Public Works and Government Services Canada

Requisition No. EZ899-191161

DRAWINGS & SPECIFICATIONS
for

Canada Border Service Agency
Waneta PoE, Kootenay
Generator Replacement

R.089489.001 July 30, 2018

APPROVED BY:

Regional Manager, AES — Date 2018-07-31

Construction Safety Coordinator — Date 2018-07-31

TENDER:

Project Manager — Date July 31, 2018

Real Property Services Branch, Professional and Technical Services, Pacific Region
Room 219 - 800 Burrard Street, Vancouver, B.C. V6Z 0B9

CONSULTANTS – SEAL & SIGNATURE

Discipline	**Seal / Signature / Date**
Electrical (Prime)	

END OF SECTION

GENERATOR REPLACEMENT
CBSA Waneta, Kootenay, BC
Project No. R.089489.001
July 30, 2018

SPECIFICATION INDEX

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1 GENERAL

1.1 CODES

.1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.

1.2 DESCRIPTION OF WORK

.1 Work under this Contract is to take place at CBSA Waneta, Kootenay, B.C. as shown on electrical drawings.

.2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents:

.1 Replace the emergency power generator and transfer switch.

.2 Revise the power distribution. Add disconnect switch and breakers. Add arc flash labels.

.3 Provide commissionaire Services.

.4 Supply and install miscellaneous items as shown on Drawings E1 to E3.

.5 Excavation and backfill.

.6 Removal of existing outdoor metal shed.

.7 Repair existing pavement, wall and asphalt.

.3 “Green” requirements:

.1 Use materials/products containing highest percentage of recycled and recovered materials practicable – consistent with maintaining cost effective satisfactory levels of completion.

.2 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.

1.3 CONTRACT DOCUMENTS

.1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the Work.

.2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the Work.

1.4 DIVISION OF SPECIFICATIONS

.1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.

.2 A division may consist of the Work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the Work rests solely with the Contractor.

.3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

1.5 TIME OF COMPLETION

.1 Complete the project, facility ready for use within sixteen (16) months after Contract Award.

1.6 HOURS OF WORK

.1 Schedule the power interruptions, communication, security and fire alarm interruptions cutovers from 6 p.m. to 6 a.m. The power interruption will be determined based on operational requirements.

1.7 WORK SCHEDULE

.1 Carry on Work as follows:

.1 Within 10 working days after Contract Award, provide a schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:

.1 Submission of shop drawings, product data, MSDS sheets and samples.

.2 Commencement and completion of work of each section of the specifications or trade for each phase as outlined.

.3 Final completion date within the time period required by the Contract documents.

.2 Do not change approved Schedule – without notifying Departmental Representative.

.3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

1.8 COST BREAKDOWN

.1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum price in detail as directed by the Department Representative and aggregating Contract price. After approval by Departmental Representative cost breakdown will be used as a basis for progress payments.

1.9 CODES, BYLAWS, STANDARDS

.1 Perform work in accordance with the National Building Code of Canada (NBC) 2015 and other indicated Codes, Construction Standards and/or any other Code or bylaw of local application.

.2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.

.3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

.4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

1.10 DOCUMENTS REQUIRED

.1 Maintain 1 copy each of the following at the job site:

.1 Contract drawings.

.2 Contract specifications.

.3 Addenda to Contract documents.

.4 Copy of approved work schedule.

.5 Reviewed/approved shop drawings.

.6 Change orders.

.7 Other modifications to Contract.

.8 Field test reports.

.9 Reviewed/approved samples.

.10 Manufacturers' installation and application instructions.

.11 One set of record drawings and specifications for "as-built" purposes.

.12 National Building Code of Canada 2015.

.13 Current construction standards of workmanship listed in technical Sections.

.14 Project Safety Plan.

1.11 REGULATORY REQUIREMENTS

.1 Obtain and pay for – Building and electrical permits required by the Corporation of Kootenay, Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.

.2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

.3 Furnish inspection certificates in evidence that the work installed conforms to the requirements of the authority having jurisdiction.

1.12 CONTRACTOR'S USE OF SITE

.1 Use of site:

.1 Exclusive and complete for execution of work as defined within area as indicated on drawings E1, E2 and E3.

.2 Assume responsibility for assigned premises for performance of this work.

.3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.

.2 Do not unreasonably encumber site with material or equipment.

.3 Request the storage / work space and obtain approval prior to occupying the space.

1.13 EXAMINATION

.1 Examine site and be familiar and conversant with existing conditions likely to affect work.

.2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

1.14 EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

.2 Contractor shall repair all damaged services due to this construction.

1.15 LOCATION OF EQUIPMENT AND FIXTURES

.1 Locations of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain his approval for actual location.

.4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.

1.16 CUTTING AND PATCHING

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove items as shown or specified.

.3 Do not cut, bore, or sleeve load-bearing members unless noted otherwise.

.4 Make cuts with clean, true and smooth edges. Make patches inconspicuous in final assembly.

.5 Fit work airtight to pipes, sleeves, ducts and conduits.

.6 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.

.7 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5 metres in ambient light, and includes painting the whole surface to the next change in plane.

1.17 SETTING OUT OF WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Provide devices need to lay out and construct work.

.3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

1.18 ACCEPTANCE OF SUBSTRADES

.1 Each trade shall examine surfaces prepared by others and job conditions which may affect its work, and shall report defects to Departmental Representative. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

1.19 QUALITY OF WORK

.1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.

.2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code of Canada 2015 and Construction Standards.

.3 In cases of dispute, decisions as to standard or quality of work rest solely with the Department Representative, whose decision is final.

1.20 WORKS COORDINATION

.1 Coordinate work of subtrades:

.1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.

.2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.

.1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.

.2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.

.1 Pay particularly close attention to overhead work and within or near to building structural elements.

.2 Identify on coordination drawings, building elements, services lines, rough-in points and indicate location services entrance to site.

.3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.

.4 Publish minutes of each meeting.

.5 Plan and coordinate work in such a way to minimize quantity of service line offsets.

.6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.

.3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.

.4 Work cooperation:

.1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.

.3 Ensure disputes between subcontractors are resolved.

.5 Departmental Representative is not responsible for, or accountable for extra cost incurred as a result of Contractor’s failure to coordinate Work.

.6 Maintain efficient and continuous supervision.

1.21 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 In accordance with Section 01 33 00, submit the requested drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.

.2 Allow sufficient time (2 weeks) for each of the following:

.1 Review of product data.

.2 Approval of shop drawings.

.3 Review of re-submission.

1.22 EXISTING SERVICE INTERRUPTIONS

.1 Contractor shall request and receive a written approval prior to any existing service interruptions.

1.23 SECURITY

.1 Coordinate with and pay for the services of a commissionaire from the BC Commissionaires to ensure that a Commissionaire is present at all times when the contractor is on site. Contract can refer to the following website as a reference: http://www.commissionaires.bc.ca/.

.2 Provide required service for any security to contractor's forces for further works to be done between substantial and final completion.

1.24 PROJECT MEETINGS

.1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.25 TESTING AND INSPECTIONS

.1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative are specified under various sections.

.2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Testing, adjustment and balancing of electrical equipment and systems.

.3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of corrected work.

.4 Contractor shall furnish labour and facilities to:

.1 Notify Departmental Representative in advance of planned testing.

.5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

.7 The Departmental Representative may require, and pay for, additional inspection and testing services not included in Paragraph 1.25.1.

.8 Provide Department Representative with 2 copies of testing laboratory reports as soon as they are available.

.9 Ensure that work to be inspected is complete at the time of inspection and in accordance with the Contract documents. Additional inspections required due to the incomplete work or poorly executed work, as judged by the Departmental Representative, as well as additional design or remedial work caused by deviations from these drawings, may be charged to the Contractor.

.10 A minimum 48 hours notice shall be given to the Departmental Representative by the Contractor for any inspection to be carried out.

1.26 AS-BUILT DOCUMENTS

.1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications and 2 copies of the original AutoCAD 2010 files to show the as-built conditions for "as-built" purposes.

.2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

1.27 CLEANING

.1 Conduct cleaning and disposal operations daily. Comply with local ordinances and anti-pollution laws.

.2 Ensure cleanup of the work areas each day after completion of work.

.3 On completion of the work, remove all temporary buildings and offices, site sign, all debris, rubbish, etc., clean-up site and leave same neat and tidy to the satisfactory of the Departmental Representative.

.4 In preparation for interim and final inspections:

.1 Examine all sight-exposed interior and exterior surfaced and concealed spaces.

.2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces, including glass and other polished surfaces.

.5 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

1.28 DUST CONTROL

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

1.29 ENVIRONMENTAL PROTECTION

.1 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.

.2 Do not dispose waste or volatile materials into water courses, storm or sanitary sewers.

.3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

1.30 MATERIALS DISPOSAL

.1 All material designated to be removed will become the property of the Contractor and will be disposed of in an environmentally acceptable manner so that they neither become a menace to marine navigation nor a nuisance to the public on adjacent or any other property.

.2 Unless otherwise specified, all existing materials to be replaced or renewed will be disposed of in accordance with .1 above.

1.31 SYSTEM OF MEASUREMENT

.1 The metric system of measurement (SI) will be employed on this Contract.

1.32 FAMILIARIZATION WITH SITE

.1 Before submitting tender, bidders are recommended to visit site to understand the work environment.

1.33 SUBMISSION OF TENDER

.1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site, and is fully conversant with all conditions.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 11 55 General Instructions.

.2 Section 01 77 00 Closeout Procedures.

1.2 ADMINISTRATIVE

.1 Submit to Department 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 an 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 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 shall be considered rejected.

.5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.6 Verify field measurements and affected adjacent Work are coordinated.

.7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittals.

.8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Not used.

.2 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.

.3 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of British Columbia, Canada where required as indicated in the specification Sections and/or drawings.

.4 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.5 Allow 14 days for Departmental Representative's review of each submission.

.6 Adjustments made on shop drawings by Department 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.

.7 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Department Representative in writing of any revisions other than those requested.

.8 Accompany submissions with transmittal letter containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each shop drawing, product data and sample.

.5 Other pertinent data.

.9 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

1. Subcontractor.

2. Supplier.

3. Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

1. Fabrication.

2. Layout, showing dimensions, including identified field dimensions, and clearances.

3. Setting or erection details.

4. Capacities.

5. Performance characteristics.

6. Standards.

7. Operating weight.

8. Wiring diagrams.

9. Single line and schematic diagrams.

10. Relationship to adjacent work.

.10 After Departmental Representative review, distribute copies.

.11 Submit one reproducible transparency of shop drawings for each requirement requested in specification Sections and as Department Representative may reasonably request.

.12 Submit the number of copies of shop drawings and/or product data sheets or brochures for requirements request in specification Sections which contractor requires for distribution plus copies which will be retained by the Departmental Representative and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.13 Submit electronic copy of test reports for requirements requested in specification Sections and as requested by the 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 1 year of date of contract award for project.

.14 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.15 Submit electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.16 Submit electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Department Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit electronic copy of Operation and Maintenance Data for requirements requested in specifications Sections and as requested by Department Representative.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings,

through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

.1 Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Department Representative site office.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 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.

1.5 PROGRESS PHOTOGRAPHS

.1 Submit progress photographs.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

PSPC Update on Asbestos Use
Effective April 1, 2016, all Public Services and Procurement Canada (PSPC) contracts for new construction and major rehabilitation will prohibit the use of asbestos-containing materials. Further information can be found at http://www.tpsgc-pwgsc.gc.ca/comm/vedette-features/2016-04-19-00-eng.html

1.1 REFERENCES

.1 Government of Canada.

.1 Canada Labour Code - Part II

.2 Canada Occupational Health and Safety Regulations.

.2 National Building Code of Canada (NBC):

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 The Canadian Electric Code (as amended)

.4 Canadian Standards Association (CSA) as amended:

.1 CSA Z797-2009 Code of Practice for Access Scaffold

.2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes

.3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures

.4 CSA Z1006-10 Management of Work in Confined Spaces.

.5 CSA Z462- Workplace Electrical Safety Standard

.5 National Fire Code of Canada 2010 (as amended)

.1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI):

.1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.7 Province of British Columbia:

.1 Workers Compensation Act Part 3-Occupational Health and Safety.

.2 Occupational Health and Safety Regulations

1.2 RELATED SECTIONS

.1 Refer to the following current NMS sections as required:

.1 Construction progress schedules: Section 01 32 18

.2 Submittals procedures: Section 01 33 00

.3 Temporary utilities: Section 01 51 00

.4 Temporary barriers and enclosures: Section 01 56 00

1.3 WORKERS' COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

.1 PSPC may terminate the Contract without liability to PSPC where the Contractor, in the opinion of PSPC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.5 SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review in accordance with Section 013300

.2 Work effected by submittal shall not proceed until review is complete.

.3 Submit the following:

.1 Site Specific Health and Safety Plan.

.2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.3 Copies of incident and accident reports.

.4 Complete set of current Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.5 Emergency Procedures.

.4 The Departmental Representative will review the Contractor's Site Specific Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 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.

.6 Submission of the Site Specific Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 RESPONSIBILITY

.1 Assume responsibility as the Prime Contractor for work under this contract.

.2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with Site Specific Health and Safety Plan.

1.7 HEALTH AND SAFETY COORDINATOR

.1 The Health and Safety Coordinator:

.1 Be responsible for completing all health and safety training and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, revising, daily enforcing, and monitoring the Site Specific Health and Safety Plan.

.3 Be on site during execution of work.

1.8 GENERAL CONDITIONS

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.2 Secure site at night time or provide security guard as deemed necessary to protect site against entry.

1.9 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Multi-employer work site.

.2 Federal employees and general public.

.3 Energized electrical services.

.4 Working from heights

.5 Working in the open exposed to unpredictable weather.

.6 High volumes of vehicular and pedestrian traffic

1.10 UTILITY CLEARANCES

.1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

1.11 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.12 WORK PERMITS

.1 Obtain speciality permit(s) related to project before start of work.

1.13 FILING OF NOTICE

.1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities.

.2 Provide copies of all notices to the Departmental Representative.

1.14 HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

1. Contractor's safety policy.

2. Identification of applicable compliance obligations.

3. Definition of responsibilities for project safety/organization chart for project.

4. General safety rules for project.

5. Job-specific safe work procedures.

6. Inspection policy and procedures.

7. Incident reporting and investigation policy and Procedures.

8. Occupational Health and Safety Committee/Representative procedures.

9. Occupational Health and Safety meetings.

10. Occupational Health and Safety communications and record keeping procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Site Specific Health and Safety Plan by Public Service and Procurement Canada (PSPC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Health

and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

1.15 EMERGENCY PROCEDURS

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

1.16 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.

.2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.

.3 Provide adequate means of ventilation in accordance with Section 01 51 00.

.4 The contractor shall ensure that the product is applied as per manufacturers recommendations.

.5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.17 ASBESTOS HAZARD

.1 Carry out any activities involving asbestos in accordance with applicable Provincial Regulations.

.2 Removal and handling of asbestos will be performed as indicated in NMS Sections 02 41 16 and 02 82 10 and 02 82 11 and 02 82 12.

1.18 PCB REMOVALS

.1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.

.2 Remove, handle, transport and dispose of as indicated in NMS Section 02 8 00.

1.19 REMOVAL OF LEAD CONTAINING PAINTS

.1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.

.2 Carry out demolition activities involving lead-containing paints in accordance with applicable Provincial Regulations.

1.20 ELECTRICAL SAFETY REQUIREMENTS

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.21 ELECTRICAL LOCKOUT

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.22 OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.23 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1- 1975 (R2003).

1.24 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and B.C. Occupational Health and Safety Regulations.

1.25 CONFINED SPACES

.1 Carry out work in confined spaces in compliance with Provincial Regulations

1.26 POWDER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.

1.27 FIRE SAFETY AND HOT WORK

.1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.28 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the DR is required prior to any gas or diesel tank being brought onto the work site.

1.29 FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

1.30 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

1.31 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Site Specific Health and Safety Plan.

.2 Sequence of work.

.3 Emergency procedures.

.4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plans or site plans.

.7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.

.8 Workplace Hazardous Materials Information System (WHMIS) documents.

.9 Material Safety Data Sheets (MSDS).

.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.32 MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.33 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

2 PRODUCTS

2.1 NOT USED

3 EXECUTION

3.1 NOT USED

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

.4 Fire Routes.

1.2 PRECEDENCE

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

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB).

.1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.

.2 CGSWB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International).

.1 CSA-0121-08-R2013, Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

1.5 HOARDING

.1 Provide barriers around excavations, trenches and openings.

1.6 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around excavations, open shafts, open stair wells, open edges of floors and roofs, and exposed wiring.

1.7 FIRE ROUTES

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

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 SECTIONS INCLUDE

.1 Progressive cleaning.

.2 Final cleaning.

1.2 PRECEDENCE

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

1.3 RELATED SECTION

.1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Section 01 77 00 - Closeout Procedures.

1.4 REFERENCE STANDARDS

.1 Not Used.

1.5 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Department Representative. Do not burn waste materials on site, unless approved by Department Representative.

.3 Clear snow and ice from access to building, remove from site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site 1 container for collection of waste materials and debris.

.6 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.7 Remove waste material and debris from site at end of each working day.

.8 Dispose of waste materials and debris off site.

.9 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.

.10 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.11 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.12 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.13 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.6 FINAL CLEANING

.1 Not Used.

.2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.4 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.5 Remove waste products and debris other than that caused by Owner or other Contractors.

.6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and equipment.

.9 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.10 Remove dirt and other disfiguration from exterior surfaces.

.11 Sweep and wash clean paved areas.

.12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 SECTIONS INCLUDE

.1 Text, schedules and procedures for systematic Waste Management Program for construction, deconstruction, demolition, and renovation projects, including:

.1 Diversion of Materials.

.2 Waste Audit (WA) - Schedule A.

.3 Waste Reduction Workplan (WRW) - Schedule B.

.4 Demolition Waste Audit (DWA) - Schedule C.

.5 Cost/Revenue Analysis Workplan (CRAW) - Schedule D.

.6 Materials Source Separation Program (MSSP).

.7 Canadian Governmental Responsibility for the Environment Resources - Schedule E.

1.2 RELATED SECTIONS

.1 Section 01 33 00 Submittals Procedures.

1.3 REFERENCES

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

1.4 DEFINITIONS

.1 Cost/Revenue Analysis Workplan (CRAW): Based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.2 .Demolition Waste Audit (DWA): Relates to actual waste generated from project.

.3 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.4 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.

.5 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.6 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.7 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.8 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.9 Separate Condition: Refers to waste sorted into individual types.

.10 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

.11 Waste Audit (WA): Detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.

.12 Waste Management Coordinator (WMC) : Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.13 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.5 DOCUMENTS

.1 Maintain at job site, one copy of following documents:

.1 Waste Audit.

.2 Waste Reduction Workplan.

.3 Material Source Separation Plan.

.4 Schedules [A] [B] [C] [D] [E] completed for project.

1.6 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare and submit following prior to project start-up:

.1 Submit 2 copies of completed Waste Audit (WA): Schedule A.

.2 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.

.3 Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule C.

.4 Submit 2 copies of Cost/Revenue Analysis Workplan (CRAW): Schedule D.

.5 Submit 2 copies of Materials Source Separation Program (MSSP) description.

.3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.

.1 Failure to submit could result in hold back of final payment.

.2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled or disposed of.

.3 For each material reused, sold or recycled from project, include amount and the destination.

.4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.7 QUALITY ASSURANCE – SITE VISIT

.1 Pre-tender site visit:

.1 Walk-through of project site prior to completion of tender submittal is mandatory.

.2 Date, time and location to be arranged by Departmental Representative.

1.8 WASTE AUDIT (WA)

.1 Conduct WA prior to project start-up.

.2 Prepare WA: Schedule A.

.3 Record, on WA – Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.9 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up

.2 WRW should include but not limited to:

.1 Destination of materials listed.

.2 Deconstruction/disassembly techniques and sequencing.

.3 Schedule for deconstruction/disassembly.

.4 Location.

.5 Security.

.6 Protection.

.7 Clear labelling of storage areas.

.8 Details on materials handling and removal procedures.

.9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.

.6 Post WRW or summary where workers at site are able to review content.

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.10 DEMOLITION WASTE AUDIT (DWA)

.1 Prepare DWA prior to project start-up.

.2 Complete DWA: Schedule C.

.3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

1.11 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Prepare CRAW: Schedule D.

1.12 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated material[s] in area[s] which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

.1 Transport to approved and authorized recycling facility.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

.1 Ship material to site operating under Certificate of Approval.

.2 Materials must be immediately separated into required categories for reuse or recycling.

1.13 WASTE PROCESSING SITES

.1 Province of British Columbia.

.1 Name:

.2 Telephone:

.3 Fax:

1.14 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

.7 Protect surface drainage, mechanical and electrical from damage and blockage.

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Provide waybills for separated materials.

1.15 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Tonnage reused or recycled.

.5 Reused or recycled waste destination.

.4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.16 USE OF SITE AND FACILITIES

.1 Execute Work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility.

1.17 SCHEDULING

.1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

2 PRODUCTS

2.1 NOT USED

.1 Not Used

3 EXECUTION

3.1 APPLICATION

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of recyclable material[s] is permitted.

.3 Demolition Waste

Material Type	**Recommended Diversion %**	**Actual Diversion %**
Acoustic Tile	[50]	[_____]
Acoustic Insulation	[100]	[_____]
Carpet	[100]	[_____]
De-mountable Partitions	[80]	[_____]

Material Type	Recommended Diversion %	Actual Diversion %
Doors and Frames	[100]	[_____]
Electrical Equipment	[80]	[_____]
Furnishings	[80]	[_____]
Marble Base	[100]	[_____]
Mechanical Equipment	[100]	[_____]
Metals	[100]	[_____]
Rubble	[100]	[_____]
Wood (uncontaminated)	[100]	[_____]
Other		[_____]

.4 Construction Waste

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	[100]	[_____]
Plastic Packaging	[100]	[_____]
Rubble	[100]	[_____]
Steel	[100]	[_____]
Wood (uncontaminated)	[100]	[_____]
Other	[100]	[_____]

3.4 WASTE AUDIT (WA)

.1 Schedule A – Waste Audit (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity (Unit)	(5) Generation Point	(6) Recycled	(7) % Reused
Wood and Plastics Material						
Descrip						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Doors and Windows Material						
Descrip:						
Painted Frames						
Glass						
Wood						
Metal						

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity (Unit)	(5) Generation Point	(6) Recycled	(7) % Reused
Other						

3.5 WASTE REDUCTION WORKPLAN (WRW)

.1 Schedule B

(1) Material Category	(2) Person Responsible	(3) Total Quantity of Waste (Unit)	(4) Reused Amount (Units) Projected	(5) Recycled Amount Unit) Projected	(6) Material(s) Destination
Wood and Plastic Material Descrip.					
Chutes					
Warped Pallet Forms					
Plastic Packaging					
Cardboard Packaging					
Other					
Doors and Windows Material Descrip.					
Painted Frames					
Glass					
Wood					
Metal					
Other					

3.6 DEMOLITION WASTE AUDIT (DWA)

.1 Schedule C – Demolition Waste Audit (DWA)

(1) Material Description	(2) Quantity	(3) Unit	(4) Total	(5) Volume (cum)	(6) Weight (cum)	(7) Remarks and Assumptions
Wood						
Wood Stud						
Plywood						
Baseboard						
Wood Door Trim						
Wood Cabinet						
Doors and Windows						
Panel						
Regular Slab						

(1) Material Description	(2) Quantity	(3) Unit	(4) Total	(5) Volume (cum)	(6) Weight (cum)	(7) Remarks and Assumptions
Regular Wood						
Laminate Byfold – Closet						
Glazing						

3.7 COST / REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Schedule D – Cost / Revenue Analysis Workplan (CRAW)

(1) Material Description	(2) Total Quantity (Units)	(3) Volume (cum)	(4) Weight (cum)	(5) Disposal Cost / Credit $(+/-)	(6) Category Sub-Total $(+/-)
Wood					
Wood Stud					
Plywood					
Baseboard					
Wood Door Trim					
Wood Cabinet Doors and Windows					
Panel					
Regular Slab					
Regular Wood					
Laminate Byfold – Closet					
Glazing					

3.8 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule E – Government Chief Responsibility for the Environment

Province	Address	General Inquiries	Fax
British Columbia	Ministry of Environment Lands and Parks 810 Blanshard Street, 4th Floor Victoria, BC V8V 1X4	(604) 387-1161	(604) 356-6464
	Waste Reduction Commission Soils and Hazardous Waste 770 South Pacific Blvd., Suite 303 Vancouver, BC V6B 5E7	(604) 660-9550	604) 660-9596

END OF SECTION

1 GENERAL

1.1 SECTIONS INCLUDES

.1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 PRECEDENCE

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

1.3 REFERENCES

.1 Not Used.

1.4 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Departmental Representative’s Inspection.

.2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested and are fully operational.

.4 Certificates required by Electrical Inspector have been submitted.

.5 Operation of systems have been demonstrated to Owner's personnel.

.6 Work is complete and ready for Final Inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Department Representative complete outstanding items and request reinspection.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 77 00 Closeout Procedures.

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA).

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting two weeks prior to contract completion with contractor's representative and CBSA Representative to:

1. Verify Project requirements.

2. Review warranty requirements.

.2 CBSA Representative to establish communication procedures for:

3. Notifying construction warranty defects.

4. Determine priorities for type of defects.

5. Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Two weeks prior to Substantial Performance of the Work, submit to the CBSA Representative, four final copies of operating and maintenance manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.5 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate 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.

.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dwg and PDF format on 2 flash drives.

1.6 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each 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 Training: refer to Section 01 79 00 - Demonstration and Training.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for CBSA Representative one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

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

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, provided by contractor.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.9 FINAL SURVEY

.1 Not Used.

1.10 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 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.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 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 Contractor's co-ordination drawings, with colour

.12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.13 [Aboveground] storage tank inspection documentation, registration, forms, decommissioning and removal in accordance with CEPA SOR/2008-197.

.14 Additional requirements: as specified in individual specification sections.

1.11 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.1 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 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional requirements: as specified in individual specifications sections.

1.12 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, 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.

1. Submit inventory listing to CBSA Representative.

2. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock 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.

1. Submit inventory listing to CBSA Representative.

2. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.3 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.

.4 Receive and catalogue items.

1. Submit inventory listing to CBSA Representative.

2. Include approved listings in Maintenance Manual.

1.13 DELIVERY, STORAGE AND HANDLING

.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 for review by CBSA Representative.

1.14 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to CBSA Representative approval.

.3 Warranty management plan to include required actions and documents to assure that CBSA Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to CBSA Representative for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by CBSA Representative.

.9 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include generator and automatic transfer switch.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

1. Name of item.

2. Model and serial numbers.

3. Location where installed.

4. Name and phone numbers of manufacturers or suppliers.

5. Names, addresses and telephone numbers of sources of spare parts.

6. Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

7. Cross-reference to warranty certificates as applicable.

8. Starting point and duration of warranty period.

9. Summary of maintenance procedures required to continue warranty in force.

10. Cross-Reference to specific pertinent Operation and Maintenance manuals.

11. Organization, names and phone numbers of persons to call for warranty service.

12. Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 9 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the CBSA Representative to proceed with action against Contractor.

1.15 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by CBSA Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.

.2 Model number.

.3 Serial number.

.4 Contract number.

.5 Warranty period.

.6 Inspector's signature.

.7 Construction Contractor.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 77 00 Closeout Procedure.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance.

.2 Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.

.3 Preparation:

.1 Verify conditions for demonstration and instructions comply with requirements.

.2 Verify designated personnel are present.

.3 Ensure equipment has been inspected and put into operation in accordance with Section 01 78 00 closeout submittal.

.4 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational.

.4 Demonstration and Instructions:

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.

.2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.

.3 Review contents of manual in detail to explain aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

.5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:

.1 Section 26 32 10 – Diesel Electric Generator Units, Liquid Cooled: [4] hours of instruction.

.2 Section 26 36 23 – Automated Load Transfer Equipment: [2] hours of instruction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for [CBSA Representative's] approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

.5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.4 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:

.1 Instruct Owner's personnel.

.2 Provide written report that demonstration and instructions have been completed.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Methods for removal of existing asphalt pavement.

1.2 RELATED SECTIONS

.1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Divert unused asphalt materials from landfill to local facility approved by Departmental Representative.

2 PRODUCTS

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

3 EXECUTION

3.1 PREPARATION

.1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

3.2 PROTECTION

.1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

.1 Remove existing asphalt pavement to lines and grades established by Departmental Representative in field.

.2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.4 Provide for suppression of dust generated by removal process.

3.4 STOCKPILING OF MATERIAL

.1 Dispose of removed asphalt pavement by stock-piling in location designated by Departmental Representative.

.2 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

3.5 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.

3.6 SWEEPING

.1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 74 19 Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D 1751-[14 (2013)], Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.24-[M90], Multicomponent, Chemical-Curing Sealing Compound.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1-[14], Concrete Materials and Methods of Concrete Construction.

.2 CAN/CSA-A23.2-[14], Methods of Test for Concrete.

.3 CAN/CSA-A3000-[13], Portland Cement.

.4 CAN/CSA-G30.5-[M1983(R1998)], Welded Steel Wire Fabric for Concrete Reinforcement.

.5 CAN/CSA-G30.18-[09], Billet-Steel Bars for Concrete Reinforcement.

1.3 SUBMITTALS

.1 Shop Drawings

.1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and all necessary details of reinforcing.

.2 Submit drawings showing formwork and falsework design to: CAN/CSA-A23.1.

.3 Drawings to bear stamp and signature of qualified professional engineer registered or licensed in Province of British Columbia, Canada.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

.5 Use trigger operated spray nozzles for water hoses.

.6 Designate cleaning area for tools to limit water use and runoff.

2 PRODUCTS

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A3000-A5, Type 10.

.2 Other concrete materials: to CAN/CSA-A23.1.

2.2 MIXES

.1 Proportion concrete in accordance with CAN/CSA-A23.1.

.2 Minimum compressive strength at 28 MPa as specified by Departmental Representative.

.3 Nominal maximum size of coarse aggregate: to CAN/CSA-A23.1.

.4 Slump: to CAN/CSA-A23.1.

.5 Air content: concrete to contain purposely entrained air in accordance with CAN/CSA-A23.1, Table 10.

.6 Admixtures: to CAN/CSA-A23.1.

3 EXECUTION

3.1 CONSTRUCTION

.1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.

3.2 INSERTS

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in. Sleeves and openings greater than 100 mm x 100 mm not indicated, must be approved by Departmental Representative.

3.3 SITE TOLERANCES

.1 Concrete floor slab finishing tolerance in accordance with CAN/CSA-A23.1.

3.4 FIELD QUALITY CONTROL

.1 Concrete testing: to CAN/CAS-A23.2 by testing laboratory designed and paid for by Contractor.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 This Section covers items common to Sections of Division 26. This section supplements requirements of Section 01 11 55.

1.2 CODES AND STANDARDS

.1 Do complete installation in accordance with the latest CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.1-M1987 except where specified otherwise.

1.3 SCOPE OF WORK

.1 The scope of Work covered by these specifications and drawings covers the complete fit-up of the project area including but not limited to:

.1 Emergency power generator,

.2 Power distribution system,

.3 Not used,

.4 Excavation and backfill,

.5 Barricades and signage,

.6 Automatic transfer switch,

.7 Circuit breakers,

.8 Disconnect switches,

.9 Commissionaire services,

.10 Raceways,

.11 Cables and wiring,

.12 Grounding and bonding,

.13 Labeling and arc flash labels,

.14 Concrete pad,

.15 Repair all surfaces damaged during construction,

.16 Demolition and removal,

.17 Relocations,

.18 All necessary attachments, brackets and braces for mounting and supporting equipment,

.19 All necessary materials, labour, apparatus and tools to complete the installation,

.20 Engage and pay for a structural engineer (P.Eng.) to review the electrical installation and provide a letter of assurance that the installation meets the NBC requirements.

1.4 CARE, OPERATION AND START-UP

.1 Instruct Departmental Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel is conversant with all aspects of its care and operation.

1.5 VOLTAGE RATINGS (R2015)

.1 Operating voltages: to CAN3-C235-83 (R2015).

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.6 PERMITS, FEES AND INSPECTION

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay associated fees.

.3 Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.

.4 Notify Departmental Representative of changes required by Electrical Inspection Department prior to making changes.

.5 Furnish Certificates of Acceptance from Electrical Inspection Department on completion of work to Departmental Representative.

1.7 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with Section 01 11 55 - General Requirements.

.2 Equipment and material are to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.

.3 Factory assemble control panels and component assemblies.

1.8 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.

.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

1.9 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.2 Nameplates:

.3 Lamicoid 3 mm thick plastic engraving sheet, white face, black core, mechanically attached with self tapping screws.

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

.4 Labels:

.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

.5 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.

.6 Allow for average of twenty-five (25) letters per nameplate and label.

.7 Identification to be English.

.8 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.9 Identify equipment with Size 3 labels engraved "ASSET INVENTORY No. [_____] ". Number as and if directed by Departmental Representative.

.10 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.11 Terminal cabinets and pull boxes: indicate system and voltage.

.12 Transformers: indicate capacity, primary and secondary voltages.

1.10 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

1.11 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other		
Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency	Red	Blue
Voice		
Other		
Security Systems	Red	Yellow

1.12 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.13 MANUFACTURERS AND CSA LABELS

.1 Visible and legible, after equipment is installed.

1.14 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 27 26.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.4 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

1.15 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.

.1 Local switches: 1200 mm.

.2 Wall receptacles:

.1 General: 400 mm.

.2 Above top of continuous baseboard heater: 200 mm.

.3 Above top of counters or counter splash backs: 175 mm.

.4 In mechanical rooms: 1400 mm.

.3 Panelboards: as required by Code or as indicated.

.4 Telephone and interphone outlets: 400 mm.

.5 Wall mounted telephone and interphone outlets: 1200 mm.

.6 Fire alarm pull stations: 1200 mm.

.7 Fire alarm bells: 2100 mm.

.8 Television outlets: 400 mm.

.9 Wall mounted speakers: 2100 mm.

.10 Clocks: 2100 mm.

.11 Door bell pushbuttons: 1200 mm.

1.16 LOAD BALANCE

.1 Measure phase current to panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.17 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

1.18 FIELD QUALITY CONTROL

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The Work of this division to be carried out by a Contractor who holds a valid Master Electrical contractor license as issued by the Province that the work is being constructed.

.3 Not used.

.4 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.5 Insulation resistance testing.

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.6 Carry out tests in presence of Departmental Representative.

.7 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.8 Submit test results for Departmental Representative's review.

1.19 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

1.20 PREMIUM TIME FOR SERVICE INTERRUPTIONS

.1 There is no power, security, fire alarm, voice/data interruption during the regular hours. Allow premium time in the week nights to disrupt existing services.

.2 Obtain prior written approval from Departmental Representative before any service interruptions.

1.21 RECORD DRAWINGS AND MAINTENANCE MANUALS

.1 Submit 3 CDs and 3 hardcopies of the record drawings in Autocad format after Departmental Representative’s approval.

.2 Submit 3 sets of maintenance manuals.

1.22 SEISMIC BRACING

.1 All new and relocated equipment / panels shall be seismic braced per NBC 2010.

1.23 FIRESTOPPING

.1 Not used.

2 PRODUCTS

2.1 NOT USED

.1 Not used.

3 EXECUTION

3.1 PROPOSED WORK SEQUENCE

.1 Submit gantt chart and shop drawings.

.2 Install a 30 kW diesel generator and automatic transfer switch to back up the existing 200 A 120/240 V power service.

.3 Remove the existing 12.5 kW propane gas generator and metal shed.

.4 Remove all existing redundant equipment and genset. Dispose existing redundant equipment and genset in accordance with Section 01 74 19 – Construction Demolition Waste Management and Disposal.

.5 Repair all damaged floors, walls and pavements. Paint the repaired surfaces to match the existing colour.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for wire and box connectors.

1.2 RELATED SECTIONS

.1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

1.3 REFERENCES

.1 Canadian Standards Association CSA International

.1 CAN/CSA-C22.2 No.18-(R2016), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

.2 CSA C22.2 No.65-93R2018, Wire Connectors.

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

.1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating)

.3 National Electrical Manufacturers Association (NEMA).

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

2 PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper alloy sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper alloy sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:

.1 Connector body and stud clamp for stranded copper conductors.

.2 Clamp for stranded copper conductors.

.3 Stud clamp bolts.

.4 Bolts for copper bar.

.5 Bolts for aluminum bar.

.6 Sized for conductors as indicated.

.4 Clamps or connectors for armoured cable, aluminum sheathed cable, flexible conduit, as required to: CAN/CSA-C22.2 No.18.

3 EXECUTION

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.3 Install fixture type connectors and tighten. Replace insulating cap.

.4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.2 REFERENCES

.1 C22.2 No .0.3-09 (R2014), Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131-17, Type TECK 90 Cable.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal, and with the Waste Reduction Workplan.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Fold up metal banding, flatten and place in designated area for recycling.

2 PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 1000 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

2.2 TECK CABLE

.1 Cable: to CAN/CSA-C22.2 No. 131.

.2 Conductors:

.1 Grounding conductor: copper.

.2 Circuit conductors: copper, size as indicated.

.3 Insulation:

.1 Chemically cross-linked thermosetting polyethylene rated type RW90, 1000V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: interlocking aluminum.

.6 Overall covering: polyvinyl chloride material.

.7 Fastenings:

.1 One hole malleable iron straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables at 3000 mm centers.

.3 Threaded rods: 6 mm dia. to support suspended channels.

.8 Connectors:

.1 Watertight, approved for TECK cable.

2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from aluminum strip.

.4 Type: flame retardant jacket over thermoplastic armour meeting requirements of Vertical Tray Fire Test of CSA C22.2 No. 0.3 with maximum flame travel of 1.2 m.

.5 Connectors: Spin on watertight.

2.4 ALUMINUM SHEATHED CABLE

.1 Conductors: copper, size as indicated.

.2 Insulation: type RA90 rated 1000 V.

.3 Sheath: aluminum applied to form continuous corrugated seamless sheath.

.4 Outer jacket of PVC applied over sheath for direct burial and wet locations.

.5 Fastenings for aluminum sheathed cable:

.1 One hole steel straps to secure surface cables 25 mm and smaller. Two hole steel straps for cables larger than 25 mm. Use aluminum strap only with single conductor cable.

.2 Channel type supports for two or more cables at 3000 mm centers.

.3 Threaded rods: 6 mm dia. to support suspended channels.

3 EXECUTION

3.1 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34.

3.2 INSTALLATION OF TECK CABLE 0 -1000 V

.1 Install cables.

.1 Group cables wherever possible on channels.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

3.3 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

.3 Use aluminum spin-on watertight connectors.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Section 26 05 02 - Common Work Results - Electrical.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

.1 ANSI/IEEE 837-2014, Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA International)

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

2 PRODUCTS

2.1 EQUIPMENT

.1 Grounding conductors: bare stranded copper, soft annealed, size as indicated.

.2 Insulated grounding conductors: green, type RW 90.

.3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Thermit welded type conductor connectors.

.5 Bonding jumpers, straps.

.6 Pressure wire connectors.

3 EXECUTION

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, conductors, connectors, accessories. Reconnect all existing ground connections.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Use mechanical connectors for grounding connections to equipment provided with lugs.

.5 Soldered joints not permitted.

.6 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.7 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

.8 Install separate ground conductor to outdoor lighting standards and underground wiring.

3.2 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list.

.1 Switchgear

.2 Main electrical service

.3 Generator.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 02 - Common Work Results - Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

1 GENERAL

1.1 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data for cabinets in accordance with Section 01 33 00 - Submittal Procedures.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal, and with the Waste Reduction Workplan.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Fold up metal banding, flatten and place in designated area for recycling.

2 PRODUCTS

2.1 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

2.2 EXTERIOR JUNCTION BOXES

.1 All exterior junction boxes shall be cast aluminum.

3 EXECUTION

3.1 JUNCTION AND PULL BOX INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.2 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 02 - Common Work Results - Electrical.

.2 Install size 2 identification labels indicating system name, voltage and phase.

END OF SECTION

1 GENERAL

1.1 REFERENCES

.1 CSA C22.1, Canadian Electrical Code, Part 1.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal, and with the Waste Reduction Workplan.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 120 V outlet boxes for 120 V switching devices.

.6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduits, minimum size 102 x 54 x 48 mm.

.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished walls.

2.3 MASONRY BOXES

.1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

.1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.6 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet boxes for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

3 EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

.5 All surface mounted boxes shall be FD or FS boxes.

.6 Voice/data outlet boxes shall be surface mounted on existing Wiremold raceways, and concrete walls.

.7 Install type written labels on boxes to identify panel and circuit numbers.

END OF SECTION

1 GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA C22.2 No. 18-98, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.

.2 CSA C22.2 No. 45-M1981 (R2003), Rigid Metal Conduit.

.3 CSA C22.2 No. 56-17, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83-M1985 (R2017), Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2-06 (R2016), Rigid PVC (Unplasticized) Conduit.

.6 CAN/CSA C22.2 No. 227.3-15, Flexible Nonmetallic Tubing.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal, and with the Waste Reduction Workplan.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

.4 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

2 PRODUCTS

2.1 CONDUITS

.1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.2 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 3 m oc.

.4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Set screws connectors and couplings for EMT. Cast type metal connectors and couplings are not permitted.

.2 Factory "ells" where 90° bends are required for 25 mm and larger conduits.

2.4 FISH CORD

.1 Polypropylene.

3 EXECUTION

3.1 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical electrical service rooms, unfinished areas, and on existing concrete walls.

.3 Surface mount conduits shall be rigid steel conduit unless otherwise indicated.

.4 Use rigid threaded conduit in the outside installations.

.5 Use electrical metallic tubing (EMT) in ceiling and wall spaces.

.6 Use flexible metal conduit for connection to motors in dry areas.

.7 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.8 Minimum conduit size for lighting and power circuits to be 21 mm.

.9 Install EMT conduit from branch circuit panels to ceiling space.

.10 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.11 Mechanically bend steel conduit over 21 mm dia.

.12 Field threads on rigid conduits must be of sufficient length to draw conduits up tight.

.13 Install fish cord in empty conduits.

.14 Run 2 - 27 mm spare conduits up to ceiling space in addition to the conduit requirements for the loads at the new and relocated panelboards. Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space.

.15 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.16 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on surface channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.4 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel. Install in centre one third of slab.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed. Use cold mastic between sleeve and conduit.

.5 Do not place conduits in slabs in which slab thickness is less than 4 times of conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

3.5 WIRE IN CONDUIT

.1 All wiring shall be in conduit unless otherwise indicated.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Technical data form Appendix A required in both Section 26 32 10 - Diesel Electric Generating Units - Liquid Cooled and Section 01 33 00 – Submittal Procedures.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 32 10 - Diesel Electric Generating Units - Liquid Cooled.

1.3 TECHNICAL DATA FORM SUBMITTAL

.1 Submit technical data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Co-ordinate with Section 26 32 10 - Diesel Electric Generating Units - Liquid Cooled.

1.4 DIESEL ENGINE

.1 Make and type: [_____].

.2 Speed: [_____] r/min.

.3 Continuous mechanical power NTP rating: [_____] kW.

.4 Continuous mechanical power site rating: [_____] kW.

.5 Cycles: [_____].

.6 No. of cylinder: [_____].

.7 Cylinder arrangement: [_____].

.8 Bore and stroke: [_____] mm x [_____] mm.

.9 Piston speed: [_____] m/s.

.10 Total displacement of cylinders: [_____] cm^3.

.11 BMEP at rated output: [_____] kPa.

.12 Naturally aspirated or supercharges: [_____].

.13 Make and type of turbo charger (if turbo charged): [_____].

.14 Cyclic irregularity: [_____].

.15 Make and type of governor: [_____].

1.5 FUEL SYSTEM

.1 Make and type of fuel system: [_____].

.2 Fuel consumption at ½ load: [_____] l/h.

.3 Fuel consumption at 3/4 load: [_____] l/h.

.4 Fuel consumption at 4/4 load: [_____] l/h.

.5 Number of fuel filters: [_____].

.6 Recommended fuel oil: [_____].

1.6 LUBRICATING OIL SYSTEM

.1 Lubricating oil cooler:

.1 Make and type: [_____].

.2 Capacity oil: [_____] l/min.

.3 Capacity water: [_____] l/min.

.4 Inlet oil temperature: [_____] degrees C.

.5 Outlet oil temperature: [_____] degrees C.

.2 Engine driven oil pump:

.1 Type: [_____].

.2 Capacity: [_____] l/min.

.3 Type of drive: [_____].

.3 Pre-lubricating oil pump (where supplied):

.1 Pump make and type: [_____].

.2 Capacity: [_____] l/min.

.3 Motor make and type: [_____].

.4 Motor power: [_____] lW.

.5 Motor voltage and phase: [_____] V.

.6 Motor speed: [_____] r/min.

.4 Filters:

.1 Make and type: [_____].

.2 Number: [_____].

.5 Lubricating oil:

.1 Total capacity of system: [l].

.2 Recommended type of lubricating oil: [_____].

.3 Recommended SAE viscosity number at 0 degrees C: [_____].

.4 Recommended SAE viscosity number at 20 degrees C: [_____].

.5 Recommended SAE viscosity number at 40 degrees C: [_____].

.6 Recommended operating temperature: [_____] degrees C.

.7 Recommended operating pressure: [_____] kPa.

.8 Lubricating oil consumption at rated output: [_____] l/kW/h.

1.7 COOLING SYSTEM (WHERE LIQUID COOLED UNIT SUPPLIED)

.1 Coolant

.1 Capacity: [l].

.2.Recommended operating temperature: [_____] degrees C.

.2 Engine driven circulating pump:

.1 Make and type: [_____].

.2 Capacity: [_____] l/min.

.3 Type of drive: [_____].

.3 Jacket heater:

.1 Make and type: [_____].

.2 Wattage: [_____] W.

.3 Voltage and phase: [_____] V.

.4 Thermostat make and type: [_____].

.4 Heater circulating pump (where supplied):

.1 Pump make and type: [_____].

.2 Pump capacity: [_____] l/min.

.3 Motor power: [_____] kW (bhp).

.4 Motor voltage and phase: [_____].

.5 Motor speed: [_____] r/min.

.5 Radiator:

.1 Capacity: [l].

.2 Radiator fan power: [_____] kW (bhp).

.3 Radiator fan speed: [_____] r/min.

.4 Number and type of belts: [_____].

.5 Air required for cooling: [_____] m^3 /min.

.6 Radiator fan motor voltage and phase: [_____] V.

1.8 EXHAUST SYSTEM

.1 Silencer make and type: [_____].

.2 Silencer dimensions: [_____].

.3 Exhaust pipe size: [_____].

.4 Exhaust rate of flow and temperature at silencer:

.1 Inlet for 100% load: [_____] m^3 /min.

.2 Inlet for 75% load: [_____] m^3 /min.

.3 Inlet for 50% load: [_____] m^3 /min.

.5 Pyrometer make and type (where supplied).

.6 Number of switch points.

1.9 AIR INTAKE SYSTEM

.1 Make and type of air cleaner: [_____].

.2 Air required for combustion: [_____] m^3 /min.

.3 Air required for cooling (where required): [_____] m^3 /min.

1.10 STARTING SYSTEM

.1 Electric start

.1 Starting motor:

.1 Make and type: [_____].

.2 Voltage: [_____] V.

.3 Breakaway current at 0 degrees C: [_____] A.

.4 Breakaway current at 40 degrees C: [_____] A.

.5 Cranking current at 0 degrees C: [_____] A.

.6 Cranking current at 40 degrees C: [_____] A.

.2 Battery

.1 Make and type: [_____].

.2 Nominal voltage: [_____] V.

.3 Number of cells: [_____].

.4 Capacity: [_____] Ah.

.5 Discharge rate: [_____] h.

.3 Battery charger

.1 Make and type: [_____].

.2 Voltage - float: [_____] V.

.3 Voltage - equalizer: [_____] V.

.4 Maximum current: [_____] A.

1.11 GENERATOR

.1 Alternator

.1 Make and type: [_____].

.2 Model: [_____].

.3 Phase and wire: [_____].

.4 Power factor: [_____].

.5 Voltage: [_____] V.

.6 Current: [_____] A.

.7 kVA and kW: [_____], [_____].

.8 Speed: [_____] r/min.

.9 Guaranteed efficiencies at rated power factor for:

.1 100% load: [_____] %.

.2 75% load: [_____]%.

.3 50% load: [_____]%.

.10 Wave form deviation: [_____].

.2 Exciter

.1 Make and type: [_____].

.2 Model: [_____].

.3 Voltage: [_____] V.

.4 kW: [_____].

.5 Filed resistance at 20 degrees C: [_____] ohms.

.3 Voltage regulator

.1 Make and type: [_____].

.2 Input power:

.1 Voltage: [_____] V.

.2 Current: [_____] A.

.3 Frequency: [_____] Hz.

.4 Phase: [_____].

.3 Input sensing:

.1 Voltage: [_____] V.

.2 Frequency: [_____] Hz.

.3 Phase: [_____].

.4 Output power:

.1 Nominal voltage: [_____] V dc.

.2 Forcing voltage: [_____] V dc.

.3 Current (max. continuous): [_____] A dc.

.4 Forcing current (maximum): [_____] A dc.

.4 Engine/generator coupling

.1 Make and type: [_____].

1.12 TRANSFER SYSTEM

.1 Make: [_____].

.2 Type: [_____].

.3 Voltage rating: [_____] V.

.4 Current rating:

.1 Continuous: [_____] A.

.2 Maximum interruption: [_____].

.5 Control voltage:

.1 Closing coil: [_____].

.2 Tripping coil: [_____].

1.13 ENGINE - GENERATOR -TRANSFER CONTROLLER

.1 Make and type: [_____].

1.14 BUSSING

.1 Rated current: [_____].

.2 Short circuit capacity: [_____].

.3 Rated voltage: [_____].

1.15 DIMENSIONS AND WEIGHTS

.1 Overall unit length: [_____] m.

.2 Overall unit width: [_____] m.

.3 Overall unit height: [_____] m.

.4 Total weight of generator: [_____] kg.

.5 Total weight of engine: [_____] kg.

.6 Generator stator weight: [_____] kg.

.7 Generator rotor weight: [_____] kg.

.8 Radiator weight: [_____] kg.

.9 Total weight of unit: [_____] kg.

.10 Weight of heaviest item to be lifted by crane: [_____] kg.

.11 Head room required for removal of piston and connecting rod: [_____] m.

2 PRODUCTS

2.1 NOT USED

.1 Not used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 19 – Construction/Demolition Waste Management And Disposal.

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include time-current characteristics curves for breakers with ampacity of 100 A and over.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction/Demolition Waste Management And Disposal.

.2 Collect and separate plastic paper packaging and corrugated cardboard in accordance with Waste Management Plan.

2 PRODUCTS

2.1 BREAKERS GENERAL

.1 Bolt-on moulded case circuit breaker: quick-make quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.2 Common-trip breakers: with single handle for multi-pole applications.

.3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times currents rating.

.4 Circuit breakers with interchangeable trips as indicated.

.5 Circuit breakers to have symmetrical rms interrupting capacity rating as noted on drawings.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

3 EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

.2 Update existing panelboard schedules with added or revised circuit breakers with new type written schedules.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Operation test and check required for acceptance in both Section 26 32 10 - Diesel Electric Generating Units (Liquid Cooled).

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 32 10 - Diesel Electric Generating Units (Liquid Cooled).

1.3 TEST SUBMITTAL

.1 Submit Factory Test in accordance with Section [01 33 00 - Submittal Procedures].

.2 Co-ordinate with Section 26 32 10 - Diesel Electric Generating Units (Liquid Cooled).

1.4 GENERAL

.1 Supplier: [_____].

.2 Spec no.: [_____].

.3 Order no.: [_____].

.4 Requisition no.: [_____].

.5 Tender file no.: [_____].

.6 Site file: [_____].

.7 Unit serial no.: [_____].

.8 Destination: [_____].

.9 Against material specification and shop drawings:

.1 Complies: [_____].

.2 Does not comply: [_____].

.3 Not checked: [_____].

.10 Against specified performance:

.1 Tested OK: [_____].

.2 Tested not OK: [_____].

.3 Not tested: [_____].

1.5 ENGINE AND ACCESSORIES

.1 Engine:

.1 Make and type: [_____].

.2 Model: [_____].

.3 Serial No.: [_____].

.4 Speed: [_____] rpm.

.5 Cycles: [_____].

.6 No. of cylinders: [_____].

.7 Cylinder arrangement: [_____].

.8 Bore and stroke: [_____] mm x [_____] mm.

.9 kW [_____] @ ntp.

.10 Governor: make and type: [_____].

.11 Base plate, including anchor bolt holes location: [_____].

.12 Aspiration: natural/pressure: [_____].

.13 Engine wiring: [_____].

.2 Fuel system:

.1 Make and type: [_____].

.2 Number of filters: [_____], make and type: [_____].

.3 Recommended fuel oil: [_____].

.4 Pumps: [_____].

.5 Injectors: [_____].

.6 Transfer pump: [_____].

.7 Lines and fittings: [_____].

.3 Lubricating oil system:

.1 Lubricating oil cooler:

.1 Make and type: [_____].

.2 Filters:

.1 Number: [_____].

.2 Make and type: [_____].

.3 Gauges:

.1 Number: [_____].

.2 Make and type: [_____].

.4 Lubricating oil:

.1 Total capacity: [_____].

.2 Recommended oil: [_____].

.3 Recommended operating temperature: [_____].

.4 Recommended operating pressure: [_____].

.5 Drain valve: [_____].

.6 Lines and fittings: [_____].

.7 Leaks: [_____].

.4 Exhaust system:

.1 Silencer: make and type: [_____].

.2 Exhaust pipe size: [_____].

.3 Silencer and fittings: [_____].

.4 Manifold guard: [_____].

.5 Air intake system:

.1 Air cleaner: make and type: [_____].

.2 Air required for combustion: [_____] m^3 /min.

.3 Turbo charger: make and type: [_____].

.6 Cooling system:

.1 Make: [_____].

.2 Fan: number [_____], type of belts: [_____].

.3 Radiator capacity: [_____].

.4 Air required for cooling: [_____].

.5 Engine heater: make and type [_____], wattage: [_____].

.6 Aquastat: make and type [_____].

.7 Thermostat: open [_____], close: [_____].

.8 Drains: valves [_____], leaks [_____].

.9 Gauges: make and type [_____].

.7 Ventilating system:

.1 Motors: number [_____], make and type [_____].

.2 Louvres: number [_____], make and type [_____].

.3 Dampers: number [_____], make and type [_____].

.4 Thermostat: make and type [_____].

.5 Transformer: make and type [_____].

.6 Auxiliary potentiometer:

.1 Construction: [_____].

.2 Dimensions: [_____].

.3 Operation: [_____].

.4 Linkage: [_____].

.5 Wipers: [_____].

.8 Starting system:

.1 Starting motor:

.1 Make and type: [_____].

.2 Voltage: [_____].

.3 F.L. Amps: [_____].

.4 Serial no.: [_____].

.2 Battery:

.1 Make and type: [_____].

.2 Nominal volts: [_____].

.3 No. of cells: [_____].

.4 A.H. capacity: [_____].

.5 Cables: [_____].

.3 Battery charger:

.1 Make and type: [_____].

.2 DC Volts - float: [_____], DC Volts - equalize: [_____].

.3 Equalize time: [_____].

.4 DC Amps: [_____].

.5 AC Volts: [_____].

.6 AC Amps: [_____].

.7 Serial no.: [_____].

.9 Vibration isolators:

.1 Make and type: [_____].

.2 Spring cap: [_____].

.10 Flexible couplings:

.1 Make and type: [_____].

.11 Other accessories:

.1 Make and type/contact arrangement: [_____].

.2 Fuel rack solenoid (FRS): [_____].

.3 Speed switch (SS): [_____].

.4 Low oil pressure switch (LOPS): [_____].

.5 High coolant temperature switch (HCTS): [_____].

.6 Engine control switch (45): [_____].

.12 Associated instruction books and sheets, parts books and drawings:

.1 Tool kit: [_____].

.2 Spare parts: [_____].

1.6 GENERATOR AND CONTROLS

.1 Alternators:

.1 Make and type: [_____].

.2 Frame: [_____].

.3 Model: [_____].

.4 Serial no.: [_____].

.5 Phase and wire: [_____] PF, [_____] Volts, [_____] Amps, [_____] KVA, [_____] kW, [_____] Speed, [_____] Cycles.

.6 Alt. field amps: [_____].

.7 Temp. rise: [_____].

.8 Bearing: front [_____], rear [_____].

.9 Junction box: [_____].

.10 Signs: DOT number [_____], warning [_____], air gap [_____], terminals [_____].

.2 Exciter:

.1 Make and type: [_____].

.2 Model: [_____].

.3 Serial no. [_____].

.4 Volts: [_____] kW, [_____] Amps.

.5 Field Amps: [_____], field winding: [_____].

.6 Temperature rise: [_____].

.7 Brushless/brush/static: [_____].

.3 Voltage regulator:

.1 Make and type: [_____].

.2 Serial no.: [_____].

.4 Regulator accessories:

.1 EFR/EFT: [_____].

.2 VAR: [_____].

.3 Transformers: [_____].

.4 Change-over SW: [_____].

.5 Current boost: [_____].

.6 Overload and short circuit test: [_____].

.5 Associated instruction books and sheets, parts books and drawings:

.1 [_____].

1.7 CONTROL PANEL AND COMPONENTS

.1 Control panel:

.1 Dimensions: [_____].

.2 Weight: [_____].

.3 Construction: [_____].

.4 Wiring: [_____].

.5 Transport Canada (TC) at sign: [_____].

.2 Transfer switch:

.1 Make and type: [_____].

.3 Overcurrent relay:

.1 Make and type: [_____].

.4 Meters:

.1 Make and type: [_____].

.2 Scale and accuracy: [_____].

.3 Ammeter: [_____].

.4 Voltmeter: [_____].

.5 Elapsed time meter: [_____].

.6 Hz meter: [_____].

.7 kW meter: [_____].

.5 Transformers: [_____].

.1 Fuses: [_____].

.6 Engine - generator - transfer controller:

.1 Make and type: [_____].

.7 Associated instruction books and sheets, parts books and drawings:

.1 [_____].

1.8 INSTRUMENT CONTROL SETTINGS

.1 High coolant temperature switch (HCTS): [_____].

.2 Low oil pressure switch (LOPS): [_____].

.3 Overspeed switch (SS High): [_____].

.4 Cranking output switch (SS Low): [_____].

.5 Normal supply overcurrent: timed [_____], inst. [_____].

.6 Emergency supply overcurrent: timed [_____], inst. [_____].

.7 Normal supply voltage limits: [_____].

.8 Emergency supply voltage limits: [_____].

.9 Frequency limits: [_____].

.10 Time delay settings:

.1 Crank delay: [_____].

.2 Restart: [_____].

.3 Bypass: [_____].

.4 Anticipated fail: [_____].

.5 Engine start: [_____].

.6 Emergency to normal: [_____].

.7 Dead bus: [_____].

.8 Cool down: [_____].

1.9 REGULATION

.1 Dot no.: [_____].

.2 Date: [_____].

		Load		Voltage		Frequency	
		Amps	kW	Level	Response	Level	Response
(1) Cold automatic voltage control	No load						
	Transient						
	Full load						
	Transient						
Eng. Temp Room Temp	No load						
	Transient						
	1/2 load						
	Transient						
	No load						
(2) Hot Automatic voltage control	No load						
	Transient						
	Full Load						
	Transient						
Eng. Temp Room Temp	No load						
	Transient						
	1/2 load						
	Transient						
	No load						
(3) Hot and cold fixed excitation	No load						
	Transient						
	Full load						

.3 Resistances

.1 Stator winding:

.1 Phase A: cold [_____], hot [_____].

.2 Phase B: cold [_____], hot [_____].

.3 Phase C: cold [_____], hot [_____].

.2 Rotor winding: cold [_____], hot [_____].

.3 Exciter field winding: cold [_____], hot [_____].

.4 Field rheostat: cold [_____], hot [_____].

.4 Voltage regulation:

.1 Maximum [_____]%, steady state [_____]%, 24 hour drift [_____]%.

.5 Speed reduction:

.1 Maximum [_____]%, steady state [_____]%, 24 hour drift [_____]%.

.6 Voltage adjustment ranges:

.1 With regulator rheostat: [_____].

.2 With field rheostat: [_____].

.7 Governor adjustment ranges:

.1 Speed changer: [_____].

.2 Speed droop: [_____].

.8 Cold start - full load application:

.1 Time since run: [_____].

.2 Lube oil temp: [_____].

.3 Fuel oil temp: [_____].

.4 Water temp: [_____].

.5 Generator iron temp: [_____].

.6 Room temp: [_____].

.7 Level of voltage overshoot: [_____].

.8 Level of frequency overshoot: [_____].

.9 Time to steady state: Volt [_____], Frequency [_____].

.10 Time load applied from start: [_____].

.11 Transient levels: volts [_____], Frequency [_____], Amps [_____].

.12 Time to settled levels: Volts [_____], Frequency [_____], Amps [_____].

.13 Settled levels: Volts [_____], Frequency [_____], Amps [_____].

1.10 HEAT RUN

.1 Table

	Generator							Battery Charger		Temperature Degrees C					
	Volts Amps														Water/Air
Time	1	2	3	1	2	3	Freq	KWs	Amp	Volts	Ambient	In	Out	Oil	Oil Pre ss Lbs

.2 Remarks:

.1 Exhaust colour: [_____].

.2 Lube, oil consumption: [_____].

.3 Fuel consumption: [_____].

.4 Atmospheric conditions:

.1 Temp/press/humidity: [_____].

1.11 COUPLING ALIGNMENT

.1 [_____].

1.12 MISCELLANEOUS

.1 Manuals:

.1 Received Transport Canada (TC): [_____] copies.

.2 Distributed: [_____] copies, [_____] site (with cabinet), [_____] copies [_____] region, [_____] copies, [_____] airport/site maintenance, [_____] copies, [_____] headquarters.

.2 Shipping:

.1 Crate: [_____].

.2 No. of pieces: [_____].

.3 Dimensions: [_____].

.4 Weight: [_____].

.5 Valuation: [_____].

.6 Date: [_____].

.7 Carrier: [_____].

.3 Factory acceptance:

.1 Date: [_____].

.2 Signature: [_____], TC inspector.

2 PRODUCTS

2.1 NOT USED

.1 Not Used.

3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 117-[17], Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C 136-[01], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D 422-[63 (2007)], Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D 698-[07], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ^{3}) (600 kN-m/m ^{3}).

.5 ASTM D 1557-[07], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ^{3}) (2,700 kN-m/m ^{3}).

.6 ASTM D 4318-[07], Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-[88], Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A3000-13, Portland Cement.

.2 CAN/CSA-A23.1-14, Concrete Materials and Methods of Concrete Construction.

1.3 DEFINITIONS

.1 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

1.4 SUBMITTALS

.1 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.

1.5 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

1.7 PROTECTION OF EXISTINGFEATURES

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Existing buried utilities and structures:

.1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Prior to commencing excavation Work, notify applicable Departmental Representative or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Department Representative or authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.3 Confirm locations of buried utilities by careful test excavations.

.4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before re-routing.

.6 Record location of maintained, re-routed and abandoned underground lines.

.7 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Department Representative, condition survey of existing underground services, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Department Representative.

.3 Where required for excavation, coordinate the schedule with the Departmental Representative.

2 PRODUCTS

2.1 MATERIALS

.1 Type 3 fill: selected material from excavation or other sources, approved by Department Representative for use intended, unfrozen and free from rocks larger than [75] mm, cinders, ashes, sods, refuse or other deleterious materials.

3 EXECUTION

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 STRIPPING OF TOPSOIL

.1 Commence topsoil stripping after area has been cleared of grasses and removed from site.

.2 Strip topsoil to depths as directed by Department Representative. Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by Department Representative. Stockpile height not to exceed 2 m.

.4 Dispose of unused topsoil to location as directed by Department Representative.

.5 Reused topsoil on the shallow trenches.

3.3 STOCKPILING

.1 Stockpile fill materials in areas designated by Department Representative. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Construct temporary Works to depths, heights and locations as directed by Department Representative.

.2 During backfill operation:

.1 Unless otherwise as indicated or as directed by Department Representative remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.

.3 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.4 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

.2 Remove excess materials from site and restore water courses as indicated and as directed by Department Representative.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Submit for Department Representative's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in manner not detrimental to public and private property, or any portion of Work completed or under construction.

3.6 EXCAVATION

.1 Try to excavate and backfill in the same day.

.2 For trench excavation, unless otherwise authorized by Department Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.3 Keep excavated and stockpilled materials a safe distance away from edge of trench as directed by Department Representative.

.4 Restrict vehicle operations directly adjacent to open trenches.

.5 Dispose of surplus and unsuitable excavated material off site.

.6 Do not obstruct flow of surface drainage or natural watercourses.

.7 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.8 Notify Department Representative when bottom of excavation is reached.

.9 Obtain Department Representative approval of completed excavation.

.10 Remove unsuitable material from trench bottom to extent and depth as directed by Department Representative.

3.7 BACKFILLING

.1 Do not proceed with backfilling operations until Department Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding [150] mm compacted thickness. Compact each layer before placing succeeding layer.

.5 Backfilling around installations.

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within [24] hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 20 m.

.6 Place unshrinkable fill in areas as indicated.

.7 Consolidate and level unshrinkable fill with internal vibrators.

3.8 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 19 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Department Representative.

.2 Replace damaged gravel as directed by Department Representative.

.3 Reinstate surfaces to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Department Representative.

.6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

3.9 GROUND PENETRATING RADAR (GPR)

.1 GPR existing underground utility locations prior to excavation.

3.10 REPAIR

.1 Contractor shall repair all existing infrastructure damaged during the construction.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for automatic load transfer equipment which can monitor voltage on all phases of normal power supply, initiate cranking of standby generator unit, transfer loads and shut down standby unit.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 78 00 - Closeout Submittals.

.4 Section 26 05 01 - Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN3-C13-M83 (R2015), Instrument Transformers.

.2 CSA C22.2 No.5-16, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE.

.3 CSA C22.2 No.178-1978(R2006), Automatic Transfer Switches.

.2 American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA)

.1 ANSI/NEMA ICS 2-2000 (R2005), Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.

1.4 SYSTEM DESCRIPTION

.1 Automatic load transfer equipment to:

.1 Monitor voltage on phases of normal power supply.

.2 Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.

.3 Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.

.4 Transfer load from standby unit to normal power supply when normal power restored, confirmed by sensing of voltage on phases above adjustable pre-set limit for adjustable time period.

.5 Shut down standby unit after running unloaded to cool down using adjustable time delay relay.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include:

.1 Make, model and type.

.2 Load classification:

.1 Motor load: 10kW.

.2 Restricted use: resistance and general loads, 0.8pf or higher 25kW.

.3 Single line diagram showing controls and relays.

.4 Description of equipment operation including:

.1 Automatic starting and transfer to standby unit and back to normal power.

.2 Test control.

.3 Manual control.

.4 Automatic shutdown.

1.6 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for automatic load transfer equipment for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Detailed instructions to permit effective operation, maintenance and repair.

.3 Technical data:

.1 Schematic diagram of components, controls and relays.

.2 Illustrated parts lists with parts catalogue numbers.

.3 Certified copy of factory test results.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene corrugated cardboard packaging material [in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by.

2 PRODUCTS

2.1 MATERIALS

.1 Instrument transformers: to CAN3-C13.

.2 Contactors: to ANSI/NEMA ICS2.

2.2 CIRCUIT BREAKER TYPE TRANSFER EQUIPMENT

.1 Circuit Breaker Type Transfer Equipment: to CSA C22.2 No.5.

.2 Rated: 120 / 240 V, 60Hz, 200 A, 3 wire, solid neutral.

.1 Fault withstand rating: 10 kA symmetrical for 3 cycles with maximum peak value of 10 kA.

.2 One normal-three phase molded-case circuit breaker with thermal magnetic, mounted on common base, designed for double throw action, motor operated, mechanically held and interlocked, wall mounted CSA enclosure.

.3 One emergency - three phase moulded-case circuit breaker with thermal magnetic trip, motor operated, and interlocked.

.4 Circuit breakers:

.1 Trip free in closed position.

.2 Interrupting rating: 10 A symmetrical.

.5 Dead front construction with access to relays and controls for inspection and maintenance, and manual operating lever for transfer switch.

.6 Auxiliary contact: to initiate emergency generator start-up on failure of normal power.

.7 Solid neutral bar, rated: 200 A.

.8 Overlapping neutral contacts on contractor type transfer equipment.

.9 Switchable neutral pole on circuit breaker type equipment.

2.3 CONTROLS

.1 Selector switch -four position ["Test", "Auto", "Manual", "Engine start"].

.1 Test position - Normal power failure simulated. Engine starts and transfer takes place. Return switch to "Auto" to stop engine.

.2 Auto position - Normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.

.3 Manual position - Transfer switch may be operated by manual handle but transfer switch will not operate automatically and engine will not start.

.4 Engine start position - Engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.

.2 Control transformers: dry type with 120V secondary to isolate control circuits from:

.1 Normal power supply.

.2 Emergency power supply.

.3 Relays: continuous duty, industrial control type, with wiping action contacts rated 10 A minimum:

.1 Voltage sensing: 3 phase for normal power and on one phase only for emergency, solid state type, adjustable drop out and pick up, close differential, 2V minimum undervoltage and over voltage protection.

.2 Time delay: normal power to standby, adjustable solid state, 5 to 180s 20s to10 min.

.3 Time delay on engine starting to override momentary power outages or dips, adjustable 0 to 60s delay.

.4 Time delay on retransfer from standby to normal power, adjustable 20s to 10 min.

.5 Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable 20s intervals to 10 min.

.6 Time delay during transfer to stop transfer action in neutral position to prevent fast transfer, adjustable, 5s intervals to 180s.

.7 Frequency sensing, to prevent transfer from normal power supply until frequency of standby unit reaches preset adjustable values.

.4 Solid state electronic in-phase monitor.

2.4 ACCESSORIES

.1 Pilot lights to indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel.

.2 Plant exerciser: 168h timer to start standby unit once each week for selected interval but does not transfer load from normal supply. Timer adjustable 0-168h in 15 min intervals.

.3 Auxiliary relay to provide 4 N.O. and 4 N.C. contacts for remote alarms.

.4 Instruments:

.1 Digital true rms, indicating type 2% accuracy, flush panel mounting:

.1 Voltmeter: ac, scale 0 to 300 V.

.2 Ammeter: ac, scale 0 to 400 A.

.3 Frequency meter: scale 55 to 65 Hz.

.5 Voltmeter selector switch: rotary, maintained contacts, panel mounting type, round notched handle, four position, labeled "OFF-Phase A-Phase B-Phase C".

.6 Potential transformers - dry type for indoor use:

.1 Ratio: 208 to 120.

.2 Rating: 208 V, 60Hz, BIL 5 kV.

.3 Accuracy rating: B.

.7 Ammeter selector switch: rotary, maintained contacts, panel mounting type, designed to prevent opening of current circuits, round notched handle, two position labeled "OFF - Phase A".

.8 Current transformers - dry type for indoor use:

.1 Ratio: 300 to 5.

.2 Rating: 249 V, 60Hz, BIL 5 kV.

.3 Accuracy rating: B.

.4 Positive action automatic short- circuiting device in secondary terminals.

.9 Manual bypass:

2.5 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 01 - Common Work Results - Electrical.

.2 Control panel:

.1 For selector switch and manual switch: size 4 nameplates.

.2 For meters, indicating lights, minor controls: size 3 nameplates.

2.6 SOURCE QUALITY CONTROL

.1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of Engineer.

.2 Notify Engineer 14 days in advance of date of factory test.

.3 Tests:

.1 Operate equipment both mechanically and electrically to ensure proper performance.

.2 Check selector switch, in modes of operation Test, Auto, Manual, Engine Start and record results.

.3 Check voltage sensing and time delay relay settings.

.4 Check:

.1 Automatic starting and transfer of load on failure of normal power.

.2 Retransfer of load when normal power supply resumed.

.3 Automatic shutdown.

.4 In-phase monitor operation.

2.7 SELF TESTING

.1 Add weekly 30 minute automatic testing in the first 3 months.

.2 After 3 months, change the testing to 30 minutes monthly testing.

3 EXECUTION

3.1 INSTALLATION

.1 Locate, install and connect transfer equipment.

.2 Check solid state monitors and adjust as required.

.3 Install and connect battery remote alarms.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical.

.2 Energize transfer equipment from normal power supply.

.3 Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.

.4 Set selector switch in "Manual" position and check to ensure proper performance.

.5 Set selector switch in "Engine start" position and check to ensure proper performance. Return switch to "Auto" to stop engine.

.6 Set selector switch in "Auto" position and open normal power supply disconnect. Standby should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 min, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.

.7 Repeat, at 1h intervals, 2 times, complete test with selector switch in each position, for each test.

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 117-[17], Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C 136-[01], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

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.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A3000-13, Portland Cement.

.2 CAN/CSA-A23.1-14, Concrete Materials and Methods of Concrete Construction.

1.3 DEFINITIONS

.1 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

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.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

1.4 SUBMITTALS

.1 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.

1.5 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

1.7 PROTECTION OF EXISTINGFEATURES

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Existing buried utilities and structures:

.1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Prior to commencing excavation Work, notify applicable Departmental Representative or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Department Representative or authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.3 Confirm locations of buried utilities by careful test excavations.

.4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before re-routing.

.6 Record location of maintained, re-routed and abandoned underground lines.

.7 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Department Representative, condition survey of existing underground services, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Department Representative.

.3 Where required for excavation, coordinate the schedule with the Departmental Representative.

2 PRODUCTS

2.1 MATERIALS

.1 Type 3 fill: selected material from excavation or other sources, approved by Department Representative for use intended, unfrozen and free from rocks larger than [75] mm, cinders, ashes, sods, refuse or other deleterious materials.

3 EXECUTION

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 STRIPPING OF TOPSOIL

.1 Commence topsoil stripping after area has been cleared of grasses and removed from site.

.2 Strip topsoil to depths as directed by Department Representative. Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by Department Representative. Stockpile height not to exceed 2 m.

.4 Dispose of unused topsoil to location as directed by Department Representative.

.5 Reused topsoil on the shallow trenches.

3.3 STOCKPILING

.1 Stockpile fill materials in areas designated by Department Representative. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Construct temporary Works to depths, heights and locations as directed by Department Representative.

.2 During backfill operation:

.1 Unless otherwise as indicated or as directed by Department Representative remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.

.3 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.4 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

.2 Remove excess materials from site and restore water courses as indicated and as directed by Department Representative.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Submit for Department Representative's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in manner not detrimental to public and private property, or any portion of Work completed or under construction.

3.6 EXCAVATION

.1 Try to excavate and backfill in the same day.

.2 For trench excavation, unless otherwise authorized by Department Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.3 Keep excavated and stockpilled materials a safe distance away from edge of trench as directed by Department Representative.

.4 Restrict vehicle operations directly adjacent to open trenches.

.5 Dispose of surplus and unsuitable excavated material off site.

.6 Do not obstruct flow of surface drainage or natural watercourses.

.7 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.8 Notify Department Representative when bottom of excavation is reached.

.9 Obtain Department Representative approval of completed excavation.

.10 Remove unsuitable material from trench bottom to extent and depth as directed by Department Representative.

3.7 BACKFILLING

.1 Do not proceed with backfilling operations until Department Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding [150] mm compacted thickness. Compact each layer before placing succeeding layer.

.5 Backfilling around installations.

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within [24] hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 20 m.

.6 Place unshrinkable fill in areas as indicated.

.7 Consolidate and level unshrinkable fill with internal vibrators.

3.8 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 19 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Department Representative.

.2 Replace damaged gravel as directed by Department Representative.

.3 Reinstate surfaces to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Department Representative.

.6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

3.9 GROUND PENETRATING RADAR (GPR)

.1 GPR existing underground utility locations prior to excavation.

3.10 REPAIR

.1 Contractor shall repair all existing infrastructure damaged during the construction.

END OF SECTION