item of Contractor's cost breakdown.<br><br>.3 CX activities supplement field quality and testing procedures described in relevant technical sections.<br><br>.4 CX is conducted in concert with activities performed during stage of project delivery. CX identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. CX activities includes transfer of critical knowledge to facility operational personnel.<br><br>.5 Departmental Representative will issue Interim Certificate of Acceptance when:<br>.1 Completed CX documentation has been received, reviewed for suitability and approved by Departmental Representative.<br>.2 Equipment, components and systems have been commissioned.<br>.3 O&M training has been completed. |
| <u>1.3 Non-conformance to Performance Verification Requirements</u> | .1 | Should equipment, system components, and associated controls be incorrectly installed or malfunction during CX, correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.<br><br>.2 Cost for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.   |
| <u>1.4 Pre CX-Review</u>  | .1 | Before Construction:<br>.1 Review contract documents, confirm in writing to Departmental Representative the following.<br>.1 Adequacy of provisions for CX.   |
-

- 
- |  |    |   |
|--|----|---|
| <u>1.4 Pre CX-Review<br/>(Cont'd)</u>      | .1 | (Cont'd)  |
|  | .1 | (Cont'd)  |
|  | .2 | Aspects of design and installation pertinent to success of CX.  |
| <br>                                       |    |   |
| <u>1.5 Conflicts</u>                       | .1 | Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.         |
|  | .2 | Failure to report conflict and obtain clarification will result in application of most stringent requirement.   |
| <br>                                       |    |   |
| <u>1.6 Submittals</u>                      | .1 | Submittals: in accordance with Section 01 33 00- Submittal Procedures.  |
|  | .2 | Submit no later than 4 weeks after award of Contract:   |
|  | .1 | Name of Contractor's CX agent.  |
|  | .3 | Draft CX documentation.   |
|  | .4 | Preliminary CX schedule.  |
|  | .1 | Submit proposed CX procedures to Departmental Representative where not specified and obtain written approval at least 3 weeks prior to start of CX.       |
|  | .2 | Provide additional documentation relating to CX process required by Departmental Representative.  |
| <br>                                       |    |   |
| <u>1.7 Commissioning<br/>Documentation</u> | .1 | Departmental Representative to review and approve CX documentation.   |
|  | .2 | Provide completed and approved CX documentation to Departmental Representative.   |
| <br>                                       |    |   |
| <u>1.8 Commissioning<br/>Schedule</u>      | .1 | Provide detailed CX schedule as part of construction schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules Bar (GANTT) Chart. |
|  | .2 | Provide adequate time for CX activities prescribed in technical sections and commissioning sections including:  |
|  | .1 | Approval of CX reports.   |
-

1.8 Commissioning Schedule (Cont'd)	.2	(Cont'd) .2 Verification of reported results. .3 Repairs, retesting, re-commissioning, re-verification. .4 Training.
1.9 Commissioning Meetings	.1	Purpose of the meetings: to resolve issues, monitor progress, identify deficiencies related to CX. Allow for 2 CX meetings at discretion of Departmental Representative.
1.10 Starting and Testing	.1	Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.
1.11 Witnessing of Starting and Testing	.1	Provide 4 days notice prior to commencement.
	.2	Departmental Representative to witness of start-up and testing.
	.3	Contractor's CX Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.
1.12 Manufacturer's Involvement	.1	Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative. .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer. .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
	.2	Integrity of warranties: .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty. .2 Verify with manufacturer that testing as specified will not void warranties.
	.3	Qualifications of manufacturer's personnel: .1 Experienced in design, installation and operation of equipment and systems.



- 
- |   |    |   |
|---|----|---|
| 1.12 Manufacturer's<br>Involvement<br><u>(Cont'd)</u> | .3 | (Cont'd)<br>.2 Ability to interpret test results accurately.<br>.3 To report results in clear, concise, logical manner. |
|---|----|---|
- 
- |                        |    |   |
|------------------------|----|---|
| <u>1.13 Procedures</u> | .1 | Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and CX.  |
|                        | .2 | Conduct start-up and testing in following distinct phases:<br>.1 Included in delivery and installation:<br>.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.  |
|                        | .3 | Visual inspection of quality of installation.<br>.1 Start-up: follow accepted start-up procedures.<br>.2 Operational testing: document equipment performance.<br>.3 System PV: include repetition of tests after correcting deficiencies.<br>.4 Post-substantial performance verification: to include fine-tuning.  |
|                        | .4 | Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.   |
|                        | .5 | Document requires tests on approved PV forms.   |
|                        | .6 | Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:<br>.1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.<br>.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.<br>.3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.<br>.1 Rejected equipment to be remove from site and replace with new. |
|                        | .7 | Subject new equipment/systems to specified start-up procedures.   |
-

- 
- |  |        |   |
|--|--------|---|
| <u>1.14 Start up Documentation</u>                                 | .1     | Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.  |
|  | .2     | Start-up documentation to include: <ul style="list-style-type: none"><li>.1 Factory and on-site test certificates for specified equipment.</li><li>.2 Pre-start-up inspection reports.</li><li>.3 Signed installation/start-up check lists.</li><li>.4 Start-up reports,</li><li>.5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.</li></ul> |
| <br><u>1.15 Operation and Maintenance of Equipment and Systems</u> | <br>.1 | <br>After start-up, operate and maintain equipment and system.  |
|  | .2     | maintenance program and submit to Departmentalepresentative for approval before implementation.   |
|  | .3     | Operate and maintain systems for length of time required for commissioning to be completed.   |
|  | .4     | After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.  |
| <br><u>1.16 Test Results</u>                                       | <br>.1 | <br>If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.   |
|  | .2     | Provide manpower and materials, assume costs for re-commissioning.  |
| <br><u>1.17 Start of Commissioning</u>                             | <br>.1 | <br>Notify Departmental Representative at least 4 days prior to start of CX.  |
|  | .2     | Start CX after elements of building affecting start-up and performance verification of systems have been completed.   |
| <br><u>1.18 Commissioning Performance Verification</u>             | <br>.1 | <br>Carry out CX: <ul style="list-style-type: none"><li>.1 Under actual and accepted simulated operating conditions, over entire operating range, in all modes.</li><li>.2 On independent systems and interacting systems.</li></ul>  |
-

1.18 Commissioning Performance Verification (Cont'd)	.2	CX procedures to be repeatable and reported results are to be verifiable.
	.3	Follow equipment manufacturer's operating instructions.
1.19 Witnessing Commissioning	.1	Departmental Representative may witness activities and verify results.
1.20 Authorities Having Jurisdiction	.1	Where specified start-up, testing or verification requirements of authority having jurisdiction, 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.
	.3	Provide copies to Departmental Representative within 5 weekdays of test and with CX report.
1.21 Extrapolation of Results	.1	Where CX of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.
1.22 Extent of Verification	.1	Provide manpower and instrumentation to verify up to 100 % of reported results.
	.2	Number and location to be at discretion of Departmental Representative.
	.3	Conduct repeated tests during verification under same conditions as original tests, using same test equipment and instrumentation.
	.4	Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.

<u>1.22 Extent of Verification (Cont'd)</u>	.5	Perform additional commissioning until results are acceptable to Departmental Representative.
<u>1.23 Sundry Checks and Adjustments</u>	.1	Make adjustments and changes which becomes apparent as CX proceeds.
<u>1.24 Deficiencies Faults, Defects</u>	.1	Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.
	.2	Report problems, faults or defects affecting CX to Departmental Representative in writing. Stop CX until problems are rectified. Proceed with written approval from Departmental Representative.
<u>1.25 Completion of Commissioning</u>	.1	Upon completion of CX, leave systems in normal condition.
	.2	Except for warranty and seasonal verification activities specified in CX specifications, complete CX prior to issuance of Interim Certificate of Completion.
	.3	CX to be considered complete when contract CX deliverables have been submitted and accepted by Departmental Representative.
<u>1.26 Activities Upon Completion of Commissioning</u>	.1	When changes are made to baseline components or system settings established during CX process, provide updated CX form for affected item.
	.2	The contractor is required to collect and record all PMSS data for all mechanical and electrical systems. The Departmental representative will assign numerical numbering sequence to components and return sheets to Contractor. Fabricate and install new identification tags for PMSS numerical numbering sequence. Labelling of system components to be fully completed prior to issuing Interim Acceptance of Project.
<u>1.27 Maintenance Materials, Spare Parts, Special Tools</u>	.1	Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

- |   |        |   |
|---|--------|---|
| <u>1.28 Performance Verification Tolerances</u>                   | .1     | Application tolerances:<br>.1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values. |
|   | .2     | Instrument accuracy tolerances:<br>.1 To be of higher order of magnitude than equipment or system being tested.   |
|   | .3     | Measurement tolerances during verification:<br>.1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.   |
| <br><u>1.29 Departmental Representative's Performance Testing</u> | <br>.1 | <br>Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.   |

## PART 2 - PRODUCTS

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

## PART 3 - EXECUTION

- |                     |    |           |
|---------------------|----|-----------|
| <u>3.1 NOT USED</u> | .1 | Not Used. |
|---------------------|----|-----------|

