

PWGSC Ontario	SPECIFICATION	Section 00 00 00
Region Project	TITLE SHEET	Page 1
Number R.058845.001		2016-12-01

PROJECT TITLE ABOVEGROUND LIQUID FUEL STORAGE TANK SYSTEM REMOVALS
AND INSTALLATIONS, CORRECTIONAL SERVICES CANADA,
BEAVER CREEK INSTITUTION, 2000 BEAVER CREEK DRIVE,
GRAVENHURST, ONTARIO.

PROJECT NUMBER R.0588445.001

PROJECT DATE 2016-12-01

END OF SECTION

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 00 - Procurement and Contracting Requirements</u>		
00 00 00	SPECIFICATION TITLE SHEET	1
<u>Division 01 - General Requirements</u>		
01 11 01	GENERAL INSTRUCTIONS MINOR WORKS	14
01 35 13	SPECIAL PROJECT PROCEDURES FOR CORRECTIONAL SERVICE CANADA SECURITY REQUIREMENT	13
01 35 29	HEALTH AND SAFETY REQUIREMENTS	7
01 35 43.01	ENVIRONMENTAL PROCEDURES	5
01 52 00	CONSTRUCTION FACILITIES	3
01 61 00	COMMON PRODUCT REQUIREMENTS	5
01 91 00	COMMISSIONING - GENERAL REQUIREMENTS	3
<u>Division 02 - Existing Conditions</u>		
02 42 93	DECONSTRUCTION AND WASTE PRODUCTS WORKPLAN SUMMARY	1
02 41 99	DEMOLITION FOR MINOR WORKS	6
<u>Division 03 - Concrete</u>		
03 20 00	CONCRETE REINFORCING	4
03 30 00.01	CAST-IN-PLACE CONCRETE	7
<u>Division 23 - Mechanical</u>		
23 05 00	COMMON WORK RESULTS - MECHANICAL	3
23 05 05	INSTALLATION OF PIPEWORK	6
23 11 13	FACILITY FUEL-OIL PIPING	6
<u>Division 26 - Electrical</u>		
26 05 01	COMMON WORK RESULTS - FOR ELECTRICAL	8
26 05 20	WIRE AND BOX CONNECTORS (0-1000 V)	2
26 05 21	WIRES AND CABLES (0-1000 V)	2
26 05 28	GROUNDING - SECONDARY	2
26 05 34	CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS	3
<u>Division 31 - Earthwork</u>		
31 00 00.01	EARTHWORK	4
<u>Division 32 - Exterior Improvements</u>		
32 12 17	Asphaltic Concrete Paving	4
<u>Division 33 - Utilities</u>		
33 56 13	ABOVEGROUND FUEL STORAGE TANKS	12
<u>Drawings</u>		
BC1	TITLE SHEET	1
BC2A	NOTES 1 of 2 (GENERAL AND MECHANICAL)	1
BC2B	NOTES 2 of 2 (ELECTRICAL)	1
BC3	EXISTING CONDITIONS AND DEMOLITION PLAN	1
BC4	NEW FUEL SYSTEM LAYOUT	1
BC5	FUEL DELIVERY EQUIPMENT DETAILS	1

Drawings (Cont'd)

BC6	FUEL PIPING DETAILS	1
BC7	ELECTRICAL DETAILS	1
BC8	NEW ASPHALT AND PRODUCT TRANSFER AREA	1
BC9	SIGNAGE	1

Appendices

APPENDIX A	Site Photographs	6
APPENDIX B	Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.	68
APPENDIX C	Environmental Management of Petroleum Storage Tank Systems (Correctional Services Canada Internal Services Directive 318-8).	14
APPENDIX D	Tank System Decommissioning Checklists	3

PART 1 - GENERAL

1.1 MINIMUM STANDARDS

- .1 Execute work to meet, exceed or comply with:
- .1 National Building Code of Canada 2010, National Fire Code of Canada 2015, Ontario Building Code, National Fire Protection Association 2013 (Standard 10: Portable Fire Extinguishers) and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
 - .2 Rules and regulations of authorities having jurisdiction.
 - .3 Federal Fire Commissioner, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
 - .4 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
 - .5 Ontario Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.
 - .6 Canadian Environmental Protection Act (CEPA), 1999.
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.
 - .7 Canadian Fisheries Act, 1985.
 - .8 Species at Risk Act, 2002.

**1.2 AUTHORITIES
HAVING JURISDICTION**

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

**1.2 AUTHORITIES
HAVING JURISDICTION
(Cont'd)**

- .2 Fire Testing requirements are for ULC or WHI listed and labelled products.
- .3 Substitution of ULI or other Fire testing reports for required ULC and WHI testing is acceptable to the Departmental Representative only if the issuing organization is accredited and listed in the "Directory of Accredited Certification Organizations (CAN-P-1505C), 1993" published by the Standards Council of Canada, 1-800-267-8220. Testing shall be to the Canadian standards and the tested products shall bear the appropriate label approved by the Federal Fire Commissioner.
- .4 Submit 3 copies of test reports under the letterhead of the accredited organization to the Departmental Representative.

1.3 TAXES

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

**1.4 FEES, PERMITS,
CERTIFICATES AND
LETTERS**

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates, permits and letters required.
- .3 Obtain Federal Fire Commissioner Inspection Letter of Deficiencies from Departmental Representative. Submit a copy of the FFC letter with a list of remedial measures taken to correct deficiencies.
- .4 Furnish certificates, permits and letters when requested.

1.5 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.

1.6 DOCUMENTS

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

1.7 SUBMITTALS

- .1 Unless specified otherwise, submit 3 hard copies for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf files on USB or through email or ftp site.

**1.8 CONTRACTOR'S
AS-BUILT DRAWINGS
AND SPECIFICATIONS**

- .1 As work progresses, neatly record significant deviations from the Contract drawings and specifications using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files.
- .2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT". Also circle on List of Drawings each title and number of drawing marked with "AS-BUILT" information. Circle on Table of Contents each specification section number and title of specification sections marked with "AS-BUILT" information.
- .3 Departmental Representative will provide one electronic set of drawings, schedules and specifications for as-built drawing and specification purposes.
 - .1 Drawings are in Autocad.
 - .2 Specifications are in NMSEdit Professional.
 - .3 Amendments are in MS Word.
- .4 Record following significant deviations:
 - .1 Depths of various elements of foundation.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction,

1.8 CONTRACTOR'S AS-BUILT
DRAWINGS AND
SPECIFICATIONS
(Cont'd)

referenced to visible and accessible features of structure.

.4 Field changes of dimension.

.5 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.

.6 Alternative materials and systems installed replacing original materials and systems specified by trade name.

.5 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work.

.6 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.9 OPERATIONS AND
MAINTENANCE DATA

0 .1 On completion of project submit to Departmental Representative 4 copies of Operations and Maintenance Data assembled in four 255 x 295 mm vinyl-covered, 3-ring, loose-leaf binders with title sheet labelled "Operations Data and Maintenance Manual", project title, date and list of contents. Organize content into applicable sections between hard paper dividers with labelled tabs.

.2 Include in each binder maintenance instructions for finished surfaces, warranties and guarantees in form approved by Departmental Representative and operations and maintenance data for equipment and systems with parts list, suppliers' names and addresses, complete set of final shop drawings (bound separately), names, addresses and phone numbers of sub-contractors and suppliers, list of materials with names of manufacturer and source of supply. Neatly type lists and rates. Use clear drawings, diagrams or manufacturer's literature.

**1.10 SHOP DRAWINGS
AND PRODUCT DATA
SHEETS**

- .1 Prior to submission check and certify as correct, shop drawings and product data sheets. Issue to Departmental Representative each submission at least 14 days before dates reviewed submission will be needed.
- .2 Where technical sections specify that shop drawings bear the stamp of a Registered Professional Engineer, the Engineer must be registered in the Province of Ontario.
- .3 Submit 3 prints and 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .4 Submit 3 prints and 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .5 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.
- .6 Submit 3 prints and 1 electronic of product

**1.10 SHOP DRAWINGS
AND PRODUCT DATA
SHEETS**

(Cont'd)

data sheets for standard manufactured items. Indicate VOC's in g/l for adhesives, primers, sealants, paints, curing and sealing compounds, sealers, particleboard, plywood, preserved wood, and any other product that emits more than 25 g/l VOC during application, curing, initial off gassing or end use.

- .7 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

**1.11 CONSTRUCTION
PHOTOGRAPHS**

- .1 Submit 3 electronic and 3 hard copies of colour digital photography in jpg format, standard resolution.
- .2 Identification: name and number of project and date of exposure indicated.
- .3 Viewpoints and location of viewpoints determined by Departmental Representative.
- .4 Frequency: as directed by Departmental Representative.

**1.12 DESIGN DATA,
TEST REPORTS,
CERTIFICATES,
MANUFACTURER'S
INSTRUCTIONS,
MANUFACTURER'S
FIELD REPORTS**

- .1 Prior to submission check and certify as correct each submission. Issue to Departmental Representative each submission at least 14 days before reviewed submission will be needed.
- .2 Submit 3 white print copies of each item requested.
- .3 For products bearing the 'Ecologo' of the Environmental Choice Program, Environment Canada, Canadian Environmental Protection Act, Environmental Choice Product Guidelines:
 - .1 Submit two copies of the licensing criteria statements and the verification of

**1.12 DESIGN DATA,
TEST REPORTS,
CERTIFICATES,
MANUFACTURER'S
INSTRUCTIONS,
MANUFACTURER'S
FIELD REPORTS
(Cont'd)**

compliance with Sections 3(a) and 3(b) of the ECP to the Departmental Representative. For adhesives, paints, primers and sealants, cleaners and degreasers, floor polishes, water borne surface coatings, indicate VOC in g/l.
.2 Alternatively, material in original containers bearing the 'Ecologo' or products bearing the 'Ecologo' will satisfy this requirement.

- .4 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

**1.13 ADDITIONAL
DRAWINGS**

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

1.14 PROTECTION

- .1 Protect existing work from damage.
 - .1 Provide protection to existing natural gas supply meters, valves and piping.
- .2 Replace damaged existing work with material and finish to match original.
- .3 Move fittings and replace following completion of each work period.
- .4 Cover fittings prior to commencing work.
- .5 Remove coverings and clean following completion of each work period.
- .6 Protect existing trees and plants on site and adjacent properties.

**1.15 EXISTING
SERVICES**

- .1 Establish location, protect and maintain existing utility lines.
- .2 Maintain existing services in occupied areas.

**1.15 EXISTING
SERVICES**

(Cont'd)

- .3 Use designated existing sanitary facilities.
- .4 Use existing water and electrical services at no cost.

**1.16 TEMPORARY
FACILITIES AND
SERVICES**

- .1 Provide and maintain temporary facilities and services required to carry out work.
- .2 Remove temporary facilities and services on completion of work.
- .3 Provide and maintain temperature and enclosure required to prevent frost damage to work.

**1.17 METRIC SIZED
MATERIALS**

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
- .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.
- .3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.
- .4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.
- .5 Claims for additional costs due to provision of specified modular metric sized products

**1.17 METRIC SIZED
MATERIALS
(Cont'd)**

will not be considered.

**1.18 MATERIAL AND
EQUIPMENT**

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.
- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

**1.19 CUTTING AND
REMEDIAL WORK**

- .1 Co-ordinate work to keep cutting and remedial work to a minimum.
- .2 Execute cutting and remedial work required. Notify Departmental Representative before cutting, boring or sleeving structural members.
- .3 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Departmental Representative prior to cutting or drilling.
- .4 Use specialists in affected material to execute cutting and remedial work.
- .5 Match work to adjoining construction and finishes.
- .6 Fit components tight to adjoining surfaces.

**1.19 CUTTING AND
REMEDIAL WORK
(Cont'd)**

- .7 Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.
- .8 After patching wall, ceiling or other painted surfaces, paint the entire wall or area up to the next change in plane or direction as directed by Departmental Representative.

1.20 FASTENINGS

- .1 Provide fastenings of type, size and spacing required to assure secure anchorage.
- .2 Obtain Departmental Representative's permission before using explosive actuated fasteners.

**1.21 CO-ORDINATION
AND CO-OPERATION**

- .1 Site will be occupied during execution of work.
- .2 Building will be occupied during execution of work.
- .3 Work area will be occupied during execution of work.
- .4 Execute work with minimum disturbance to occupants and normal use of site, building and work area.

**1.22 ALTERATIONS TO
EXISTING BUILDING**

- .1 Provide new openings required in existing construction.
- .2 Block in openings where items removed with material and finish to match existing adjoining construction.

**1.23 INSPECTION AND
TESTING**

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

1.24 COST BREAKDOWN

- .1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract price.
- .2 Show separately cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax license number.
- .3 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.25 SCHEDULING

- .1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.
- .2 Carry out work Monday to Friday from 07:30 to 16:00 hours.
- .3 Carry out noise generating work Monday to Friday from 07:30 to 16:00 hours.

1.26 CLEANING

- .1 Maintain project free of accumulated waste and rubbish.
- .2 Final cleaning:
 - .1 Remove temporary protection.
 - .2 Remove dust, dirt and foreign matter from surfaces. HEPA vacuum interior surfaces.
 - .3 Polish new glass and metal surfaces.
 - .4 Broom clean paved exterior surfaces, rake clean other exterior surfaces.

**1.27 CONSTRUCTION &
DEMOLITION WASTE**

- .1 Carefully deconstruct and source separate materials/equipment and divert from demolition and construction waste destined for landfill to maximum extent possible. Reuse, recycle or sell material off site for

**1.27 CONSTRUCTION &
DEMOLITION WASTE
(Cont'd)**

reuse except where indicated otherwise. On site sales are not permitted. Target for this project is 50% diversion from landfill.

- .2 For construction and demolition projects, even for those not over 2,000 m² total floor area, source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
 - .1 Provide facilities for collection, handling and storage of source separated wastes.
 - .2 Source separate the following waste:
 - .1 Brick and portland cement concrete.
 - .2 Corrugated cardboard.
 - .3 Wood, not including painted or treated wood or laminated wood.
 - .4 Gypsum board, unpainted.
 - .5 Steel.
- .3 Submit a waste reduction work plan indicating the materials and quantities of material that will be recycled and diverted from landfill.
 - .1 Indicate how material being removed from the site will be reused or recycled.
- .4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

**1.28 ASBESTOS
DISCOVERY**

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

**1.29 DESIGNATED
SUBSTANCES**

- .1 The work areas have been surveyed for the presence of designated substances referred to in the Occupational Health and Safety Act and Regulations for Construction Projects, O. Reg. 213/91 as amended.
- .2 Provide copies of this list to each prospective subcontractor prior to entering into a contract with them. Refer to Section 01 35 29 Item 1.8 for list of designated substance.
- .3 Post prominent notices identifying and warning of the hazardous agent in the part of the workplace in which the agent is found or used. Notices shall be in English and other languages as prescribed under the Act.

1.30 HALOCARBONS

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

**1.31 SPECIAL
PROTECTION AND
PRECAUTIONS**

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

**1.32 POLLUTION
CONTROL**

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

1.32 POLLUTION
CONTROL
(Cont' d)

number (613) 996-6666 collect.

1.33 OPSS AND OPSD

- .1 OPSS Ontario Provincial Standard
Specifications and OPSD Ontario Provincial
Standard Drawings quoted in these
specifications are available online at
[http://www.raqsa.mto.gov.on.ca/
techpubs/ops.nsf/OPSHomepage](http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage).

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 PURPOSE

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

1.2 DEFINITIONS

- .1 "Contraband" means:
 - .1 An intoxicant, including alcoholic beverages, drugs and narcotics.
 - .2 Tobacco or associated tobacco products.
 - .3 An igniting device, lighter or matches.
 - .4 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.
 - .5 An explosive or a bomb or a component thereof.
 - .6 Currency over any applicable prescribed limit, \$25.00 when possessed by an inmate without prior authorization.
 - .7 Any item not described in paragraphs 2.1.1 to 2.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
- .2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.
- .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.

1.2 DEFINITIONS
(Cont'd)

- .4 "CSC" means Correctional Service Canada.
- .5 "Director" means Director, Warden or Superintendent of the Institution as applicable.
- .6 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .7 "Departmental Representative" means the project manager from Public Works and Government Services Canada.
- .8 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.
- .9 "Construction Limits" means the area as shown on the contract drawings that the Contractor will be allowed to work. This area may or may not be isolated from the security area of the Institution.

**1.3 PRELIMINARY
PROCEEDINGS**

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

**1.4 CONSTRUCTION
EMPLOYEES**

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

1.5 VEHICLES

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

1.6 PARKING

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

1.7 SHIPMENTS

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

1.7 SHIPMENTS
(Cont'd)

any material, equipment or tools.

1.8 TELEPHONES

- .1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the Institution unless prior approval of the Director is received.
- .2 The Director will ensure that approved telephones, facsimile machine and computers with internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an internet connection to unauthorized personnel.
- .3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, Blackberries, telephone used as 2-way radios, are not permitted within the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.
- .4 The Director may approve but limit the use of two way radios.

1.9 WORK HOURS

- .1 Work hours within the Institution are: Monday to Friday 07:30 hrs to 16:00 hrs.
- .2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

1.10 OVERTIME WORK

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

**1.11 TOOLS AND
EQUIPMENT**

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

**1.11 TOOLS
AND
EQUIPMENT
(Cont'd)**

remain in the possession of the employees of the Contractor. Scaffolding shall be secured and locked when not erected and when erected, will be secured in a manner agreed upon with the Institutional designate.

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

1.12 KEYS

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

**1.13
SECURITY
HARDWARE**

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

**1.14
PRESCRIPTION
DRUGS**

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

**1.15
SMOKING
RESTRICTIONS**

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

1.16 CONTRABAND

- .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on Institutional Property.
- .2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Director.
- .3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in cancellation of the security clearance of the affected employee.

**1.16 CONTRABAND
(Cont'd)**

Serious infractions may result in the removal of the company from the Institution for the duration of the construction.

- .4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.

1.17 SEARCHES

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

**1.18 ACCESS TO AND
REMOVAL FROM
INSTITUTION
PROPERTY**

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

**1.19 MOVEMENT OF
VEHICLES**

- .1 Commercial vehicles will not be allowed access to the Institution. If required in consultation with the Institution, commercial vehicle access will only be allowed with an escort.
- .2 Vehicles will be allowed through the Sally Port between 7:30am and 11:00am and 1:00pm and 4:00pm. Construction vehicles may be required to remain onsite until an inmate count is completed.

**1.19 MOVEMENT OF
VEHICLES
(Cont'd)**

- .3 The Contractor shall advise the Director forty-eight (48) hours in advance of the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.
- .4 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC Staff or Commissionaires working under the authority of the Director.
- .5 Commercial Vehicles will only be allowed access to Institutional Property when their contents are certified by the Contractor or his/her representative as being strictly necessary to the execution of the construction project.
- .6 Vehicles shall be refused access to Institutional Property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.
- .7 Private vehicles of Construction Employees will not be allowed within the security wall or fence of medium security Institutions without the permission of the Director.
- .8 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

**1.20 MOVEMENT OF
CONSTRUCTION
EMPLOYEES ON
INSTITUTIONAL
PROPERTY**

- .1 Subject to the requirements of good security, the Director will permit the Contractor and his/her employees as much freedom of action and movement as is possible.
- .2 However, notwithstanding paragraph above, the Director may:
 - .1 Prohibit or restrict access to any part of the Institution.
 - .2 Require that in certain areas of the Institution, either during the entire construction project or at certain intervals, Construction Employees only be allowed access when accompanied by a member of the CSC security staff.

**1.21 SURVEILLANCE AND
INSPECTION**

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

1.22 STOPPAGE OF WORK

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

**1.23 CONTACT WITH
INMATES**

- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his/her security clearance revoked.
- .2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this Contract.

**1.24 COMPLETION OF
CONSTRUCTION
PROJECT**

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA): Canada
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
 - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario:
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 O. Reg. 860, Workplace Hazardous Materials Information System (WHMIS), R.R.O 1990.
 - .5 Municipal statutes and authorities.
- .5 Fire Commissioner of Canada (FCC):
 - .1 FC-301 Standard for Construction Operations, June 1982.
 - .2 FC-302 Standard for Welding and Cutting, June 1982.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 11 01.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and

1.2 SUBMITTALS
(Cont'd)

Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operations found in work plan.

.3 Measures and controls to be implemented to address identified safety hazards and risks.

.4 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Facility Emergency Procedures and Evacuation Plan in place at the site.

Departmental Representative will provide Facility Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

.5 Contractor's and Sub-contractors' Safety Communication Plan.

.6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Facility Emergency Response requirements and procedures provided by Departmental Representative.

.3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

.4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

1.2 SUBMITTALS
(Cont'd)

- .5 Submit names of personnel and alternates responsible for site safety and health.
- .6 Submit records of Contractor's Health and Safety meetings when requested.
- .7 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, as requested.
- .8 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .9 Submit copies of incident and accident reports.
- .10 Submit Workplace Safety and Insurance Board (WSIB) - Experience Rating Report.

**1.3 FILING OF
NOTICE**

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

1.4 WORK PERMIT

- .1 Obtain building permits related to project prior to commencement of Work.
- .2 Obtain Hot Work Permit from Works Department.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

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

**1.7 REGULATORY
REQUIREMENTS**

- .1 Comply with the Acts and regulations of the Province of Ontario.
- .2 Comply with specified standards and regulations to ensure safe operations at site.

**1.8 PROJECT/SITE
CONDITIONS**

- .1 Work at site will involve contact with:
 - .1 Silica in concrete.
 - .2 Benzene in refined petroleum fuels.

**1.9 GENERAL
REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

**1.10 COMPLIANCE
REQUIREMENTS**

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter O.1, as amended.

1.11 RESPONSIBILITY

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

**1.11 RESPONSIBILITY
(Cont'd)**

- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.

**1.12 UNFORSEEN
HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

**1.13 POSTING OF
DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
 - .1 Contractor's Safety Policy.
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Environmental Protection Plan (EPP)

1.13 POSTING OF
DOCUMENTS
(Cont'd)

including posting location of EEP and location of spill response material .
.11 Site-Specific Safety Plan.
.12 Location of Spill Response Materials.
.13 Valid certificate of first aider on duty.
.14 WSIB "In Case of Injury at Work" poster.
.15 Location of toilet and cleanup facilities.

1.14 CORRECTION OF
NON-COMPLIANCE

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

1.15 BLASTING

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

1.16 POWDER
ACTUATED DEVICES

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

1.17 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 DEFINITIONS

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

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which must be addressed during construction. The Plan shall detail main construction activities, potential associated environmental risks, and appropriate mitigation measures to address those risks.
- .3 Contractor to include documentation listing spill response materials that are to be available during the course of the project. Document to indicate location of spill response materials.

1.2 SUBMITTALS
(Cont'd)

- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Environmental Protection Plan to include:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of identified features to be preserved within authorized work areas.
 - .6 Spill control plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .8 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
 - .9 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site with appropriate spill containment; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .10 Vehicles to be inspected daily and use of drip pan or similar containment device placed under parked vehicles, if parking on unpaved surfaces.

1.2 SUBMITTALS
(Cont'd)

.11 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

1.3 FIRES

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

1.4 DISPOSAL OF WASTES

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

1.5 DRAINAGE

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

1.6 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Do not skid logs or construction materials across waterways.
- .5 Do not blast under water or within 100 m of indicated spawning beds.

1.7 POLLUTION CONTROL

- .1 Maintain pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .4 Spills of deleterious substances:
 - .1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
 - .2 Report immediately to the Institutional Representative.
 - .3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

1.8 NOTIFICATION

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

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

- | | | |
|-------------------------------------|----|---|
| 1.1 SECTION INCLUDES | .1 | Construction aids. |
| | .2 | Parking. |
| | .3 | Project identification. |
| 1.2 REFERENCES | .1 | Canadian Standards Association (CSA International)
.1 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment. |
| 1.3 INSTALLATION AND REMOVAL | .1 | Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area, details of fence installation, and protection details for natural gas plant shown on drawings. No trailers will be permitted inside the fence. A location outside the fence can be provided if necessary. |
| | .2 | Indicate on site plan use of supplemental or other staging area. |
| | .3 | Indicate on site plan existing section of chain-link fence surrounding tanks to be temporarily removed as shown on drawings. |
| | .4 | Provide construction facilities in order to execute work expeditiously. |
| | .5 | Remove from site all such work after use. |
| 1.4 HOISTING | .1 | Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof. |
| | .2 | Hoists/cranes shall be operated by qualified operator. |
| | .3 | Hoists/cranes shall not be loaded beyond 80% of their rated load capacity. |
| | .4 | Any use of cranes onsite must be reported to the neighbouring airport. They will require the date and time of use as well as height of the crane. |
| 1.5 SITE STORAGE/LOADING | .1 | Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products. |
| | .2 | Do not load or permit to load any part of work with a weight or force that will endanger the work. |

- | | | |
|--|----|--|
| 1.6 CONSTRUCTION PARKING | .1 | Parking will be permitted in the visitor's parking area. |
| | .2 | If authorized to use existing roads for access to project site, maintain such roads for duration of contract and make good damage resulting from Contractors' use of roads. |
| | | |
| 1.7 SANITARY FACILITIES | .1 | Permanent facilities may be used on approval of Departmental Representative. |
| | | |
| 1.8 CONSTRUCTION SIGNAGE | .1 | No other signs or advertisements, other than warning signs, are permitted on site. |
| | .2 | Signs and notices for safety and instruction shall be in both official languages graphic symbols shall conform to CAN/CSA-Z321. |
| | .3 | Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative. |
| | | |
| 1.9 PROTECTION AND MAINTENANCE OF TRAFFIC | .1 | Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic. |
| | .2 | Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations. |
| | .3 | Dust control: adequate to ensure safe operation at all times. |
| | | |
| 1.10 CLEAN-UP | .1 | Remove construction debris, waste materials, packaging material from work site daily. |
| | .2 | Clean dirt or mud tracked onto paved or surfaced roadways. |
| | .3 | Store materials resulting from demolition activities that are salvageable. |
| | .4 | Stack stored new or salvaged material. |

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

**3.1 NATURAL GAS PLANT
PROTECTION**

- .1 Deploy and maintain natural gas plant protection per contractor's site plan.
- .2 Remove natural gas plant protection on completion of work.

3.2 CHAIN LINK FENCE

- .1 Carefully remove and set aside west-portion of existing chain-link fence enclosure surrounding existing tanks 422-01 and 422-02 as shown on the drawings.
 - .1 Remove and dispose concrete from fence posts.
- .2 Reinstall west-portion of chain-link fence to match pre-existing condition on completion of work.
 - .1 Supply and install new concrete around existing fence posts to match pre-removal condition.
 - .2 Replace any damaged fence materials and/or hardware at no cost to the Departmental Representative.

3.1 TEMPORARY FACILITIES

- .1 Deploy and maintain temporary facilities per contractor's site plan and in accordance with Section 01 52 00.
- .2 Remove temporary facilities on completion of work.

END OF SECTION

PART 1 - GENERAL

**1.1 SECTION
INCLUDES**

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Existing facilities.

1.2 REFERENCES

- .1 Within text of specifications, reference may be made to reference standards.
- .2 Conform to these standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be borne by the Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of bids, except where specific date or issue is specifically noted.
- .6 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at <http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>.

1.3 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

**1.3 QUALITY
(Cont'd)**

- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 In event of failure to notify Departmental Representative at commencement of work and should it subsequently appear that work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

**1.5 STORAGE,
HANDLING AND
PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

**1.5 STORAGE,
HANDLING AND
PROTECTION
Cont'd)**

- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

**1.7 MANUFACTURER'S
INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.8 QUALITY
OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

**1.10 LOCATION OF
FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.11 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Keep exposed fastenings to a minimum, space evenly and install neatly.

- | | | |
|--|----|--|
| 1.11 FASTENINGS
(Cont'd) | .5 | Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable. |
| | | |
| 1.12 FASTENINGS -
EQUIPMENT | .1 | Use fastenings of standard commercial sizes and patterns with material and finish suitable for service. |
| | .2 | Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas. |
| | .3 | Bolts may not project more than one diameter beyond nuts. |
| | .4 | Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel. |

PART 2 - PRODUCTS

- | | | |
|---------------------|----|-----------|
| 2.1 NOT USED | .1 | Not Used. |
|---------------------|----|-----------|

PART 3 - EXECUTION

- | | | |
|---------------------|----|-----------|
| 3.1 NOT USED | .1 | Not Used. |
|---------------------|----|-----------|

END OF SECTION

PART 1 - GENERAL

**1.1 SECTION
INCLUDES**

- .1 Includes general requirements for commissioning facility systems.

**1.2 RELATED
SECTIONS**

- .1 Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.3 QUALITY ASSURANCE

- .1 Comply with applicable procedures and standards of the certification sponsoring association.
- .2 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.4 SUBMITTALS

- .1 Submit documentation to confirm Contractor personnel compliance with quality assurance provision.
- .2 Submit completed report forms within 3 days after completion of each testing to Departmental Representative for review and verification.
- .3 Submit post-commissioning reports of testing, adjusting, and balancing postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

1.5 REPORT FORMS

- .1 Testing organization shall make reports.
- .2 Report forms shall include:
 - .1 Startup Checklists.
 - .2 Product Information (PI) Report forms.
 - .3 Performance Verification (PV) Report forms.
- .3 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.
- .4 Submit signed form to Departmental Representative for review and approval. After approval, immediately submit form bearing Departmental Representative's signature to Departmental Representative.

1.6 CONTRACTOR'S RESPONSIBILITIES

- .1 Prepare each system for testing and balancing.
- .2 Cooperate with testing organization and provide access to equipment and systems.
- .3 Provide personnel and operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.
- .4 Notify testing organization and Departmental Representative 7 days prior to time project will be ready for testing, adjusting, and balancing.
- .5 Correct deficiencies identified in accordance with Departmental Representative's written instructions.

1.7 PREPARATION

- .1 Make instruments available to Departmental Representative to facilitate spot checks during testing and functional performance verification.

1.7 PREPARATION
(Cont'd)

- .2 Retain possession of instruments and remove at completion of services.
- .3 Verify systems installation is complete and in continuous operation.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

DECONSTRUCTION AND WASTE PRODUCTS WORKPLAN SUMMARY

Project Number R.058845.001

Section 02 42 93

Page 1

General Contractor / Waste Management Coordinator	Contact Person(s)	Tel & Fax Nos. Phone - - Fax - -
Project Site:	Type & Work Location: Deconstruction and Renovation	

Material Division #	Material Category	Quantity	Unit of Measure	Material Receiving Body & Hauler	% of total Weight	Disposal Option - % Breakdown			
						Reuse	Recycle	Landfill	

Division 01 - General Requirements									
	Pallets		each						
	Wood		kg.						
	Cardboard Packaging		cu. m.						
	Plastic Packaging		cu. m.						
	Styrene Packaging		cu. m.						
	PS Polyethylene Sheet		sq. m.						
	Metal Banding		kg.						
				Subtotal	%	%	%	%	%
Division 02 - Existing Conditions									
	Above ground storage tank removal		each						
	Piping		lin. m.						
	Steel grating		kg						
	Pumps		each						
				Subtotal	%	%	%	%	%
Division 03 - Concrete									
	Poured concrete		tonnes						
	Concrete containment		tonnes						
	Concrete Reinforcing Steel, Rebars, Mesh		tonnes						
				Subtotal	%	%	%	%	%

PART 1 - GENERAL

**1.1 RELATED
REQUIREMENTS**

- .1 Section 02 42 93 - Deconstruction and Waste Products Workplan Summary.

**1.2 INFORMATIONAL
SUBMITTALS AND ACTION**

- .1 Submit in accordance with Section 01 11 01.
- .2 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Reduction Workplan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 % of construction wastes were recycled or salvaged.

1.3 SITE CONDITIONS

- .1 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Proceed only after receipt of written instructions have been received from Departmental Representative.
- .2 Notify Departmental Representative before disrupting site access or services.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
 - .1 Existing concrete foundation pads to existing tanks 422-01 and 422-02 (to be removed) shall remain in place.
 - .2 Existing controls for the diesel generator are to remain.
 - .3 To allow for continued use of existing emergency generator, the day tank (422-0A) shall be removed after installation of new tank 422-04 and all connections to the existing generator have been completed.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

3.2 PREPARATION

- .1 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features (including exterior fencing to existing tanks 422-01 and 422-02 that will be removed as outlined in this Section).
 - .2 Protect building systems, services and equipment. In particular protect the natural gas meter, valves and piping.
 - .3 Complete work in accordance with Section 01 11 01.
 - .4 Ensure no contact with electrified security fence.
- .2 Disconnect or remove source of ignition from vicinity of tanks 422-01, 422-02 and day tank (422-0A).
- .3 Provide temporary protection for safe movement of personnel and vehicle traffic.

**3.2 PREPARATION
(Cont'd)**

- .4 Cut, braze or weld metal only in monitored areas established to be free of ignitable vapour concentrations.
- .5 Ground and bond metal equipment, including tanks and transfer pipes, before operating equipment or transferring flammable materials.
- .6 Use non-sparking tools and intrinsically safe electrical equipment.
- .7 Smoking is not permitted.

3.3 TANK REMOVAL

- .1 Drain and flush piping (both aboveground and underground) for tanks 422-01, 422-02 and day tank (422-0A) into each respective tank.
 - .1 Pump-out and dispose residual fuel and purge vapours from aboveground and underground piping.
- .2 Pump out liquid from tanks 422-01, 422-02 and day tank (422-0A).
 - .1 Use explosion proof, air driven or hand pump.
 - .2 Diesel fuel that has been removed shall be reused for new tank 422-04 once installed.
- .3 Remove and dispose sludge from tank bottoms.
 - .1 Dispose of product and sludge in accordance with local and Provincial regulations using waste disposal carrier licensed by Provincial Environmental Agency having jurisdiction.
 - .2 Contractor to submit proof of proper disposal to Departmental Representative of product and sludge removed from tanks for record purposes.
- .4 Affix label onto the fill pipe of each tank stating "Do Not Fill. The tank is permanently out of service".
- .5 Render both tanks unusable by cutting a hole at least 0.04m² at one end of each tank.

**3.4 VAPOUR
REMOVAL**

- .1 Purging:
 - .1 Purge vapours to less than 10% of lower explosive limit (LEL).
 - .2 Verify with combustible gas metre.
- .2 Inverting:
 - .1 Displace oxygen to levels below necessary to sustain combustion.
 - .2 Verify with combustible gas metre.
- .3 Air Method:
 - .1 Ventilate tanks with air using small gas exhauster operated with compressed air.
 - .2 Air to enter opening at one end and to exit opening at other end to quickly remove vapour.
 - .3 Test interior of tanks to determine when tank is free of vapour.
- .4 Dry Ice Method:
 - .1 Add 1.85 gm of solid carbon dioxide (dry ice) for each 100 litre capacity.
 - .2 Crush and distribute ice evenly over greatest area to secure rapid evaporation. Avoid skin contact.
 - .3 Verify dry ice has vapourized.

**3.5 SECURING AND
REMOVAL FROM SITE**

- .1 Plug holes after tanks have been freed of vapours and before tanks are moved from site.
 - .1 Leave vents open.
- .2 Check vapour levels prior to transport:
 - .1 Remove vapour if required.
 - .2 Dispose of tank in accordance with local, Provincial, and Federal regulations.
- .3 Tank removal:
 - .1 Tanks 422-01 and 422-02 to be removed from fenced area. Dismantle only west segment of fencing as shown on drawings. Replace west segment of fencing on commissioning of new fuel system.
 - .2 Secure tanks on truck for transport. Transport disposal site.
 - .3 Cut suitable openings in tank sides to render tanks unusable.

**3.5 SECURING AND
REMOVAL FROM SITE
Cont'd)**

- .1 Contractor to provide tank photographs to Departmental Representative as documentation.
- .2 Ensure 3 mm vent hole located at uppermost point on tank.
- .3 Tanks to be disposed off-site.
- .4 Copies of disposal waybills/certificates for tanks must be provided to Departmental Representative upon tank disposal for record purposes.

3.6 PIPE REMOVAL

- .1 Remove six (6) existing supply and return pipes to existing tanks 422-01, 422-02 and day tank (422-0A) located in a concrete trench (90 mm wide and 112 m long) in the floor (depth of trench: 20 mm) of Building FBN as shown in the drawings.
 - .1 Remove existing day tank normal vent and seal roof deck penetration to be liquid-tight.
 - .2 Remove existing supply and return pipes to generator.
- .2 Existing steel gratings covering the pipe trench to be removed and disposed off-site.
- .3 Remove existing supply/return piping from the existing day tank to the boilers including all valves, pipe hangers and pipe supports as shown in the drawings.
- .4 Existing pumps with controls associated with the day tank shall be removed as shown on the drawings.
- .5 Fill all wall pipe penetrations with unshrinkable grout. Parge grout surfaces to match existing walls.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01 and 02 42 93.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
REQUIREMENTS**

- .1 Section 03 30 00.01 - Cast-in-Place Concrete.

1.2 REFERENCES

- .1 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Manual of Standard Practice.
- .2 Canadian Standards Association (CSA) International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

1.4 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 11 01:
 - .1 Upon request, submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

**1.5 DELIVERY, STORAGE
AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in dry Location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400R, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .4 Mechanical splices: subject to approval of Departmental Representative.

PART 3 - EXECUTION

**3.1 PLACING
REINFORCEMENT**

- .1 Place reinforcing steel as indicated on drawing and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 Protect epoxy and paint coated portions of bars with covering during transportation and handling.

3.2 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.3 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave Work area clean at end of each day.

3.4 CLEANING
(Cont'd)

- .2 Final Cleaning: upon completion remove Surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.
- .3 Waste Management: separate waste Materials for reuse and recycling in accordance with Section 01 11 01.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
SECTIONS**

- .1 Section 03 20 00 - Concrete Reinforcing.

1.2 REFERENCES

- .1 American Standard for Testing and Materials (ASTM) International
 - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-11, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM D1751-04(2013), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding 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) International
 - .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 01.

1.3 SUBMITTALS
(Cont'd)

- .2 At least 2 weeks prior to beginning work, submit to Departmental Representative specification sheets of the following materials proposed for use:
 - .1 Curing compound.
- .3 Submit specification sheets of materials to be used in concrete mix.
- .4 Materials that have been tested by accredited testing laboratory within the previous 2 months and have passed tests equal to requirements of this specification, submit for review by Departmental Representative test certificates from testing laboratory showing suitability of materials for this project.
- .5 Concrete hauling time: submit for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.4 QUALITY ASSURANCE

- .1 Provide to Departmental Representative, 2 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .2 Minimum 2 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Cold weather concrete.
 - .3 Curing.
 - .4 Finishes.
 - .5 Formwork removal.
 - .6 Joints.
- .3 Health and Safety Requirements: construction occupational health and safety in accordance with Section 01 35 29.

**1.5 DELIVERY,
STORAGE AND
HANDLING**

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by the Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

**1.6 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Separate materials for reuse and recycling in accordance with Section 01 11 01.
- .2 Ensure emptied containers are sealed and stored safely.
- .3 Divert unused concrete materials from landfill to local quarry or facility as reviewed by Departmental Representative.
- .4 Provide appropriate area on job site where concrete trucks can be safely washed.
- .5 Divert admixtures and additive materials from landfill to approved official hazardous material collections site as reviewed by Departmental Representative.
- .6 Unused admixtures and additive materials must not be disposed of into sewer systems, lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Cement: to CSA-A3000.
 - .1 For cold weather concreting (air temperature below 5°C for more than three consecutive days) use type HE, otherwise type GU.
- .2 Water: to CSA A23.1/A23.2.
- .3 Aggregates: to CSA A23.1/A23.2.
- .4 Admixtures:
 - .1 Air entraining admixture: to ASTM C260/C260M.
 - .2 Chemical admixture: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .5 Reinforcement bars: in accordance with Section 03 20 00.
- .6 Pre-moulded joint filler:
 - .1 Asphalt fiber to ASTM D1751.
- .7 Joint sealer/filler: grey to 19.24 Type 1, Class B.
- .8 Curing agent: Water base, hydrocarbon resin curing compound to ASTM C309, Type 1, Class B.
- .9 Wood forms for cold weather concreting to CSA A23.1/A23.2.
- .10 Other concrete materials: to CSA A23.1/A23.2.

2.2 MIXES

- .1 Concrete mix in accordance with CSA A23.1/A23.2.

2.2 MIXES
(Cont'd)

- .1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1/A23.2.
- .2 Concrete mix for normal including:
 - .1 Class of exposure: C-2.
 - .2 Aggregate: normal-density, maximum size 20 mm.
 - .3 Admixture: air-entraining and chemical to ASTM C494/C494M-10.
 - .4 Maximum water/cement ratio: 0.50.
 - .5 Air content: 4.0% to 7.0%.
 - .6 Slump: at time and point of discharge 20 to 80 mm.
 - .7 Compressive strength at 28 days: 30 MPa minimum.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Provide Departmental Representative 24 hours' notice before each concrete pour.
- .2 Place concrete reinforcing in accordance with Section 03 20 00.
- .3 For cold weather concreting:
 - .1 Ground surface, existing concrete, formwork and metal embedments must be above 0°C.
- .4 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or work.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Protect previous work from staining.
- .7 Clean and remove stains prior to application of concrete finishes.
- .8 Do not place load upon new concrete until authorized by Departmental Representative.

**3.2 INSTALLATION/
APPLICATION
(Cont'd)**

- .4 Curing and bonding agents and to CSA A23.1/A23.2. Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.
- .5 Sealing:
 - .1 After curing is complete, apply poly-siloxane resin blend sealer at 4 m²/L.

**3.3 EXPANSION AND
ISOLATION JOINTS**

- .1 Install pre-moulded joint filler in expansion and isolation joints to full depth of slab Flush with finished surface to CSA A23.1/A23.2.

**3.4 FIELD QUALITY
CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.

3.5 CLEANING

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to limit water use and runoff.
- .3 Cleaning of concrete equipment to be done in accordance with Section 01 35 43.
- .4 Waste Management: on completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

**1.1 RELATED
SECTIONS**

- .1 Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 EQUIPMENT LIST

- .1 Complete list of equipment and materials to be used on this project including manufacturer's name, model number and details of materials, and submit for approval.
- .2 Submit for approval within 48 hours after award of contract.

1.3 TRIAL USAGE

- .1 Departmental Representative may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

**1.4 PROTECTION OF
OPENINGS**

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

1.5 SPECIAL TOOLS

- .1 Provide one set of special tools as required to service equipment as recommended by manufacturers.

**1.6 DEMONSTRATION AND
OPERATING AND
MAINTENANCE
INSTRUCTIONS**

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .2 Where specified elsewhere in Mechanical Divisions, manufacturers to provide demonstrations and instructions.

**1.6 DEMONSTRATION
AND OPERATING AND
MAINTENANCE
INSTRUCTIONS**

Cont'd)

- .3 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.
- .4 Where deemed necessary, Departmental Representative may record these demonstrations on video tape for future reference.

**1.7 CLOSEOUT
SUBMITTALS**

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 11 01.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Departmental Representative before final inspection.
- .3 Maintenance data shall include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.

**1.8 SHOP DRAWINGS AND
PRODUCT DATA**

- .1 Submit shop drawings and product data in accordance with Section 01 11 01.
- .2 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances, e.g., access door swing spaces.
- .3 Shop drawings and product data shall be accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Points of operation on performance curves.
 - .3 Manufacturer to certify as to current model production.
 - .4 Certification of compliance to applicable codes.

**1.9 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 11 01.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative.
- .3 Dispose of unused paint material at official hazardous material collections site approved by Departmental Representative.
- .4 Do not dispose of unused paint material into sewer system, streams, and lakes, onto ground or in other locations where it will pose health or environmental hazard.
- .5 Remove from site and dispose of packaging materials at appropriate recycling facilities.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 The Master Painters Institute (MPI)
.1 Maintenance Repainting Manual, 2012
edition.

**1.2 ACTION AND
INFORMATIONAL
SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 11 01.

**1.3 DELIVERY,
STORAGE AND
HANDLING**

- .1 Deliver, store and handle in accordance with
Section 01 11 01.
- .2 Deliver materials to site in original factory
packaging, labelled with manufacturer's name and
address.

**1.4 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Separate and recycle waste materials in
accordance with Section 01 11 01.
- .2 Remove from site and dispose of packaging
materials at appropriate recycling
facilities.
- .3 Collect and separate for disposal paper,
plastic, polystyrene, corrugated cardboard,
packaging material for recycling in accordance
with Waste Management Plan.
- .4 Divert unused metal materials from landfill to
metal recycling facility approved by
Departmental Representative.

PART 2 - PRODUCTS

- 2.1 NOT USED** .1 Not Used.

PART 3 - EXECUTION

- 3.1 APPLICATION** .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

- 3.2 CONNECTIONS TO EQUIPMENT** .1 In accordance with manufacturer's instructions unless otherwise indicated.
- .2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.
- .3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

- 3.3 CLEARANCES** .1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.
- .2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other systems, equipment, and components.

3.4 DIELECTRIC COUPLINGS

- .1 General: compatible with system, to suit pressure rating of system.
- .2 Locations: where dissimilar metals are joined.
- .3 NPS 2 and under: isolating unions or bronze valves.
- .4 Over NPS 2: isolating flanges.

3.5 PIPEWORK INSTALLATION

- .1 Use welded pipe and fittings except where connections to equipment are made.
- .2 Protect openings against entry of foreign material.
- .3 Install to isolate equipment and allow removal without interrupting operation of other equipment and systems.
- .4 Assemble piping using fittings manufactured to ANSI standards.
- .5 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
- .6 Slope piping in direction of flow for positive drainage and venting.
- .7 Install to permit separate thermal insulation of each pipe.
- .8 Group piping wherever possible.
- .9 Ream pipes, remove scale and other foreign material before assembly.
- .10 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.

3.6 SLEEVES

- .1 General: install where pipes pass through masonry, concrete structures and fire rated assemblies.
- .2 Material: schedule 40 black steel pipe.
- .3 Construction: foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.
- .4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.
- .5 Installation:
 - .1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.
 - .2 Before installation, paint exposed exterior surfaces with heavy application of REX 5.1G (MPI) zinc rich/aliphatic polyurethane.
- .6 Sealing:
 - .1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.
 - .2 Elsewhere: Provide space for fire stopping. Maintain fire rating integrity.
 - .3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.
 - .4 Ensure no contact between copper pipe or other tube and sleeve.

3.6 FLUSHING OUT OF PIPING SYSTEMS

- .1 Before start-up, clean interior of piping systems in accordance with requirements of Section 01 11 01 supplemented as specified in Section 23 11 13.
- .2 Prior to acceptance, clean and refurbish

**3.6 FLUSHING OUT OF
PIPING SYSTEMS
(Cont'd)**

equipment and leave in operating condition, including replacement of filters in piping systems.

**3.7 PRESSURE
TESTING OF
EQUIPMENT AND
PIPEWORK**

- .1 Advise Departmental Representative 48 hours minimum prior to performance of pressure tests.
- .2 Pipework: test as specified in relevant Section 23 11 13.
- .3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in Section 23 11 13.
- .4 Prior to tests, isolate equipment and other parts that are not designed to withstand test pressure or media.
- .5 Conduct tests in presence of Departmental Representative.
- .6 Pay costs for repairs or replacement, retesting, and making good. Departmental Representative to determine whether repair or replacement is appropriate.
- .7 Insulate or conceal work only after approval and certification of tests by Departmental Representative.

**3.8 EXISTING
SYSTEMS**

- .1 Connect new piping to existing generator as shown on the drawings.
- .2 Request written approval from Departmental Representative 10 days minimum prior to commencement of work.
- .3 Be responsible for damage to existing plant by this work.

**3.8 EXISTING
SYSTEMS
(Cont'd)**

- .4 Ensure daily clean-up of existing areas.

3.9 CLEANING

- .1 Clean in accordance with Section 01 11 01
 - .1 Remove surplus materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME-B16.3-2011, Malleable-Iron Threaded Fittings: Classes 150 and 300.
 - .2 ANSI/ASME-B16.42-2011, Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300.
- .2 ASTM International
 - .1 ASTM A47/A47M-99(2009), Standard Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
- .3 CSA International
 - .1 CSA-B139-09, Installation Code for Oil Burning Equipment.
 - .2 CSA-B140.0-08, Oil Burning Equipment: General Requirements.
- .4 Manufacturers Standardization Society of the Valve and Fitting Industry (MSS)
 - .1 MSS-SP-80-08, Bronze Gate, Globe, Angle and Check Valves.
- .5 National Fire Code of Canada (NFCC 2012).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 01.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheets for piping, fittings and equipment and include product characteristics, performance

**1.3 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)**

criteria, physical size, finish and limitations.

- .3 Manufacturers' Instructions: provide manufacturer's installation instructions.

**1.4 CLOSEOUT
SUBMITTALS**

- .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 11 01.

**1.5 QUALITY
ASSURANCE**

- .1 Ensure piping is installed by individual authorized by authority having jurisdiction.

**1.6 DELIVERY,
STORAGE AND
HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials in accordance with Section 01 11 01.

PART 2 - PRODUCTS

**2.1 FILL VENT AND
CARRIER PIPE**

- .1 Materials as per CSA-B139 and NFCC.
- .2 Steel: to ASTM A53/A53M, Schedule 40, continuous weld or electric resistance welded, screwed.

**2.1 FILL VENT AND
CARRIER PIPE
(Cont'd)**

- .3 316 Stainless steel braided flexible hose:
 - .1 Size: 13 mm diameter.
 - .2 Male threaded connections welded at end, threaded steel union.
 - .3 13 mm NPT stainless steel nipples with 13 mm stainless steel transport unions.

**2.2 STEEL PIPE
COATING**

- .1 Primers, paints and coating: in accordance with manufacturer's recommendations for surface conditions.

**2.3 JOINTING
MATERIAL**

- .1 Screwed fittings: Compound suitable with fluid being transported.

2.4 FITTINGS

- .1 Steel:
 - .1 Malleable iron: screwed, banded, Class 150 to ASME-B16.3.
 - .2 Welding: butt-welding to ASME-B16.9.
 - .3 Unions: malleable iron, brass to iron, ground seat, screwed, to ASTM A47/A47M.
 - .4 Nipples: Schedule 40, to ASTM A53/A53M.

2.5 GATE VALVES

- .1 NPS 2 and under, screwed bonnet: rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, solid wedge disc as specified under Section 23 05 23.01.

2.6 BALL VALVES

- .1 NPS 2 and under: bronze body, screwed ends, TFE seal, hard chrome ball, 4 MPa, WOG as specified under Section 23 05 23.01.

**2.7 ANT-SIPHON
VALVE**

- .1 For new tank 422-04: anti-siphon valve with the following specifications:
 - .1 Aluminum body.
 - .2 Stainless steel spring.
 - .3 Hard-coated aluminum poppet and seal.
 - .4 Highly saturated nitrile poppet seal.
 - .5 Buna-N for all other O-rings.
- .2 Size as indicated on drawings.

**2.8 FIRE SAFE
VALVE**

- .1 NPS 2 and under, screwed to ANSI/ASME-B16.42:
 - .1 Body/cap material: ductile iron or stainless steel.
 - .2 Gasket material: TFE/PTFE.
 - .3 Poppet: Ductile iron or stainless steel
 - .4 O-Ring: PTFE encapsulated fluorocarbon elastomer.
 - .5 Spring: Stainless steel.
 - .6 Seal nut/plug: Stainless steel.
 - .7 Fuse link: 74 degrees Celsius.

PART 3 - EXECUTION

3.1 PIPING

- .1 Install piping in accordance with Section 23 05 05, supplemented as specified.
- .2 Install oil piping system in accordance with NFCC, CSA-B139 and CSA-B140.0.
- .3 Slope piping down in direction of storage tank unless otherwise indicated.
- .4 Piping inside building:
 - .1 Use approved fitting to CSA-B139 for steel.
 - .3 Install filter, gate valve, and fire valve at burners.
- .5 Piping at tanks:
 - .1 Suction: terminate 150 mm from bottom

3.1 PIPING (Cont'd)

- of tank with foot valve and strainer.
- .2 Return: terminate 150 mm from bottom of tank.
- .3 Comply with CSA-B139 for piping for venting at tanks including venting whistle.
- .4 Fill pipes: install to comply with CSA-B139.
 - .1 Include vapour and liquid tight cover.
 - .2 Equip fill pipes on tanks with liquid and vapour tight connections.
- .6 Clearly label piping runs in legible form indicating;
 - .1 Piping product content.
 - .2 Direction of flow.
 - .3 Identify transfer points in piping systems to CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification

3.2 VALVES

- .1 Install valves with stems upright or horizontal unless approved otherwise by Departmental Representative.
- .2 Install gate and ball valves at branch take-offs, to isolate pieces of equipment and as indicated.
- .3 Install anti-siphon valve and fire safe valve at locations indicated and in accordance with manufacturer's written recommendations.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Test system to CSA-B139 and CSA-B140.0 and authorities having jurisdiction.
 - .2 Isolate tanks from piping pressure tests.
 - .3 Maintain test pressure during backfilling.

3.4 CLEANING

- .1 Clean in accordance with manufacturer's written recommendations, supplemented as follows:
 - .1 Flush after pressure test with number 1 fuel oil for a minimum of two hours. Clean strainers and filters.
 - .2 Dispose of fuel oil used for flushing out in accordance with requirements of authority having jurisdiction.
 - .3 Ensure vents from regulators, control valves are terminated in approved location and are protected against blockage and damage.
 - .4 Ensure entire installation is approved by authority having jurisdiction.
 - .5 Clean in accordance with Section 01 11 1
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.1-2012, Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
 - .2 CAN/CSA-C22.3 No. 1-10, Overhead Systems.
 - .3 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 The Ontario Electrical Safety Code 2009, and all bulletins (Ontario).
- .4 Hydro requirements and local applicable codes and regulations.

1.2 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01.
- .2 Product Data: submit WHMIS MSDS.
- .3 Quality Control: in accordance with Section 01 11 01.
 - .1 Provide CSA certified equipment and material.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract. Pay associated fees. Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
 - .5 Submit certificate of acceptance from Electrical Inspection Department authority having jurisdiction upon completion of Work to Departmental Representative.

1.4 QUALITY ASSURANCE

- .1 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.

**1.5 DELIVERY,
STORAGE AND
HANDLING**

- .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 11 01.

1.6 SYSTEM STARTUP

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

PART 2 - PRODUCTS

**2.1 MATERIALS AND
EQUIPMENT**

- .1 Provide material and equipment in accordance with Section 01 11 01.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment is are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - Submittals.
- .3 Factory assemble control panels and component assemblies.

2.2 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction and Departmental Representative.
- .2 Decal signs, minimum size 175 x 250 mm.

2.3 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: plastic laminate 3 mm thick plastic engraving sheet, matt white finish face, black core, lettering accurately aligned and engraved into core.
 - .2 Sizes as follows:

NAMEPLATE SIZES

Size 1	1	line	3 mm high letters
Size 2	1	line	5 mm high letters
Size 3	1	lines	3 mm high letters
Size 4	2	line	8 mm high letters
Size 5	2	lines	5 mm high letters
Size 6	2	100 mm 1 line	12 mm high letters
Size 7	2	100 mm 2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

**2.5 WIRING
IDENTIFICATION**

- .1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA-C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

**2.6 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	Green	Blue
Communication Systems		
Fire Alarm	Red	
Emergency	Red	Blue
Voice		
Other	Red	Yellow
Security Systems		

2.7 FINISHES

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

3.2 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 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:
 - .1 New tank overfill alarm console: in location as indicated and in consultation with Departmental Representative.

**3.3 CO-ORDINATION
OF PROTECTIVE
DEVICES**

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

**3.4 FIELD QUALITY
CONTROL**

- .1 Load Balance: .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .1 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
 - .2 Provide upon completion of work, load balance report as directed in PART 1 - Submittals: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests in accordance with Section 01 11 01:
 - .1 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .2 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.

**3.5 FIELD QUALITY
CONTROL**

(Cont'd)

- .3 Carry out tests in presence of Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

3.6 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 CSA International
 - .1 CAN/CSA-C22.2 No.18-98 (R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65-03 (R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Pressure type wire connectors to:
CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Clamps or connectors for TECK cable as required to: CAN/CSA-C22.2 No.18.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and cables and:
 - .1 Install mechanical pressure type connectors and tighten screws. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
 - .2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.

3.2 CLEANING

- .1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.

PART 1 - GENERAL

1.1 PRODUCT DATA

- .1 Provide product data in accordance with Section 01 11 01.

PART 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 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, Jacketted.

2.2 TECK 90 CABLE

- .1 Cable: in accordance with Section 26 05 01.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
- .3 Insulation:
 - .1 Cross-linked polyethylene XLPE.
 - .2 Rating: 300 and 600 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: flat interlocking.
- .6 Overall covering: thermoplastic polyvinyl chloride.
- .7 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

- | | |
|-------------------------------|--|
| 2.2 TECK 90 CABLE
(Cont'd) | .8 Connectors:
.1 Watertight, explosion-proof approved
for TECK cable. |
|-------------------------------|--|

PART 3 - EXECUTION

- | | |
|------------------------------|--|
| 3.1 FIELD QUALITY
CONTROL | .1 Perform tests in accordance with Section 26
05 01.
.2 Perform tests before energizing electrical
system. |
|------------------------------|--|

- | | |
|-----------------------------------|--|
| 3.2 GENERAL CABLE
INSTALLATION | .1 Lay cable in cable trays in accordance with
Section 26 05 36.
.2 Terminate cables in accordance with Section 26
05 20.
.3 Cable Colour Coding: to Section 26 05 01.
.4 Wiring in walls: typically drop or loop
vertically from above to better facilitate
future renovations. Generally wiring from
below and horizontal wiring in walls to be
avoided unless indicated. |
|-----------------------------------|--|

- | | |
|---------------------------------------|---|
| 3.3 INSTALLATION OF
BUILDING WIRES | .1 Install wiring as follows: .1 In conduit
systems in accordance with Section 26 05 34. |
|---------------------------------------|---|

- | | |
|-------------------------------------|--|
| 3.4 INSTALLATION OF
TECK90 CABLE | .1 Group cables wherever possible on channels.
.2 Install cable exposed, securely supported by
required. |
|-------------------------------------|--|

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American National Standards Institute
/Institute of Electrical and Electronics
Engineers (ANSI/IEEE)
.1 ANSI/IEEE 837-02, IEEE Standard for
Qualifying Permanent Connections Used in
Substation Grounding.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in
accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- .1 Clamp for grounding: Retractable static
grounding reel. Cable length: 30 m.
- .2 Copper conductor: 2/0, stranded, soft
annealed.
- .3 Grounding conductors: #12 bare copper.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

- .1 Install ground bar and clamp, as indicated.
Install in accordance with manufacturer's
instructions.
- .2 Protect exposed grounding conductors from
mechanical injury.

**3.1 INSTALLATION
GENERAL
(Cont'd)**

- .3 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .4 Soldered joints not permitted.
- .5 Splice existing copper bus bar and re-route clear new tertiary fuel tank dike. to

**3.2 EQUIPMENT
GROUNDING**

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, frames of motors, control panels, building steel work, generators, and cable trays.

**3.3 FIELD QUALITY
CONTROL**

- .1 Perform tests in accordance with Section 26 05 01.
- .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

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No. 45.1-07, Electrical Rigid Metal Conduit - Steel (Tri-National standard, with UL 6 and NMJ-J-534-ANCE-2007).
 - .2 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45., galvanized steel threaded.
- .2 Rigid pvc conduit: to CSA C22.2 No. 211.2.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits NPS 2 50 mm and smaller.
 - .1 Two hole steel straps for conduits larger than NPS 2 50 mm.

2.3 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

**2.3 CONDUIT
FITTINGS
(Cont'd)**

- .2 Ensure factory "ells" where 90 degrees bends for NPS 1 25 mm and larger conduits.
- .3 Eys fittings for hazardous locations.
- .4 Sealing compound: two-part (resin and hardener) liquid epoxy.

2.4 FISH CORD

- .1 Polypropylene.

PART 3 - EXECUTION

**3.1 MANUFACTURER'S
INSTRUCTIONS**

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

3.2 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 and electrical service rooms.
- .3 Use rigid galvanized steel threaded conduit except where specified otherwise.
- .4 Use rigid pvc conduit as indicated.
- .5 Use explosion proof flexible connection for connection to explosion proof motors.
- .6 Install conduit sealing fittings in hazardous areas.
 - .1 Fill with compound.

**3.2 INSTALLATION
(Cont'd)**

- .7 Install rigid metal conduit for high level alarm panel, as indicated.
- .8 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 19 mm diameter.
- .10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .11 Install fish cord in empty conduits.
- .12 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .13 Dry conduits out before installing wire.
- .14 Replace existing electrical junction box at floor level near southwest corner of building with new box of equal or better specification.

**3.3 SURFACE
CONDUITS**

- .1 Run parallel or perpendicular to building lines.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible on surface channels.

3.4 CLEANING

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

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials (ASTM) International
ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ftn) (600kN-m/mn).
- .2 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
.1 OPSS 1010 April 2004, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 01.
 - .1 Submit to designated testing agency, 23 kg sample of backfill for fill material proposed for use, no later than one week before backfilling or filling work.
- .2 Quality Control: in accordance with Section 01 11 01.
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article.
 - .2 Submit testing results as described in PART 3 - FIELD QUALITY CONTROL.

**1.3
REGULATORY
REQUIREMENTS**

- .1 Health and Safety Requirements: perform construction occupational health and safety in accordance with Section 01 35 29.

**1.4 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.

**1.5 EXISTING
CONDITIONS**

- .1 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular material to Ontario Provincial Standard Specification (OPSS) 1010 for:
 - .1 Crushed stone.
 - .2 Granular A base course.
 - .3 Granular B sub-base course.

PART 3 - EXECUTION

**3.1 SITE
PREPARATION**

- .1 Remove and dispose gravel, grass, and topsoil below Product Transfer Area.
- .2 Remove and dispose additional material below Product Transfer Area as required to achieve specified compaction.

3.2 PROTECTION

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

**3.2 PROTECTION
(Cont'd)**

- .3 Protect buried services that are required to remain undisturbed.
- .4 Do not touch electrified security fence.

3.3 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Excavate for slabs to subgrade levels.
- .3 Dispose of surplus and unsuitable excavated material off-site.

3.4 BACKFILLING

- .1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by Departmental Representative.
- .2 Remove snow, ice, construction debris and standing water from spaces to be filled.
- .3 Compaction of subgrade: compact existing subgrade under concrete slab to same compaction as fill.
 - .1 Fill excavated areas with selected subgrade material compacted as specified for fill.
- .4 Placing:
 - .1 Place backfill, fill and base course material in 150 mm lifts: add water as required to achieve specified density.
- .5 Compaction: compact each layer of material to following densities for material to ASTM D698:
 - .1 To underside of base courses: 100%.
 - .2 Base courses: 100%.
 - .3 Elsewhere: 100%.
- .6 Place and compact base course and sub-base course below concrete as shown on drawing.

**3.5 FIELD QUALITY
CONTROL**

- .1 Testing of materials will be carried out by testing laboratory designated by Departmental Representative.
- .2 Not later than 1 week minimum before backfilling or filling, submit to designated testing agency, samples of backfill as described in PART 1 - SUBMITTALS.
- .3 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.
- .4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative to allow compaction tests to be carried out by designated testing agency.

3.6 RESTORATION

- .1 Replace topsoil as directed by Departmental Representative.
- .2 Reinstall lawns with sod to elevation which existed before excavation.
- .3 Clean and reinstall areas affected by Work as directed by Departmental Representative.
- .4 Match existing gravel road to new concrete pad surface.

3.7 CLEANING

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

END OF SECTION

1 GENERAL

1.01 RELATED

- .1 Section 01 10 00 - Summary of Work.
- .2 Section 01 11 06 - General Instructions.
- .3 Section 01 35 29 - Health and Safety Requirements

1.02 PROTECTION

- .1 Protect buildings, landscaping, roads, driveways, sidewalks, trees and shrubs on site and adjacent property that may be damaged by paving machinery, equipment or personnel. Make good property damaged due to paving operations.
- .2 Take necessary precautions to protect workmen and public from hazards of paving operations.
- .3 Keep vehicular traffic off newly paved areas until paving properly cured.
 - .1 Supply and space temporary traffic cones as required to prevent access to the work area by vehicular traffic, or as directed by the Departmental Representative.
- .4 Provide access to building structure at all times. Maintain emergency vehicle access to building at all times. Arrange paving schedule to minimize interference with normal use of premises.

2 PRODUCTS

2.01 MATERIALS

- .1 Asphalt base course: to Ontario Provincial Standard Specification OPSS 1150, November 2010 for type HL 8. Maximum size aggregate 19mm.
- .2 Asphalt surface course: to Ontario Provincial Standard Specification OPSS 1150, November 2010 for type HL 3. Maximum size aggregate 13.2mm.
- .3 Primer: emulsified asphalt to Ontario Provincial Standard Specification OPSS 1103, November 2007 for rapid setting type.
- .4 Granular base: to Ontario Provincial Standard Specification OPSS 1010, April 2004 for Granular A. Maximum size 19.0mm.
- .5 Granular sub-base: to Ontario Provincial Standard Specification OPSS 1010, April 2004 for Granular B. Maximum size 26.5mm.

PWGSC ONTARIO	ASPHALTIC CONCRETE	SECTION 32 12 17
REGION PROJECT	PAVING	PAGE 2
NUMBER R.058845.001		2016-12-01

3 EXECUTION

3.01 CLEANING

- .1 Remove dust, contaminants, loose and foreign materials, oil and grease in designated areas.
- .2 Use rotary power brooms supplemented by hand-brooming as required.
- .3 Where directed, remove to existing pavement level, sealing compound which has protruded excessively and dispose of removed material as directed.
- .4 Keep drainage system clear of loose and waste materials.

3.02 GRANULAR BASE PREPARATION

- .1 Prepare granular base under existing granular driveway and under existing grassed area as follows (refer to drawings):
 - .1 Existing granular driveway: remove sufficient granular material to allow placement of Granular "A" and new asphalt as shown on the drawings. Compact exposed granular material to minimum 100% SPDD. Supply, place and compact Granular "A" to minimum 100% SPDD. Dispose excess fill offsite.
 - .2 Existing grassed area: remove sufficient material to allow placement of Granular "B" sub-base course and Granular "A" base course and new asphalt as shown on the drawings. Compact exposed material to minimum 99% SPDD, or replace material with Granular "B" as required to achieve 99% SPDD. Supply, place and compact "Granular "B" and Granular "A" to minimum 100% SPDD as shown on the drawings. Dispose excess fill offsite.
- .2 Make excavations to clean lines to minimize quantity of fill material required.
- .3 Earth bottoms of excavations to be dry undisturbed soil, reasonably level, free from loose or organic matter.

3.03 INSPECTION

- .1 Check graded subgrade for conformity with elevations and cross-sections before placing granular sub-base and granular base material.
- .2 Proof-roll subgrade sub-base and base surface with mass and type of roller approved by Departmental Representative.
 - .1 Check for unstable areas.
 - .2 Check for areas requiring additional compaction.
- .3 Notify Departmental Representative of unsatisfactory conditions.
- .4 Do not begin paving work until such conditions have been corrected and are ready to receive paving.
- .5 When complete, have Departmental Representative inspect excavations to verify soil bearing capacity, depths and dimensions.
- .6 Correct unauthorized excavations at no extra cost by filling with Granular

A material and compacting per Section 32 12 17.

3.04 GRANULAR SUB-BASE AND GRANULAR BASE

- .1 Place 300mm compacted thickness of granular sub-base over backfilled excavations.
- .2 Place 150mm compacted thickness of granular base.
- .3 Place in layers not exceeding 150 mm compacted thickness. Compact each layer to 100 % Standard Proctor Dry Density.

3.05 ASPHALT COURSE

- .1 Apply primer at approximately 0.5 L/m².
- .2 Place 50mm of compacted asphaltic concrete base course.
- .3 Place 50mm of compacted asphaltic concrete surface course.
- .4 Minimum 7°C air temperature when placing mixture.
- .5 Minimum 118°C mixture temperature when spread.
- .6 Maximum 149°C mixture temperature at any time.
- .7 Compact each course with roller when it can support roller mass without undue cracking or displacement.
- .8 Roller, power driven, minimum mass 9 tonnes, minimum wheel width 600 mm.
- .9 Roll until roller marks are eliminated. Compact to 96 % laboratory density.
- .10 Keep roller speed slow enough to avoid mixture displacement.
- .11 Moisten roller wheels to prevent mixture adhesion.
- .12 Compact mixture with hot tampers in areas inaccessible to roller.
- .13 Finish surface true to grade and free from deviations exceeding 1:1000 when measured in any direction with a 3 m straight edge.

3.06 JOINTS

- .1 Cut back bituminous course to full depth in straight or curved lines as required to expose fresh vertical surfaces. Remove any broken or loose material.
 - .2 Dispose cut, broke, and loose asphalt per Section 02 65 00.
- .2 Paint exposed edge of asphaltic joints, edges of manholes and catch basin frames, curbs and similar items with asphalt primer prior to placing asphalt courses.
- .3 Where paving comprises two courses overlap longitudinal joints not less than 600 mm.
- .4 Carefully place and compact hot asphaltic material against joints.

PWGSC ONTARIO	ASPHALTIC CONCRETE	SECTION 32 12 17
REGION PROJECT	PAVING	PAGE 4
NUMBER R.058845.001		2016-12-01

3.07 PAVEMENT MARKING

.1 Do not mark pavement.

END OF SECTION

PART 1 - GENERAL

**1.1 SECTION
INCLUDES**

- .1 Upgrades to existing diesel above ground storage (AST) tank system comprising tanks 422-01, 422-02 and a day tank (422-0A) including:
 - .1 Removal and disposal of: existing tanks 422-01, 422-02, a day tank (422-04B), and associated piping, transfer pumps and controls.
 - .2 Supply and installation of two ASTs with associated piping and appurtenances.
 - .3 Supply and installation of automatic level gauge, interstitial monitor, and overfill strobe light & horn for the new tank with connections to existing Building Automation System (BAS).
 - .4 Installation of truck grounding clamp.
 - .5 Re-routing of existing copper ground bus bar.
 - .6 Partial filling of existing pipe trench with concrete.
 - .7 Application of paint to piping.

**1.2 RELATED
SECTIONS**

- .1 Section 01 91 00 - Commissioning - General Requirements.
- .2 Section 02 41 99 - Demolition for Minor Works.
- .2 Section 03 30 00.01 - Cast-in-Place Concrete.
- .3 Section 23 11 13 - Facility Fuel-Oil Piping.
- .4 Section 26 05 00 - Common Work Results - Mechanical.

1.3 REFERENCES

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME).
 - .1 ANSI/ASME A13.1-2007 Scheme for the Identification of Piping Systems.
- .2 Canadian Council of Ministers of the Environment (CCME).
 - .1 CCME-PN1326-2008, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .3 Canadian Petroleum Products Institute (CCPI)
 - .1 Using the CPPI Colour-Symbol System To Mark Equipment and Vehicles For Product Identification, January 2009.
- .4 Canadian Standards Association (CSA)/CSA International.
 - .1 CAN/CSA-B139, Installation Code for Oil Burning Equipment with Ontario Amendments, 1st Edition, 2006.
- .5 Environmental Management of Petroleum Storage Tank Systems (Correctional Services Canada Internal Services Directive 318-8).
- .6 Department of Justice Canada (Jus).
- .7 The Master Painters Institute (MPI)
 - .1 Maintenance Repainting Manual, 2012 edition.
- .8 Occupational Health and Safety Authority (OSHA).
 - .1 OSHA Standard 1910.24, Fixed Industrial Stairs. Materials Information System (WHMIS), R.R.O 1990.

**1.3 REFERENCES
(Cont'd)**

- .9 National Research Council/Institute for Research in Construction.
 - .1 National Fire Code of Canada (NFC)-2010.
- .10 Underwriters' Laboratories of Canada (ULC).
 - .1 ULC/ORD C58.15-1992, Overfill Protection Devices for Flammable Liquid Storage Tanks.
 - .2 CAN/ULC-S602 Aboveground Steel Tanks for the Storage of Combustible Liquids Intended to be Used as Heating and/or Generator Fuels.

1.4 SUBMITTALS

- .1 Provide maintenance data for new tank system detection system for incorporation into manual specified in Section 01 11 01.
- .2 Provide PM3, TSSA and all other applicable Contractor licenses.
- .3 Submit completed Tank System Decommissioning Checklists (Appendix D) along with all supporting information prior to commissioning new fuel tank system.

**1.5 WASTE
MANAGEMENT
AND
DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.
- .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 bins for off-site recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel, Metal and Plastic waste in accordance with Waste Management Plan and dispose off-site.

**1.5 WASTE
MANAGEMENT AND
DISPOSAL
(Cont'd)**

- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose off-site of hazardous materials in accordance with the CEPA, TDGA, Provincial and Municipal regulations.
- .7 Ensure emptied containers are sealed and stored safely.
- .8 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .9 Divert unused concrete materials from landfill to local quarry or facility as approved by Departmental Representative.
- .10 Dispose of unused paint or coating material at an official hazardous material collections site as approved by Departmental Representative.
- .11 Do not dispose of unused paint material into sewer system, streams, and lakes, onto ground or in other location where it will pose health or environmental hazard.
- .12 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

**2.1 NEW TANKS:
422-04A and 422-
04B**

- .1 Complete units as follows:
 - .1 360° Double wall steel to ULC-S602.
 - .2 One coat zinc-rich primer overlaid with heavy-duty industrial polyurethane coating. Colour of coating to be in accordance with the CPPI colour system for fuel being stored.

2.1 NEW

TANKS: 422-
04A and 422-
04B (Cont'd)

- .3 Capacity of each tank: 455 L plus or minus 10 Percent, or as approved by the Departmental Representative.
- .2 Standard fittings:
 - .1 Size, rating and type of connections shall be by Vendor.
 - .2 Tank openings to accommodate the following:
 - .1 Normal vent.
 - .2 Fuel supply to generator.
 - .3 Fuel return from generator.
 - .4 Level switch.
 - .5 Level gauge.
 - .6 Interstitial monitoring.
 - .7 Vacuum switch.
 - .8 Fuel fill.
 - .9 Spare with plug.
- .3 English and French bilingual decal package:
 - .1 Fuel type: "Diesel".
 - .2 Tank capacity in litres.
 - .3 Flammable warning signs.
 - .4 No smoking signs.
 - .5 WHMIS and TDG signs.
 - .6 Tank weight: empty.
 - .7 Tank weight: full.

**2.2 OVERFILL
PROTECTION**

- .1 Overfill protection device to: ULC/ORD-C58.15.
 - .1 Tank fill with automatic shut-off.
 - .2 Integrated anti-siphon valve to isolate tank from potential siphon due to broken or leaking fill pipe.
- .2 Locate audible and visual alarm for each tank as indicated on drawings.

2.3 LEVEL GAUGING

- .1 Electronic solid state combination tank level sensor and leak detector to tie into the existing Building Automation System (BAS) at Building FBN.
 - .1 Automatic level gauge.
 - .2 Interstitial leak detection.
 - .3 Visual and audible alarm for:
 - .1 High-level/overfill.
- .2 Probes and sensors: factory calibrated and pre-set to suit diameter of tank.

**2.4 PRODUCT
TRANSFER**

- .1 ASTs with normal vent:
 - .1 Liquid and vapour-tight connection on fill pipe for flammable products.
- .2 Fill port with spill containment box (size as indicated) and as supplied by Vendor.
 - .1 Cam and groove fitting for fill port:
 - .1 Size: 50 mm.
 - .2 Construction: Stainless steel.
- .3 Ground clamp in accordance with Section 26 05 28.

**2.5 PIPING, VALVES
AND FITTINGS**

- .1 In accordance with Section 23 11 13.
- .2 Piping located below product level equipped with either manual or automatic shut-off at storage tank.

2.6 SPILL KIT

- .1 Empty, weather-tight, polypropylene spill cart with removable castors for outdoor use: Volume: 416 L (110 imperial gallons).
- .2 Supply and place into each spill kit:
 - .1 150 Petroleum Absorbent Pads (Oil, Gas & Diesel)
 - .2 50 Universal Absorbent Pads (Antifreeze)
 - .3 6 3" x 4' Absorbent Socks (Oil, Gas & Diesel)
 - .4 4 3" x 8' Absorbent Socks (Oil, Gas & Diesel)
 - .5 2 Sections of 5" x 10' Linkable Absorbent Boom
 - .6 2 18" x 18" Oil Absorbent Pillows
 - .7 1 36" x 36" Neoprene Drain Cover
 - .8 10 HD Hazmat Disposal Bags
 - .9 2 Pairs of heavy-duty nitrile gloves

2.7 PIPE AND TANK LABELING

- .1 In accordance with ANSI/ASME A13.1-2007.
- .2 Labels to indicate product contents and flow direction.
- .3 Label new tanks and outdoor spill container with new CSC identification numbers.

2.8 METAL COATINGS AND NEW BAR GRATING

- .1 For steel piping:
 - .1 REX 5.1G (MPI) - Zinc Rich/Aliphatic Polyurethane.
- .2 Colour: To meet CPPI colour system requirement.
- .3 New bar grating:
 - .1 Type 30-102 galvanized steel
 - .2 Bearing bar depth 32 mm.
 - .3 Bearing bar thickness 5 mm.
 - .4 Approximate span 1.22 m
 - .5 Approximate width: fit to existing trench (approximately 0.76 m).

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Remove fuel from existing tanks 422-01, 422-02 and day tank. Dispose of water and sludge in accordance with O. Reg. 347 (as amended). Diesel to be reused per clause 3.1.2. Dispose of excess diesel beyond aggregate capacity of new tanks 422-04A and 422-04B.
- .2 To minimize generator downtime, new tank 422-04B shall be temporarily placed outside the boiler room near the new Product Transfer Area. This tank shall be filled with diesel fuel from existing tanks 422-01 or 422-02 or 422-04B and connected to the existing generator using new copper supply/return tubing and flared copper fittings. Connect tubing to generator via new boiler house wall penetrations for fill and vent piping. Install temporary vent and vent hood. Protect tank from vehicle impact.
- .3 Existing tanks 422-01, 422-02, day tank (422-0A), associated piping, transfer pumps and controls to the day tank to be removed and disposed in accordance with Section 02 41 99.

3.1 PREPARATION
(Cont'd)

.4 Existing diesel generator controls are to stay in current location.

.5 After removal of fuel supply and return piping to Building FBN (Section 02 41 99), existing concrete pipe trench to be filled with concrete to match level of existing floor, except where new generator fuel supply and return piping will be placed as shown in the drawings.

.6 Holes in exterior wall to be sealed by filling with unshrinkable grout. Match grout to exterior foundation wall surface.

3.2 INSTALLATION

- .1 Install new tanks 422-04A and 422-04B in accordance with CAN/CSA-B139, National Fire Code of Canada, manufacturer's written recommendations, CSC Internal Services Directive 318-8, CCME PN 1326 and CAN/CSA B139.
- .2 Position new tanks 422-04A and 422-04B using lifting lugs and hooks, and where necessary use spreader bars. Do not use chains in contact with tank walls.
- .3 Install new tanks 422-04A and 422-04B using licensed, trained and certified installers to TSSA Certified Petroleum Mechanic PM3.
- .4 Install new tank 422-04A complete with all piping and controls shown on drawings. Provide temporary plug for vent manifold connection to new tank 422-04B. Transfer diesel fuel from tank 422-04B to tank 422-04A. Work with CSC staff to test generator for proper function as connected to tank 422-04A. Install new tank 422-04B complete with all piping and controls as shown in the drawings.
- .5 Provide certification of installation to Departmental Representative.
- .6 Install new tanks 422-04A and 422-04B inside existing day tank containment dike inside boiler house as shown on the drawings.

3.3 PIPING, VALVES AND FITTINGS	.1	Install in accordance with Section 23 11 13 and as indicated on drawings.
3.4 OVERFILL PROTECTION DEVICE	.1	Install new vent whistle on new tank 422-04A as shown on the drawings.
3.5 LEVEL GAUGE SYSTEM	.1	Provide leak and vapour proof caulking at connections.
	.2	Shield capillary and tubing connections in heavy duty 50 mm polyethylene pipe.
	.3	Install mechanical level gauges on both tanks as shown on the drawings.
	.4	Calibrate level gauges.
3.6 TANK MONITORING SYSTEM	.1	Install at location indicated and in accordance with Vendor's written recommendations.
	.2	Tank monitoring system shall be a CSA-listed commercially-available device designed to monitor tank level (low and high) and interstitial space vacuum for two (2) aboveground liquid fuel tanks. Tank level probes and vacuum switches shall be certified for use with the tank monitoring system.
	.3	Tank monitoring system shall be equipped with visual and audible alarms for each tank for low product level, high product level, and interstitial vacuum loss.
	.4	Tank monitoring system shall be installed with outputs connected to the existing BAS to notify of low product level, high product level, and interstitial vacuum loss for each tank.
	.5	Test and calibrate system. Test and calibrate BAS connections.

**3.7 PRODUCT
TRANSFER**

- .1 Install spill box in accordance with manufacturer recommendations and as shown on the drawings.
- .2 Install ground clamp in accordance with Section 26 05 28, manufacturer recommendations, and as shown on the drawings.
- .3 Install cam and groove fitting on fill port in accordance with manufacturer recommendations.

**3.8 LOCATION OF
IDENTIFICATION ON
PIPING SYSTEMS**

- .1 On long straight runs in open areas.
- .2 Adjacent to each change in direction.
- .3 On both sides of visual obstruction or where run is difficult to follow.
- .4 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.
- .5 At beginning and end points of each run and at each piece of equipment in run.
- .6 Install labels in accordance with ANSI/ASME A13.1-2007 and according to manufacturer's recommendations.

**3.9 COATING
APPLICATION**

- .1 Perform preparation and operations for painting in accordance with MPI Maintenance Repainting requirements except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Do not perform painting work when:
 - .1 Substrate and ambient air temperatures are expected to fall outside paint

**3.9 COATING
APPLICATION
(Cont'd)**

- manufacturer's prescribed limits.
- .2 Rain or snow is forecast to occur before paint has thoroughly cured.
- .3 It is foggy, misty, raining or snowing at site.
- .4 Clean surfaces to be painted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .6 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.
- .7 Protect factory finished products and equipment.
- .8 Do not paint over name plates or instruction labels.
- .9 Apply paint by method that is best suited for substrate being repainted using brush and/or air sprayer. Conform to manufacturer's application instructions unless specified otherwise.

- 3.10 TOUCH-UP .1 Where coating is damaged, touch-up with original coating material.
- 3.11 FIELD QUALITY CONTROL .1 Verify operation and functional performance of the systems in accordance with Section 01 91 00.
- .2 Test tanks and associated piping and appurtenances for leaks to requirements of manufacturer, Code of Practice CCME-PN1326-2003), NFC and in presence of authority having jurisdiction as part of commissioning.
- .3 Emergency Response Plan (ERP), supplied by Owner, shall be located in the vicinity of the tank prior to fill.
- 3.12 CLEANING .1 Proceed in accordance with Section 01 11 01.
- .2 On completion and verification of performance of installation remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION



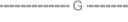










FUEL TANK SYSTEM REMOVALS, INSTALLATIONS AND UPGRADES

Correctional Services Canada
Beaver Creek Institution - Medium Security Unit
2000 Beaver Creek Drive, Gravenhurst, Ontario

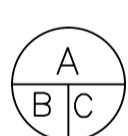

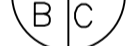
LIST OF DRAWINGS	
Drawing Number	Drawing Title
BC1	Title Sheet
BC2A	Notes (1 of 2)
BC2B	Notes (2 of 2)
BC3	Existing Conditions and Demolition Plan
BC4	New Fuel System Layout
BC5	Fuel Delivery Equipment Details
BC6	Fuel Piping Details
BC7	Electrical Details
BC8	New Asphalt and Product Transfer Area
BC9	Signage



LEGEND	
	STORM SEWER
	WATERMAIN
	GAS PIPELINE
	PROPANE PIPE
	FUEL TANK PRODUCT PIPE
	ELECTRICAL CONDUIT
	FORCEMAIN
	APPROXIMATE PROPERTY BOUNDARY
	APPROXIMATE LIMIT OF ASPHALT SAW-CUT
	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE
	WORK AREA

06		
05	Issued for Tender	09 Jun 2017
04	Design Adjustment	27 Apr 2017
03	Design Adjustment	21 Feb 2017
02	Issued for Tender	19 Jan 2017
01	Issued for 99% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the engineer of all discrepancies.

	A Detail No. No. du détail
	B drawing no. — where detail required dessin no. — où détail exigé
	C drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet

Ontario

FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES

Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin

TITLE SHEET

drawn by
dessiné par HET

designed by
conçu par JD

approved by
approuvé par JD

tender
soumission Javier Banuelos

project manager
administrateur de projets

project date
date du projet 2016/11/30

project no.
no. du projet R.058845.001

drawing no.
dessiné no. BC1

GENERAL NOTES:

1.

SYSTEM IS TO BE INSTALLED AS PER THE MOST RECENT PUBLISHED VERSIONS OF:
 - NATIONAL FIRE CODE OF CANADA;
 - CEPA SOR/2008-197 STORAGE TANK SYSTEMS FOR PETROLEUM PRODUCTS AND ALLIED PETROLEUM PRODUCTS REGULATIONS;
 - CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT, PN1326 ENVIRONMENTAL CODE OF PRACTICE FOR ABOVEGROUND AND UNDERGROUND STORAGE TANK SYSTEM CONTAINING PETROLEUM AND ALLIED PETROLEUM PRODUCTS;
 - CSA C22.1-2015 CANADIAN ELECTRICAL CODE, 22ND EDITION;
 - ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS;
 - ONTARIO INSTALLATION CODE FOR OIL-BURNING EQUIPMENT (BASED ON CSA B139, WITH ONTARIO AMENDMENTS); AND
 - OTHER LOCAL, PROVINCIAL, FEDERAL REGULATIONS, ALL LATEST EDITIONS.
2.

A CONTRACTOR SUBMITTING A BID IS REQUIRED TO POSSESS A CURRENT AND VALID LIQUID FUELS CONTRACTOR LICENSE FROM THE ONTARIO TECHNICAL STANDARDS AND SAFETY AUTHORITY (TSSA).
3.

IF FURTHER CLARIFICATIONS ARE REQUIRED ON EQUIPMENT OR THE INSTALLATION OF EQUIPMENT, IT IS THE CONTRACTORS RESPONSIBILITY TO REQUEST CLARIFICATIONS FROM CONSULTANT/OWNER.
4.

ALL PIPING, ELBOWS, TEES, REDUCERS, UNIONS AND FITTINGS TO BE SOCKET WELD STEEL ASTM A312. ALL FITTINGS TO BE WELDED UNLESS OTHERWISE SPECIFIED. THREADED FITTINGS MUST BE SEALED WITH PETROLEUM RESISTANT SEAL.
5.

CONTRACTOR TO REINSTATE DISTURBED SITE CONDITIONS TO MATCH EXISTING TO THE SATISFACTION OF THE ENGINEER AND DEPARTMENTAL REPRESENTATIVE AND ON-SITE OPERATIONS MANAGER. THE CONTRACTOR IS RESPONSIBLE FOR DAILY CLEANING OF WORK AREA.
6.

CONTRACTOR SHALL NOT UNDERMINE OR COMPROMISE ANY FOOTINGS OR FOUNDATION STRUCTURES. ALWAYS BE AWARE OF THE LOCATION OF EXISTING UTILITIES AND OVERHEAD POWER LINES.
7.

SITE UTILITIES ARE NOT LOCATED ON THESE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL UTILITY LOCATES, CLEARANCES AND PERMITS PRIOR TO COMMENCEMENT OF WORK.
8.

PIPING LAYOUTS ILLUSTRATED ON DRAWINGS INDICATE THE GENERAL ROUTING OF PIPE WORK AND DOES NOT SHOW ALL THE FITTINGS AND OFFSETS REQUIRED FOR THE COMPLETE INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPING, FITTINGS & OFFSETS REQUIRED.
9.

THE CONTRACTOR SHALL PROVIDE A TWELVE (12) MONTH WARRANTY ON ALL LABOUR, MATERIAL AND EQUIPMENT.
10.

THE CONTRACTOR SHALL PROVIDE A PAPER COPY AND AN ELECTRONIC COPY OF SUPPORTING MATERIAL FOR THE OPERATION AND MAINTENANCE MANUAL PRIOR TO COMMISSIONING.
11.

THE CONTRACTOR SHALL PROVIDE AS BUILT DRAWINGS IN PAPER AND ELECTRONIC COPIES PRIOR TO FIRST FILL OF THE SYSTEM.
12.

THE CONTRACTOR SHALL TRAIN THE SYSTEM OPERATORS AFTER THE NEW SYSTEM HAS BEEN INSTALLED.
13.

THE CONTRACTOR IS RESPONSIBLE FOR THE COST OF COMMISSIONING AND TESTING ALL NEW AND REINSTATED EQUIPMENT.
14.

THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING PIPING, FITTINGS, TANKS, PUMPS, FUEL AND ALL OTHER APPURTENANCES PER APPLICABLE REGULATIONS. THE CONTRACTOR SHALL PURGE EXPLOSIVE VAPOURS FROM ALL TANKS AS SET OUT IN THE SPECIFICATIONS.
15.

THE CONTRACTOR SHALL FOLLOW THE DECOMMISSIONING CHECKLISTS PROVIDED IN THE SPECIFICATIONS FOR EACH TANK, AND SHALL PROVIDE DOCUMENTARY PROOF OF EACH ITEM (COPIES, PHOTOS, ATTESTATIONS AS APPLICABLE).
15.

ALL EQUIPMENT SHALL BE STORED AND INSTALLED AS PER THE MANUFACTURER'S INSTRUCTIONS.

MECHANICAL NOTES:

1.

ALL PIPE SIZES ARE SHOWN IN MILLIMETERS.
2.

INSTALL EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS. CLEARANCES AROUND NEW EQUIPMENT TO BE AS PER MANUFACTURER'S RECOMMENDATIONS AND CODE REQUIREMENTS.
3.

LAYOUT, ROUTING & LOCATIONS ARE INDICATIVE, CONTRACTOR TO VERIFY SITE CONDITIONS & COORDINATE INSTALLATION WITH ALL TRADES ON SITE CONTRACTOR TO ADAPT INSTALLATION TO SITE CONDITION.
4.

PROVIDE NECESSARY EXPANSION LOOPS, COMPENSATORS, ANCHORS, GUIDES, SUPPORTS ETC. AND FIRESTOP FOR ALL AFFECTED SYSTEMS.
5.

ALL PIPING TO BE SCH 40 ASTM A53/A53M STEEL. SOCKET WELDED FITTINGS TO BE ASTM A53/A53M.
6.

PIPING SHALL BE RUN AS PRACTICAL AS POSSIBLE AND PROVISIONS SHALL BE MADE FOR EXPANSION, CONTRACTION, JARRING, VIBRATION AND SETTLING.
7.

THE TANKS SHALL BE INSTALLED WITH GAUGES AND ULC LABELS ACCESSIBLE TO OPERATORS.
8.

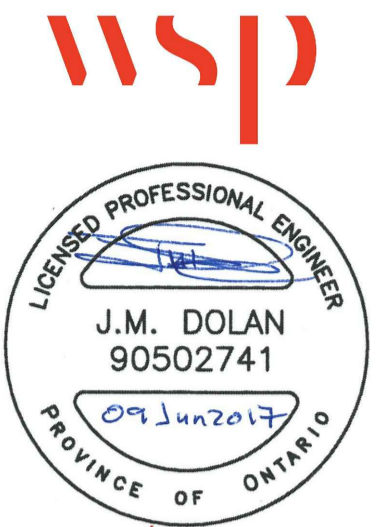
NEW TANKS SHALL BE DOUBLE WALLED PER ULC S602 AND EQUIPPED WITH VISUAL GAUGES, VACUUM GAUGES AND ACCESS TO INTERSTITIAL MONITORING.
9.












ALL PIPING SHOULD BE CLEARLY LABELED WITH CONTENTS, FLOW DIRECTION, AND PRODUCT (DIESEL SUPPLY, DIESEL RETURN). ALL FUEL RELATED EQUIPMENT SHALL BE CLEARLY IDENTIFIED.
10.

THE CONTRACTOR SHALL COMPLETE AT A MINIMUM A TWO HOUR PRESSURE TEST USING NITROGEN GAS AT 50psi ON THE FUEL PIPING. TESTING TO BE CONDUCTED AFTER THE INSTALLATION IS COMPLETE AND PRIOR TO SYSTEM COMMISSIONING. CONTRACTOR SHALL PRESSURE TEST PRIMARY TANK SHELL PER MANUFACTURER'S REQUIREMENTS PRIOR TO COMMISSIONING.
11.

ALL GASKETS TO BE RATED FOR A MINIMUM TEMPERATURE OF 1000°F (BUNA-N OR EQUIVALENT).
12.

ALL TANKS AND PIPING SHALL BE LABELLED PER THE CPPI COLOUR-CODING SYSTEM.



LEGEND		
	STORM SEWER	
	WATERMAIN	
	GAS PIPELINE	
	PROPANE PIPE	
	FUEL TANK PRODUCT PIPE	
	ELECTRICAL CONDUIT	
	FORCEMAIN	
	IRON BAR	
	APPROXIMATE PROPERTY BOUNDARY	
	APPROXIMATE LIMIT OF ASPHALT SAW-CUT	
	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE	

06	Issued for Tender	09 Jun 2017
05	Design Adjustments	27 Apr 2017
04	Design Adjustment	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 99% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the engineer of all discrepancies.

<div><div>A</div><div>B</div><div>C</div></div>	<div>A Detail No. No. du détail</div> <div>B drawing no. – where detail required dessin no. – où détail exigé</div> <div>C drawing no. – where detailed dessin no. – où détaillé</div>
---	--

project title
titre du projet

Ontario

FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES

Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin

NOTES (1 of 2)

drawn by
dessiné par

HET

designed by
conç par

JD

approved by
approuvé par

JD

tender
soumission

Javier Banuelos

project manager
administrateur de projets

project date
date du projet

2016/12/01

project no.
no. du projet

R.058845.001

drawing no.
dessiné no.

BC2A

ELECTRICAL NOTES

1. GENERAL CONDITIONS

a. PROVIDE ALL LABOUR, EQUIPMENT, MATERIALS & TOOLS NECESSARY TO COMPLETE ALL SYSTEMS SHOWN ON THE DRAWINGS, THUS RENDERING A COMPLETE INSTALLATION.

b. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN OR INDICATED.

c. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, DIMENSIONS, ELEVATIONS ETC. IN THE FIELD.
2. CODES, PERMITS AND INSPECTION

a. PAY FOR & BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS AS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER THIS WORK. INCLUDE THESE COSTS IN THE TENDER PRICE. SUBMIT FINAL INSPECTION REPORT TO OWNER.

b. INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE CANADIAN ELECTRICAL CODE, 2015 EDITION, PROVINCIAL & FEDERAL CODES AND LOCAL BYLAWS AND N.S. STANDARDS FOR CONSTRUCTION AND INSTALLATION FOR PETROLEUM STORAGE TANK SYSTEMS, 1997.
3. DRAWING

a. PREPARE AND PAY FOR ANY LARGE SCALE WORKING DRAWINGS WHICH MAY BE REQUIRED BY THE EXAMINING AUTHORITIES, INCLUDE THIS COST IN THE TENDER PRICE.
4. RECORD DRAWINGS

a. KEEP A SEPARATE, COMPLETE, SET OF DRAWINGS ON SITE AND NOTE ALL CHANGES AND DEVIATIONS FROM THE ORIGINAL DESIGN. ONE SET OF THESE PLANS SHOWING AS-BUILT CONDITIONS SHALL BE FORWARDED TO THE OWNER AT THE COMPLETION OF THIS CONTRACT & BEFORE APPLYING FOR FINAL PAYMENT.
5. EXAMINATION OF SITE

a. ANY DEVIATIONS AND/OR CONFLICTS ON SITE SHALL BE REPORTED TO THE DEPARTMENTAL REPRESENTATIVE PRIOR TO SUBMITTING TENDER.
6. IDENTIFICATION

a. COLOUR CODE ALL ELECTRICAL JUNCTION BOXES TO BUILDING STANDARD. IDENTIFY WITH BLACK MARKER ON BOX COVERS ALL CIRCUITS CONTAINED WITHIN.
7. REVISIONS AND EXTRAS

a. NO ADDITIONAL MONEY OVER THE CONTRACT PRICE SHALL BE PAID UNLESS AN APPROVED CHANGE ORDER IS ISSUED BY THE OWNER. CLAIMS FOR EXTRAS SHALL BE SUBMITTED WITH A COMPLETE BREAKDOWN OF MATERIAL, LABOUR, HOURLY RATES, ETC.
8. CLEANUP

a. ALL CUTTING, PATCHING, & PAINTING REQUIRED FOR THE WORK OF THIS TRADE TO BE PERFORMED BY THE CONTRACTOR'S FORCES AT THE CONTRACTOR'S EXPENSE. CLEAN UP ALL DEBRIS UPON COMPLETION OF CONTRACT, COOPERATE WITH ALL OTHER TRADES.

b. MAINTAIN SITE IN TIDY CONDITION FREE FROM ACCUMULATION OF WASTE PRODUCTS AND DEBRIS. UPON OBTAINING SUBSTANTIAL PERFORMANCE OF THE WORK, REMOVE SURPLUS PRODUCTS, TOOLS, MACHINERY, AND EQUIPMENT FROM THE SITE. COMPLETION OF CLEANUP IS REQUIRED FOR TOTAL PERFORMANCE OF THE WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR ANY DAMAGE DONE TO EXISTING FEATURES AS A RESULT OF THIS WORK. DAMAGED OR DISTURBED ITEMS SHALL BE REPLACED IN KIND AND AT NO ADDITIONAL COST TO THE OWNER.
9. EQUIPMENT AND MATERIAL

a. ALL EQUIPMENT AND MATERIAL, UNLESS SPECIFICALLY NOTED OTHERWISE, SHALL BE NEW AND WITHOUT BLEMISH OR DEFECT. ALL MATERIAL SHALL BEAR A CSA (CANADIAN STANDARDS ASSOCIATION) APPROVAL STAMP. ALL DEVICES SHALL BE SPECIFICATION GRADE.
10. TESTING

a. PERFORM TESTING ON EACH SYSTEM TO THE SATISFACTION OF THE OWNER AND SUBMIT TEST RESULTS FOR APPROVAL PRIOR TO THE FINAL ACCEPTANCE OF THE WORK.

b. PANELS SHALL BE BALANCED WITHIN 5% OF LOAD PER PHASE. GROUNDING SHALL BE AS REQUIRED BY ELECTRICAL CODE.
11. ACCESSIBILITY

a. ALL WORK SHALL BE INSTALLED SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIRS.
12. RESPONSIBILITY

a. MAINTAIN RESPONSIBILITY FOR THE WORK UNTIL COMPLETION & FINAL ACCEPTANCE. REPLACE ANY ITEM THAT MAY BE DEFECTIVE, DAMAGED, LOST OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY TO THE COMPLETION OF THE PROJECT.

b. THE OWNER SHALL NOT BE RESPONSIBLE FOR THE ACTS OF OMISSION OF THE CONTRACTOR, SUBCONTRACTOR OR THEIR AGENTS OR EMPLOYEES OR ANY OTHER PERSON PERFORMING WORK.

c. THE CONTRACTOR SHALL DESIGN AND PROVIDE ANY TEMPORARY SHORING, BRACING, ETC. AS NEEDED FOR THE WORK SO AS NOT TO ENDANGER THE STRUCTURAL INTEGRITY OF ANY EXISTING FEATURE.
13. WARRANTY

a. WARRANT ALL WORK AND APPARATUS INSTALLED UNDER THIS CONTRACT AGAINST ALL DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR AFTER LETTER OF FINAL ACCEPTANCE.
14. SAFETY

a. OBSERVE ALL APPLICABLE SAFETY REQUIREMENTS INCLUDING THE USE OF SAFETY GLASSES, HARD HATS AND PROTECTION OF AREA WHEN WORKING OVERHEAD. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR CONTRACTOR SAFETY.
15. WIRING












a. RUN ALL WIRING IN RIGID CONDUIT. INSTALL RIGID CONDUIT PERPENDICULAR & PARALLEL TO BUILDING LINES. SUPPORT RIGID CONDUIT IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE. USE FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT. BX WIRE SHALL NOT BE USED.

b. ALL WIRING TO BE 600V MINIMUM RATED #12 COPPER RW90 XLPE UNLESS NOTED OTHERWISE.
16. LOAD DISTRIBUTION PANELS

a. THE CONTRACTOR SHALL VERIFY CIRCUIT BREAKER TYPE AND INSTALL CIRCUIT BREAKERS AS REQUIRED.

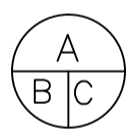
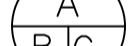

b. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR BALANCING THE CIRCUITS AND VERIFYING LOADING CAPACITY.



LEGEND		
	STORM SEWER	
	WATERMAIN	
	GAS PIPELINE	
	PROPANE PIPE	
	FUEL TANK PRODUCT PIPE	
	ELECTRICAL CONDUIT	
	FORCEMAIN	
	IRON BAR	
	APPROXIMATE PROPERTY BOUNDARY	
	APPROXIMATE LIMIT OF ASPHALT SAW-CUT	
	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE	

06	Issued for Tender	07 Jun 2017
05	Design Adjustments	24 Apr 2017
04	Design Adjustments	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 75% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the engineer of all discrepancies.

	A Detail No. No. du détail
	B drawing no. – where detail required dessin no. – où détail exigé
	C drawing no. – where detailed dessin no. – où détaillé

project title
titre du projet

Ontario

FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES

Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin

NOTES (2 of 2)

drawn by
dessine par

HET

designed by
conc par

JD

approved by
approuve par

JD

tender
soumission

Javier Banuelos

project manager
administrateur
de projets

project date
date du projet

2016/12/01

project no.
no. du projet

R.058845.001

drawing no.
dessine no.

BC2B



LEGEND		
—ST—	STORM SEWER	
—W—	WATERMAIN	
—G—	GAS PIPELINE	
—P—	PROPANE PIPE	
—GO—	FUEL TANK PRODUCT PIPE	
—E—	ELECTRICAL CONDUIT	
—FM—	FORCEMAIN	
—	APPROXIMATE PROPERTY BOUNDARY	
—	APPROXIMATE LIMIT OF ASPHALT SAW-CUT	
—	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE	
—	EQUIPMENT TO BE REMOVED AND DISPOSED	

06	Issued for Tender	09 Jun 2017
05	Design Adjustments	24 Apr 2017
04	Design Adjustment	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 75% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the engineer of all discrepancies.

A	Detail No.
B	drawing no. — where detail required
C	drawing no. — where detailed

project title
titre du projet
Ontario
FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES
Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin
EXISTING CONDITIONS AND
DEMOLITION PLAN

drawn by
dessiné par
HET

designed by
conçu par
JD

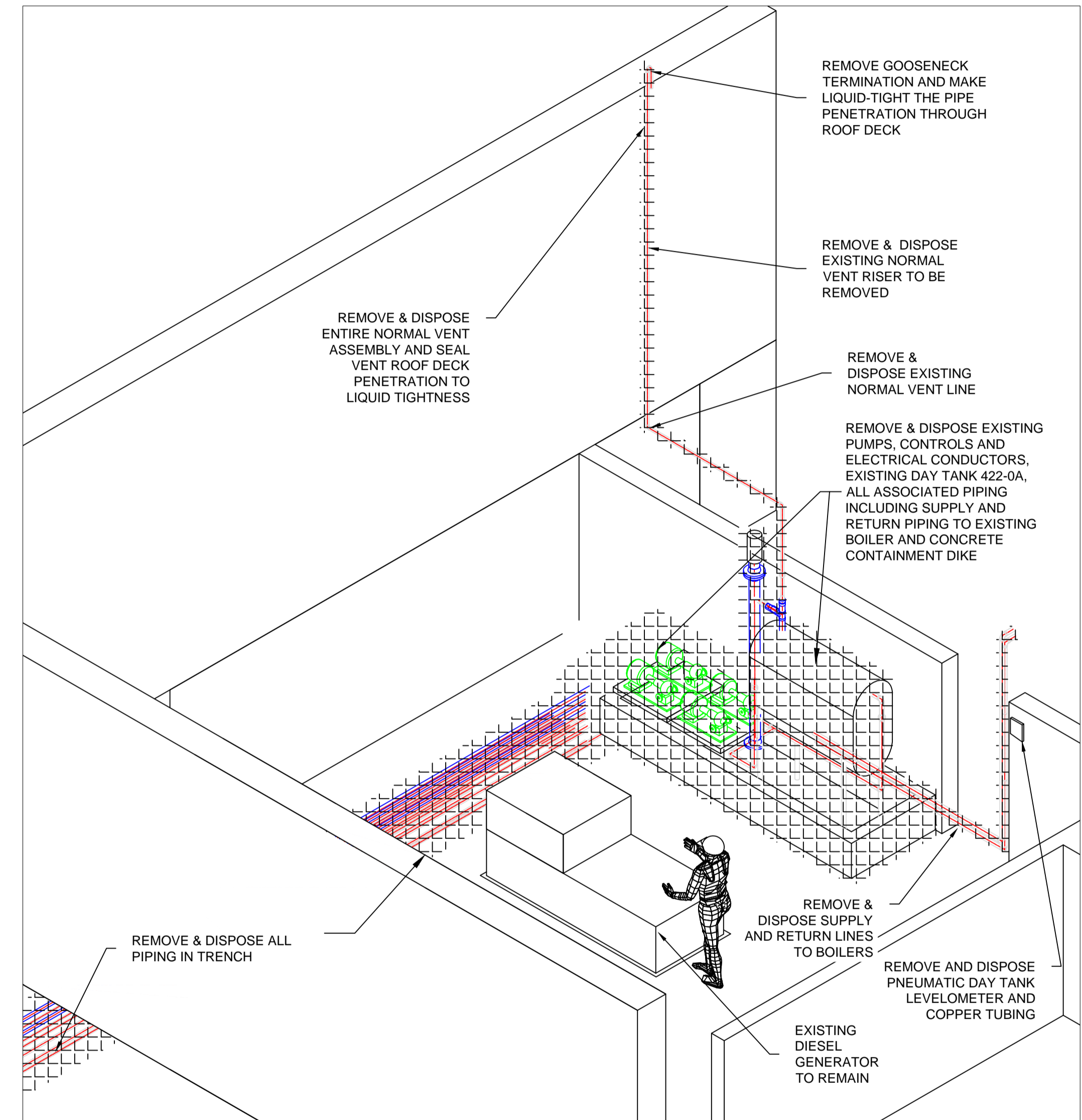
approved by
approuvé par
JD

tender
soumission
Javier Banuelos

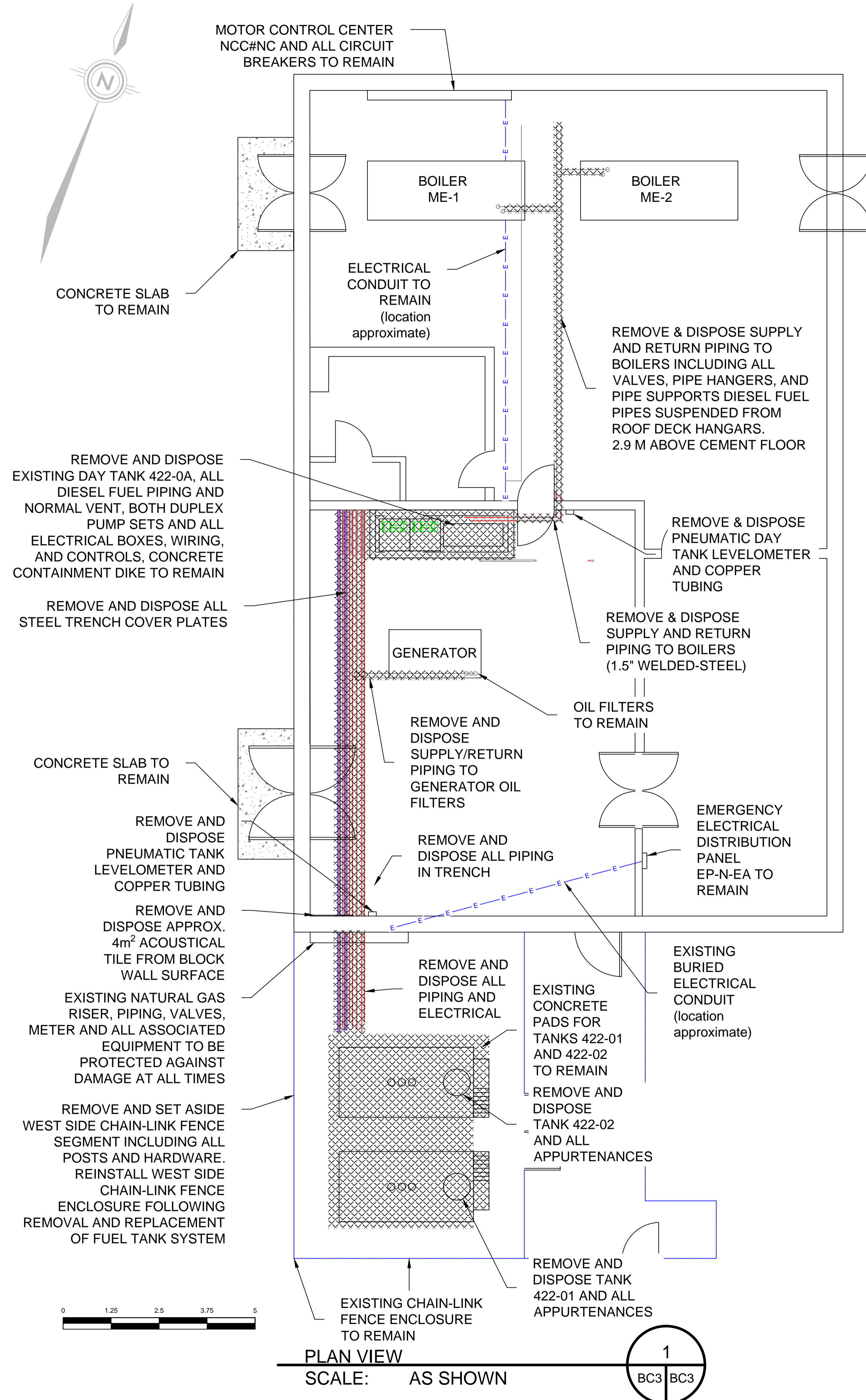
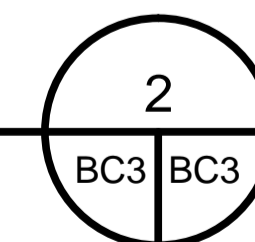
project date
date du projet
2016/12/19

project no.
no. du projet
R.058845.001

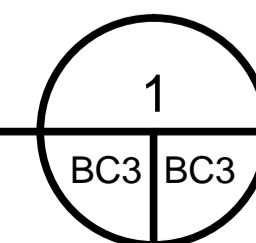
drawing no.
dessiné no.
BC3

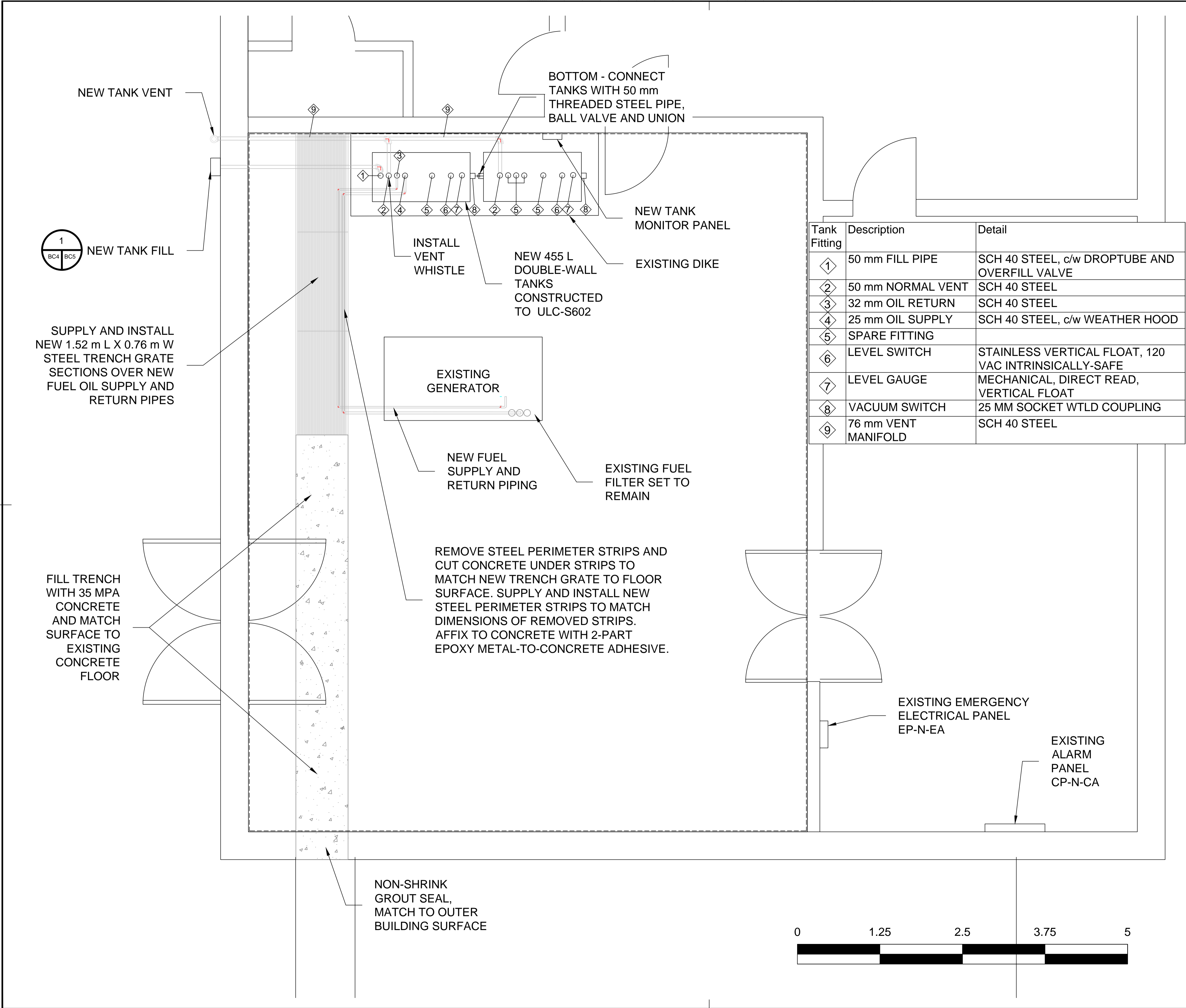


ISOMETRIC VIEW
SCALE: NOT TO SCALE













PLAN VIEW
SCALE: AS SHOWN








Tank Fitting	Description	Detail
1	50 mm FILL PIPE	SCH 40 STEEL, c/w DROPTUBE AND OVERFILL VALVE
2	50 mm NORMAL VENT	SCH 40 STEEL
3	32 mm OIL RETURN	SCH 40 STEEL
4	25 mm OIL SUPPLY	SCH 40 STEEL, c/w WEATHER HOOD
5	SPARE FITTING	
6	LEVEL SWITCH	STAINLESS VERTICAL FLOAT, 120 VAC INTRINSICALLY-SAFE
7	LEVEL GAUGE	MECHANICAL, DIRECT READ, VERTICAL FLOAT
8	VACUUM SWITCH	25 MM SOCKET WTLD COUPLING
9	76 mm VENT MANIFOLD	SCH 40 STEEL



LEGEND		
	ST	STORM SEWER
	W	WATERMAIN
	G	GAS PIPELINE
	P	PROPANE PIPE
	GO	FUEL TANK PRODUCT PIPE
	E	ELECTRICAL CONDUIT
		APPROXIMATE PROPERTY BOUNDARY
		APPROXIMATE LIMIT OF ASPHALT SAW-CUT
		CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE
		GROUND BUS BAR

07	Issued for Tender	09 Jun 2017
06	Design Adjustments	24 Apr 2017
05	Design Adjustment	21 Feb 2017
04	Issued for Tender	18 Jan 2017
03	Proposed Amendment	21 Dec 2016
02	Issued for 99% Review	19 Dec 2016
01	Issued for 75% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the engineer of all discrepancies.

	A	Detail No.
	B	No. du détail
	C	drawing no. - where detail required dessin no. - où détail exigé
		drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet

Ontario

FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES

Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin

NEW FUEL SYSTEM
LAYOUT

drawn by
dessiné par

HET

designed by
conç par

JD

approved by
approuvé par

JD

tender
soumission

Javier Banuelos

project manager
administrateur de projets

project date
date du projet

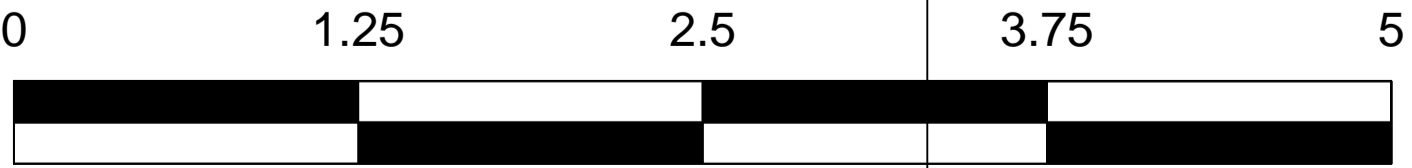
2016/11/30

project no.
no. du projet

R.058845.001

drawing no.
dessiné no.

BC4





LEGEND

—ST—	STORM SEWER
—W—	WATERMAIN
—G—	GAS PIPELINE
—P—	PROPANE PIPE
—GO—	FUEL TANK PRODUCT PIPE
—E—	ELECTRICAL CONDUIT
—FM—	FORCEMAIN
■ SIB	IRON BAR
— — — — —	APPROXIMATE PROPERTY BOUNDARY
— — — — —	APPROXIMATE LIMIT OF ASPHALT SAW-CUT
— — — — —	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE

06	Issued for Tender	09 June 2017
05	Design Adjustments	24 Apr 2017
04	Design Adjustments	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 98% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the engineer of all discrepancies.

A	Detail No.
B	drawing no. — where detail required
C	drawing no. — where detailed

project title
titre du projet
Ontario
FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES
Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin
FUEL DELIVERY
EQUIPMENT DETAILS

drawn by
dessiné par
HET

designed by
conçu par
JD

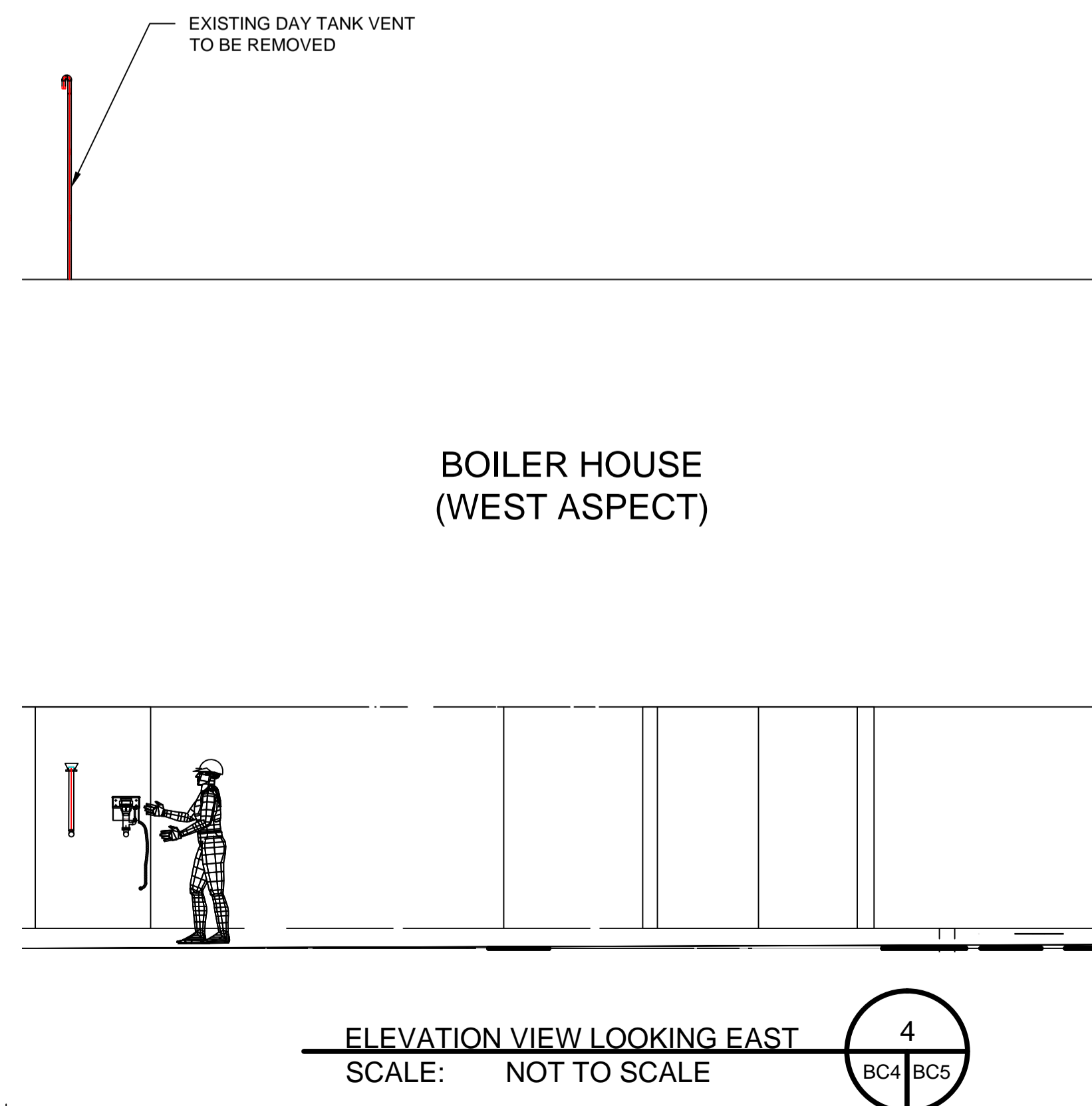
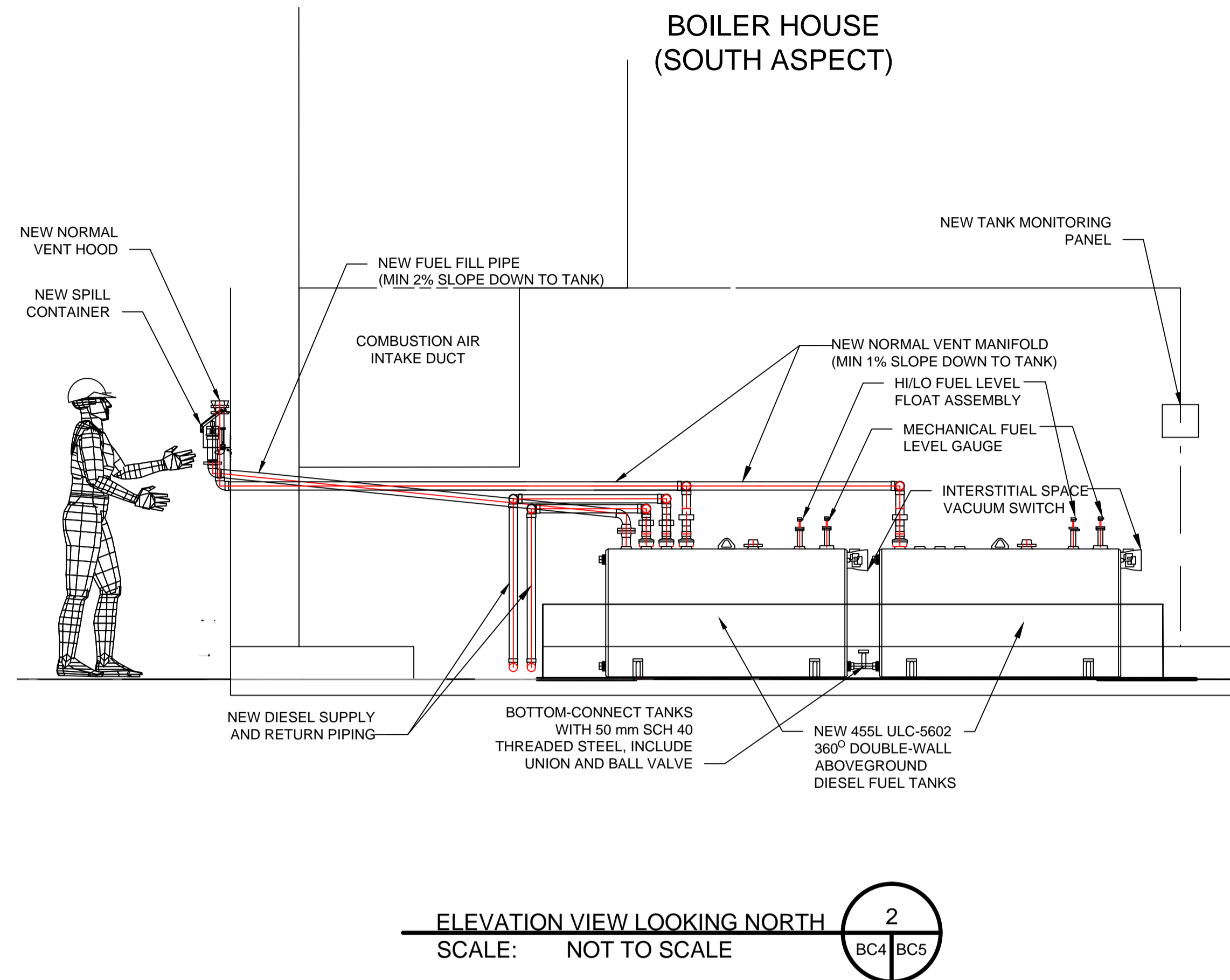
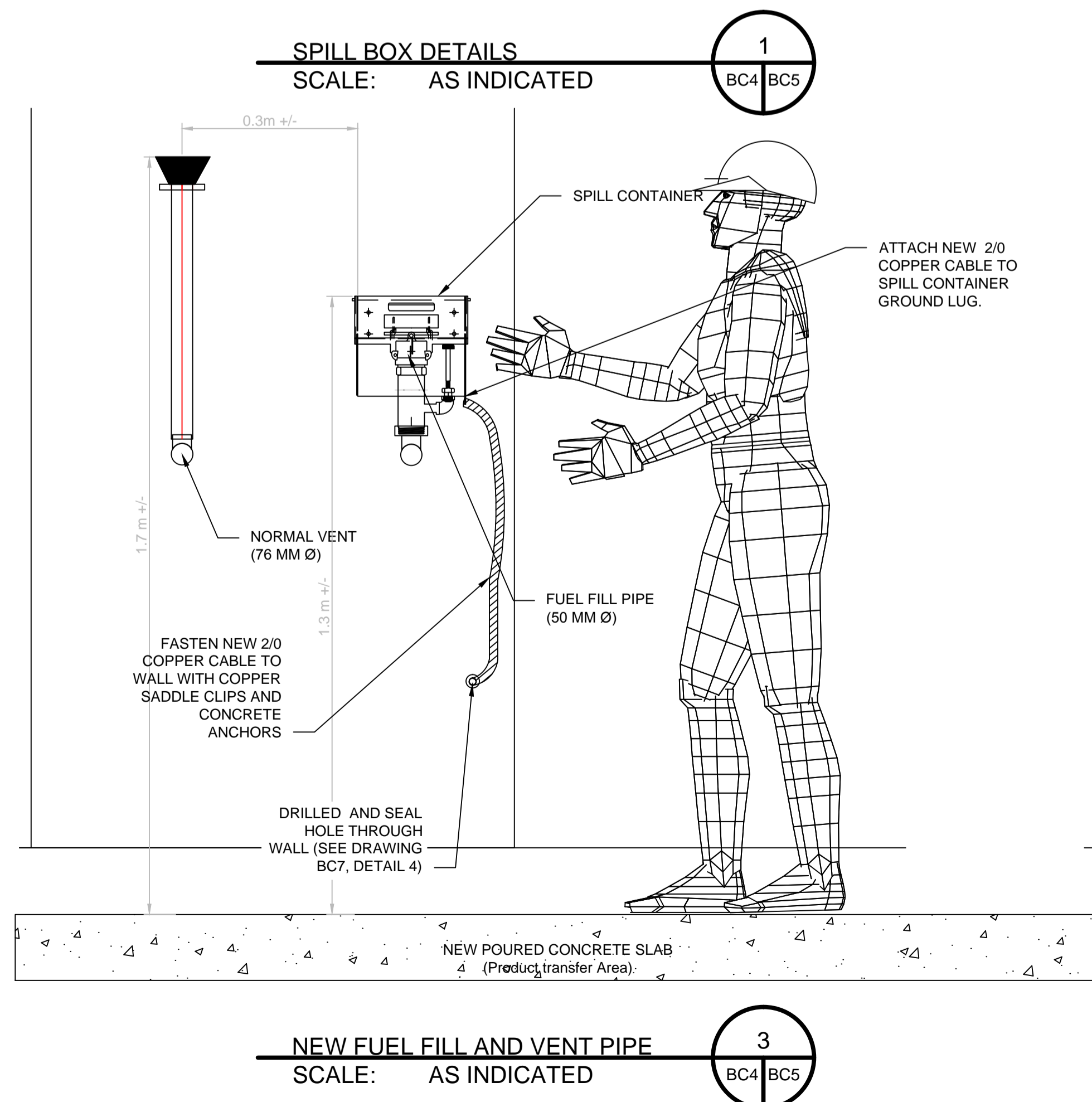
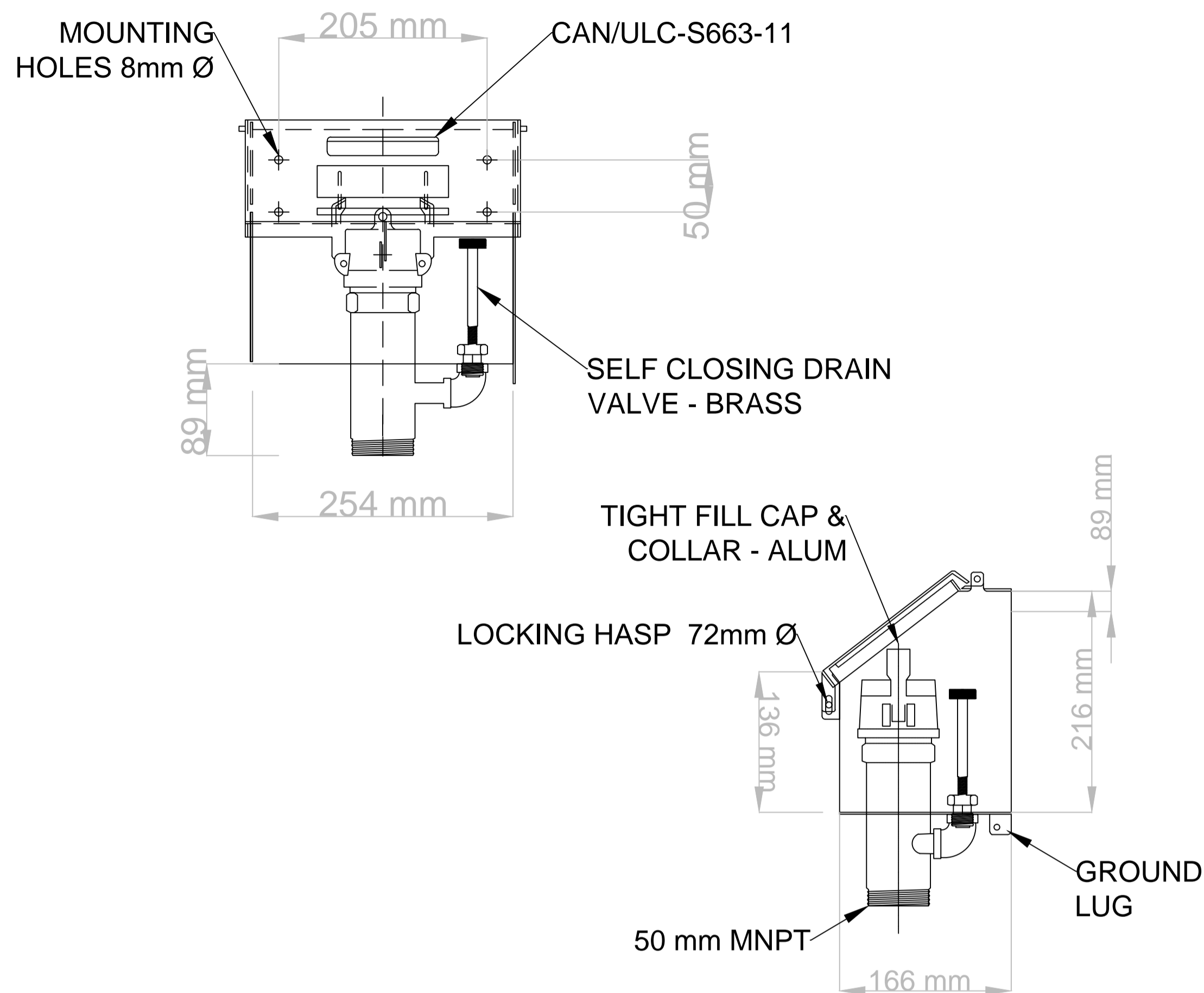
approved by
approuvé par
JD

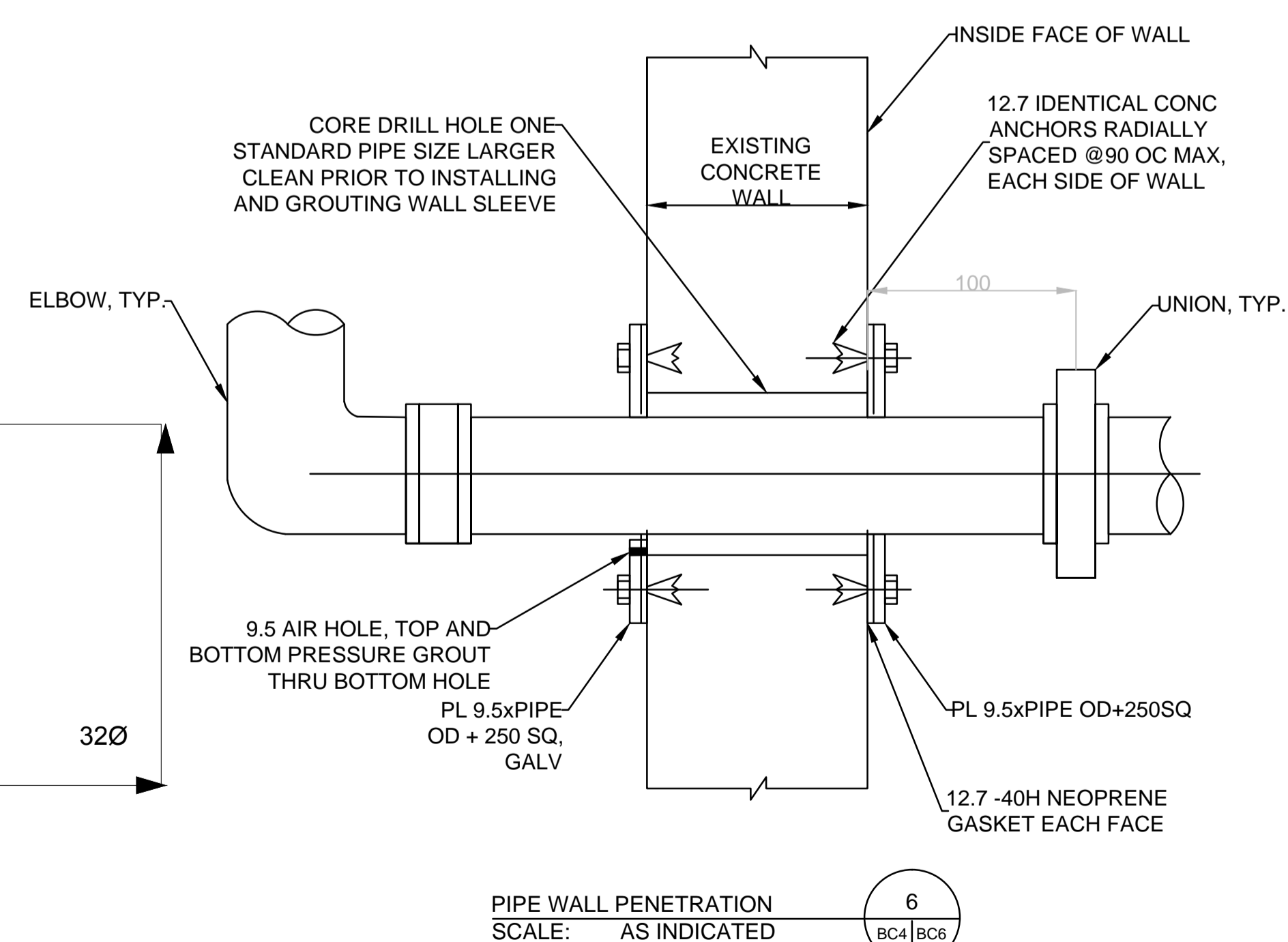
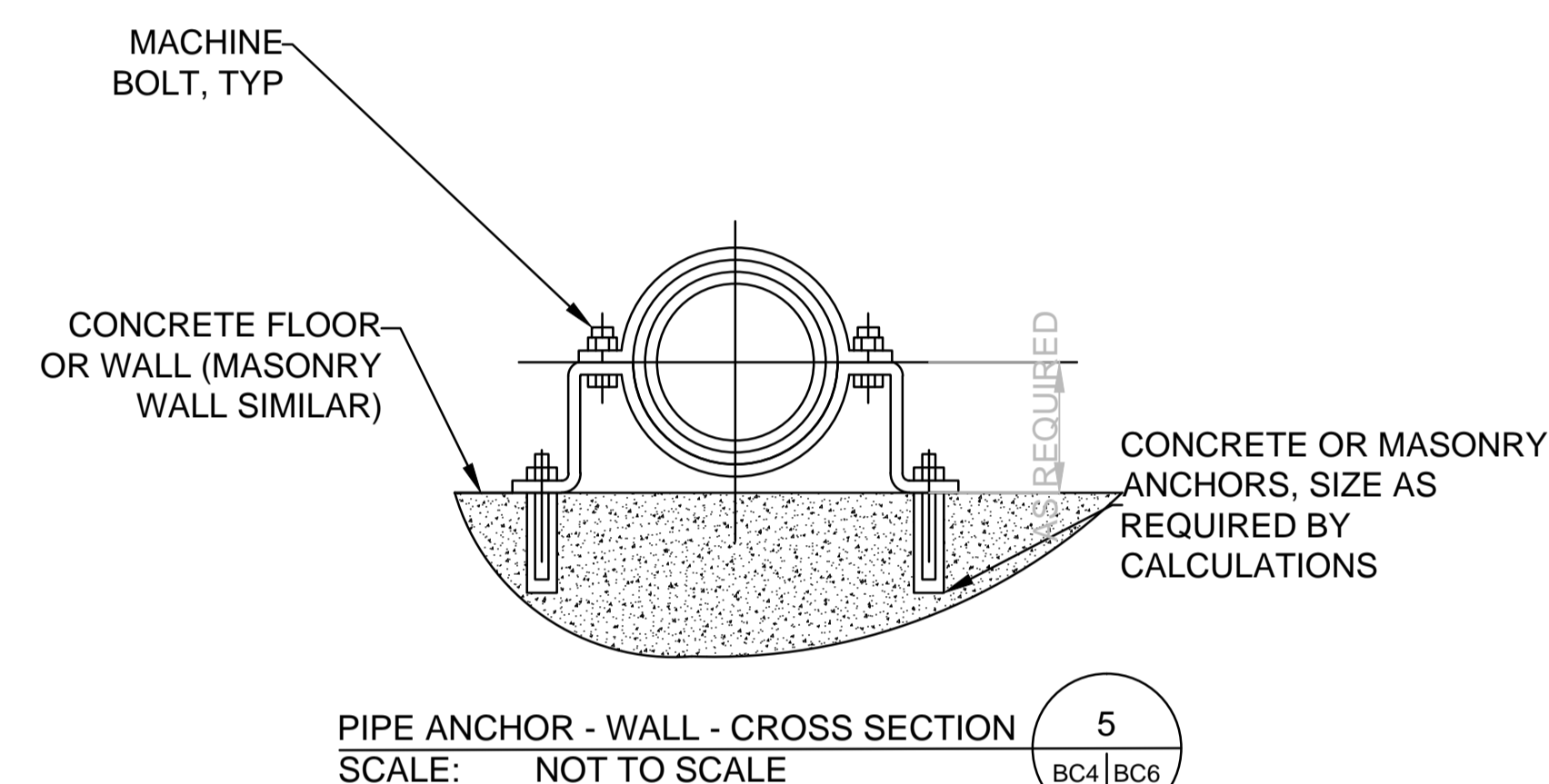
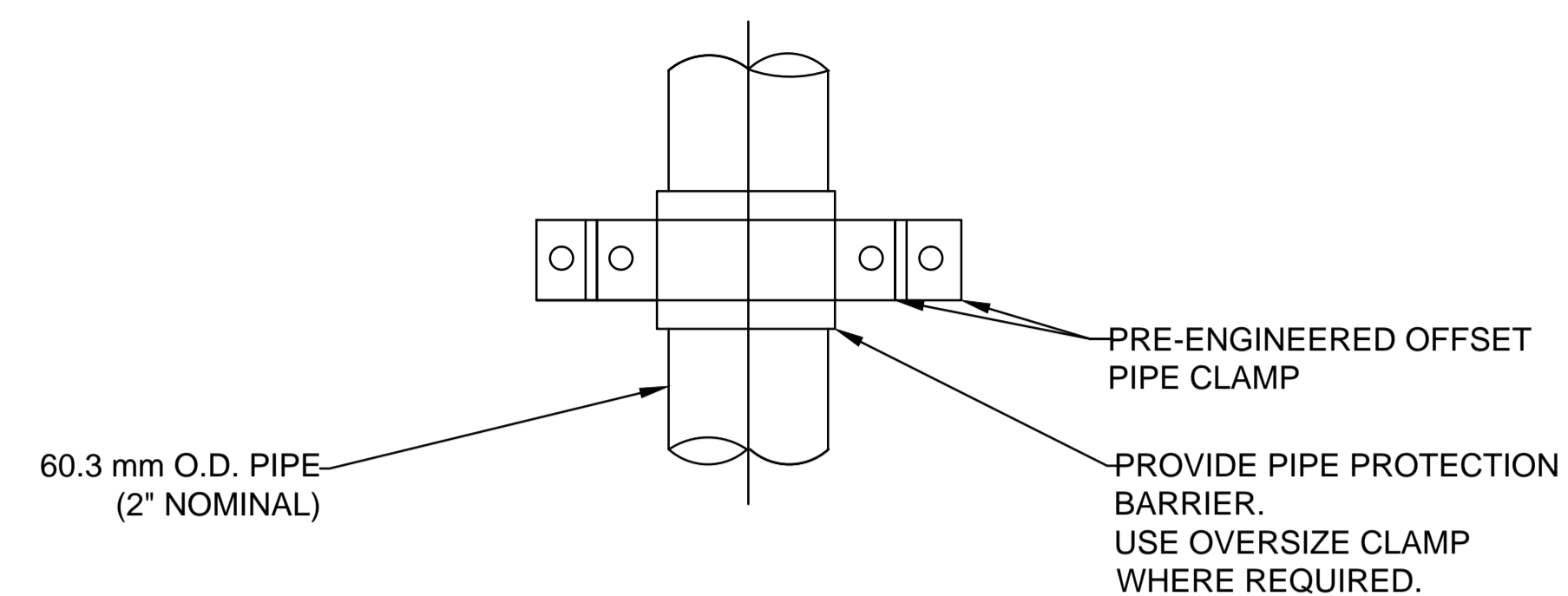
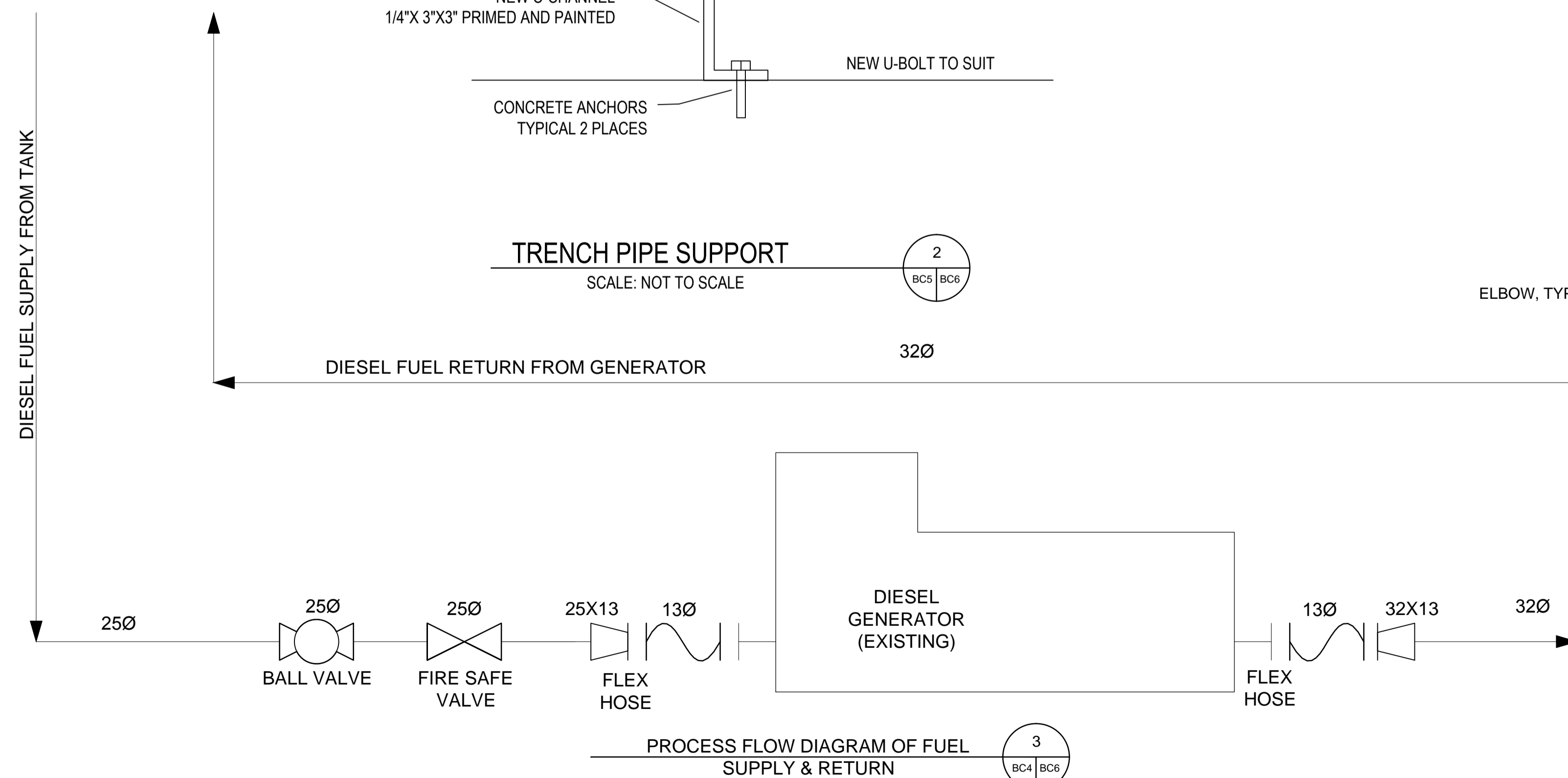
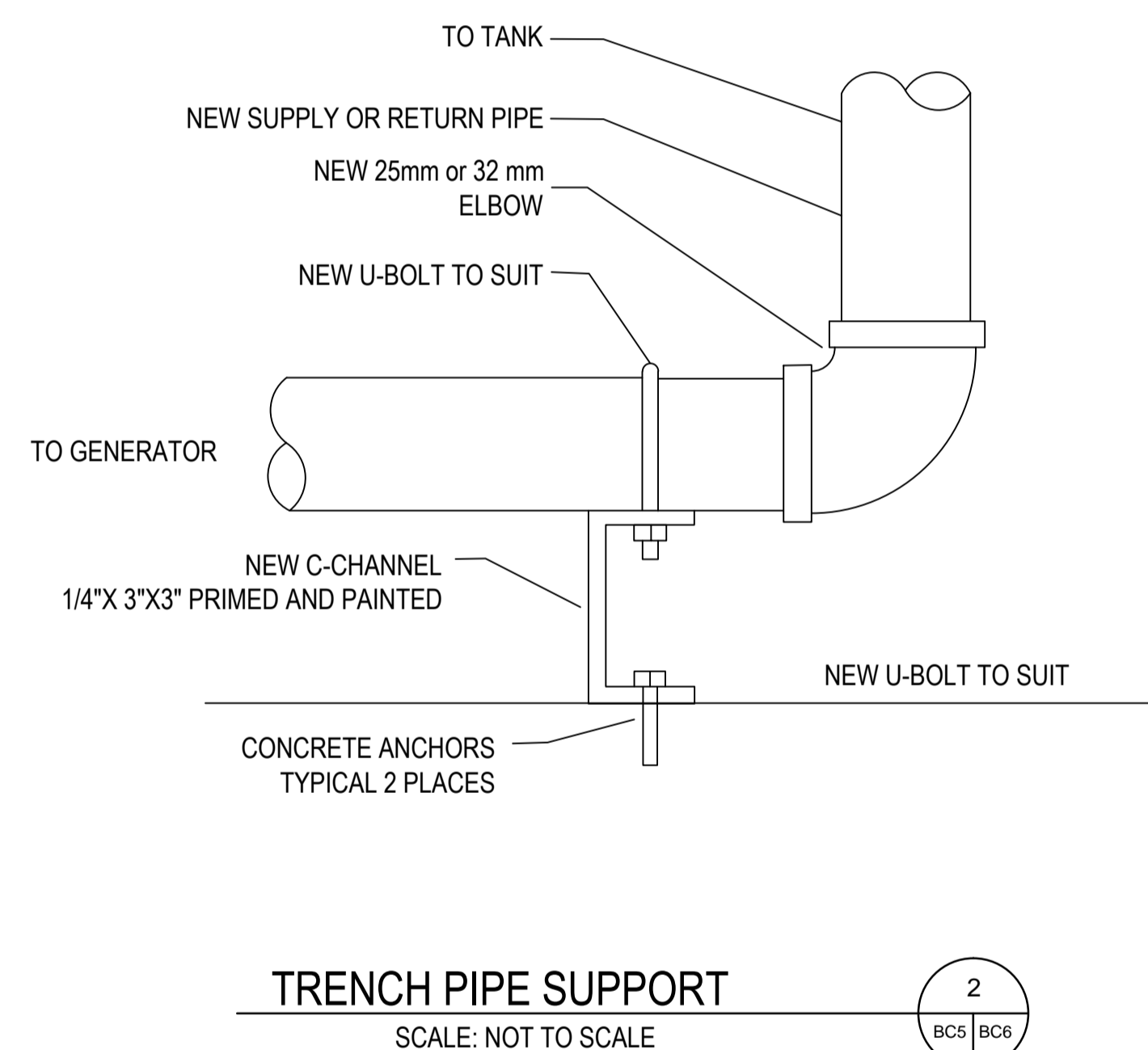
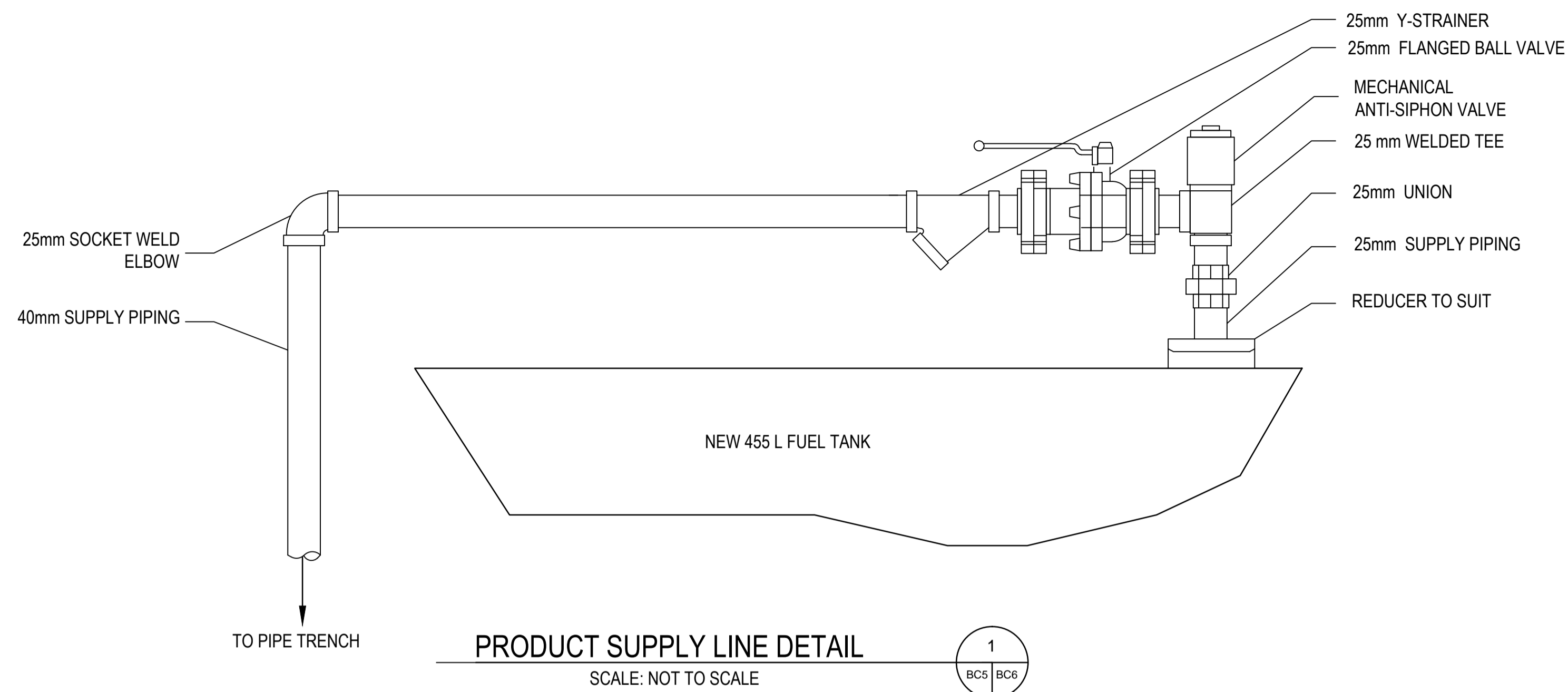
tender
soumission
Javier Banuelos

project date
date du projet
2016/11/30

project no.
no. du projet
R.058845.001

drawing no.
dessiné no.
BC5







LEGEND

—ST—	STORM SEWER
—W—	WATERMAIN
—G—	GAS PIPELINE
—P—	PROPANE PIPE
—GO—	FUEL TANK PRODUCT PIPE
—E—	ELECTRICAL CONDUIT
—FM—	FORCEMAIN
■ SIB	IRON BAR
— — — — —	APPROXIMATE PROPERTY BOUNDARY
— · — · — · —	APPROXIMATE LIMIT OF ASPHALT SAW-CUT
— · — · — · —	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE

06	Issued for Tender	09 Jun 2017
05	Design Adjustments	24 Apr 2017
04	Design Adjustments	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 99% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the engineer of all discrepancies.

A	Detail No.
B	drawing no. — where detail required
C	drawing no. — where detailed

project title
titre du projet

Ontario
FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES
Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin

ELECTRICAL DETAILS

drawn by
dessiné par

HET

designed by
conçue par

JD

approved by
approuvé par

JD

tender
soumission

Javier Banuelos

project date
date du projet

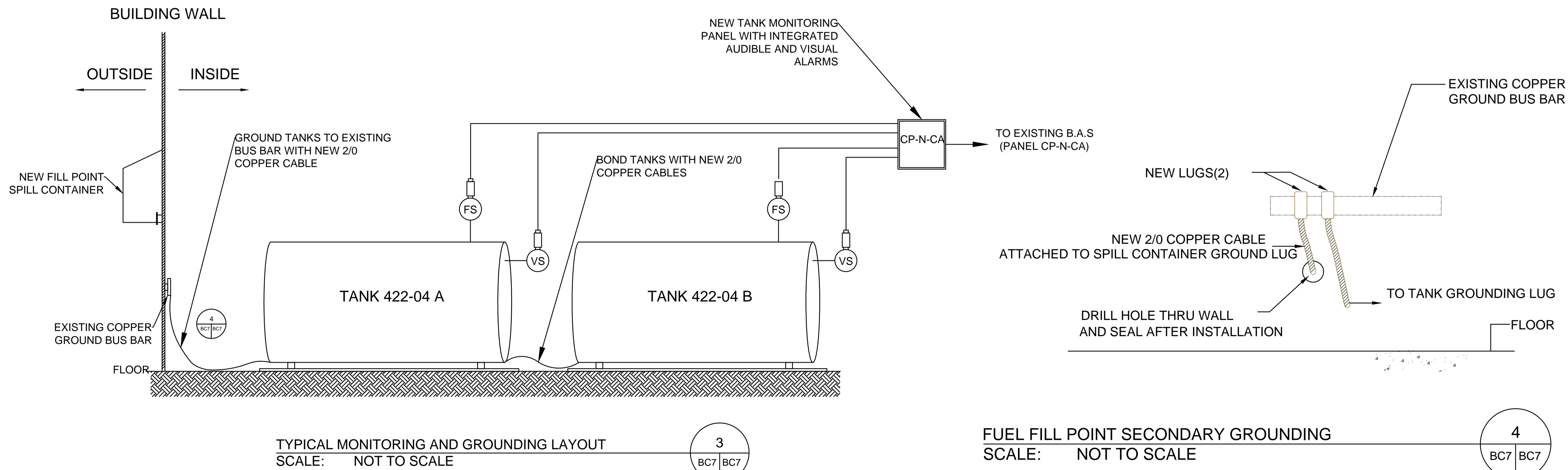
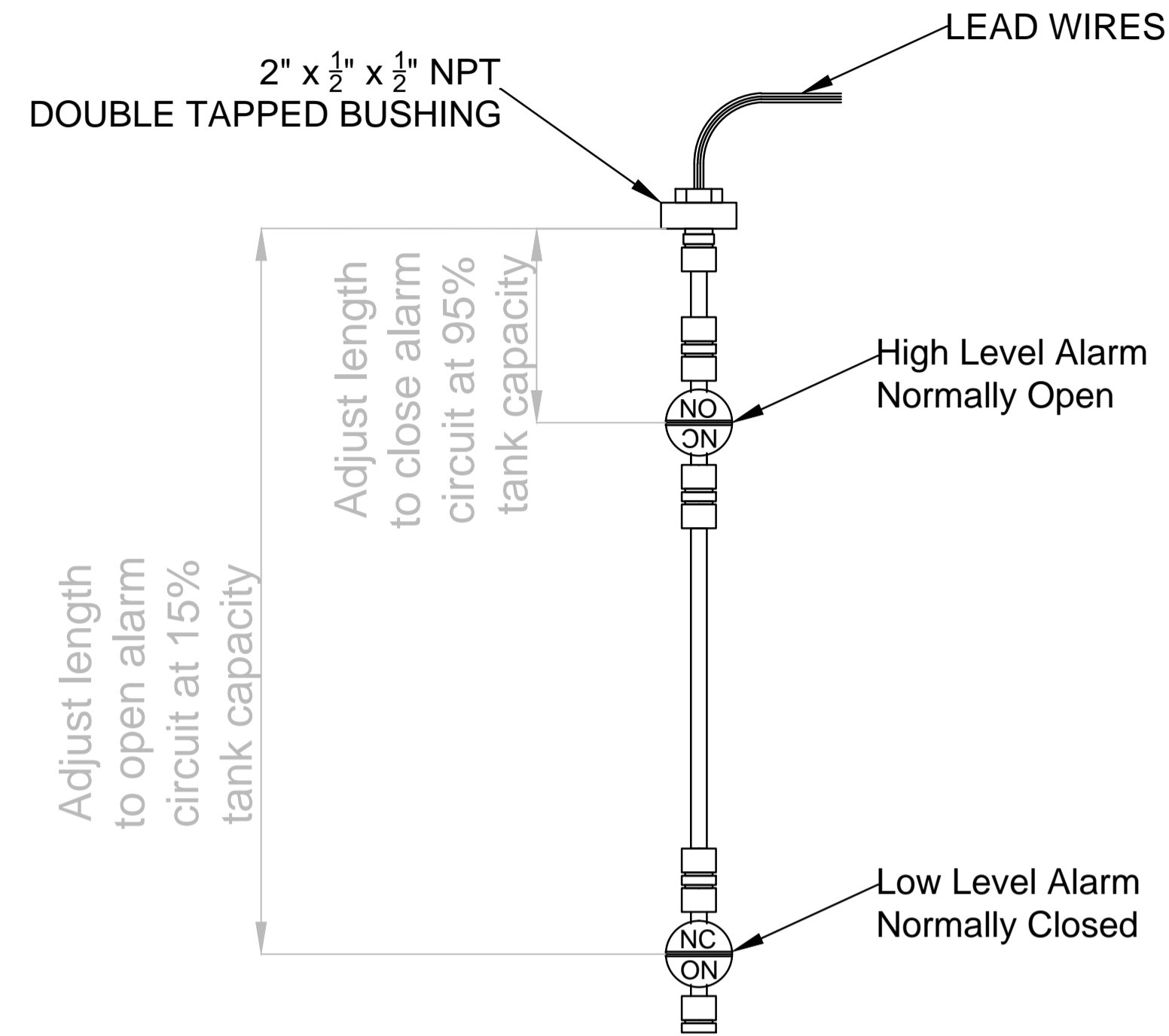
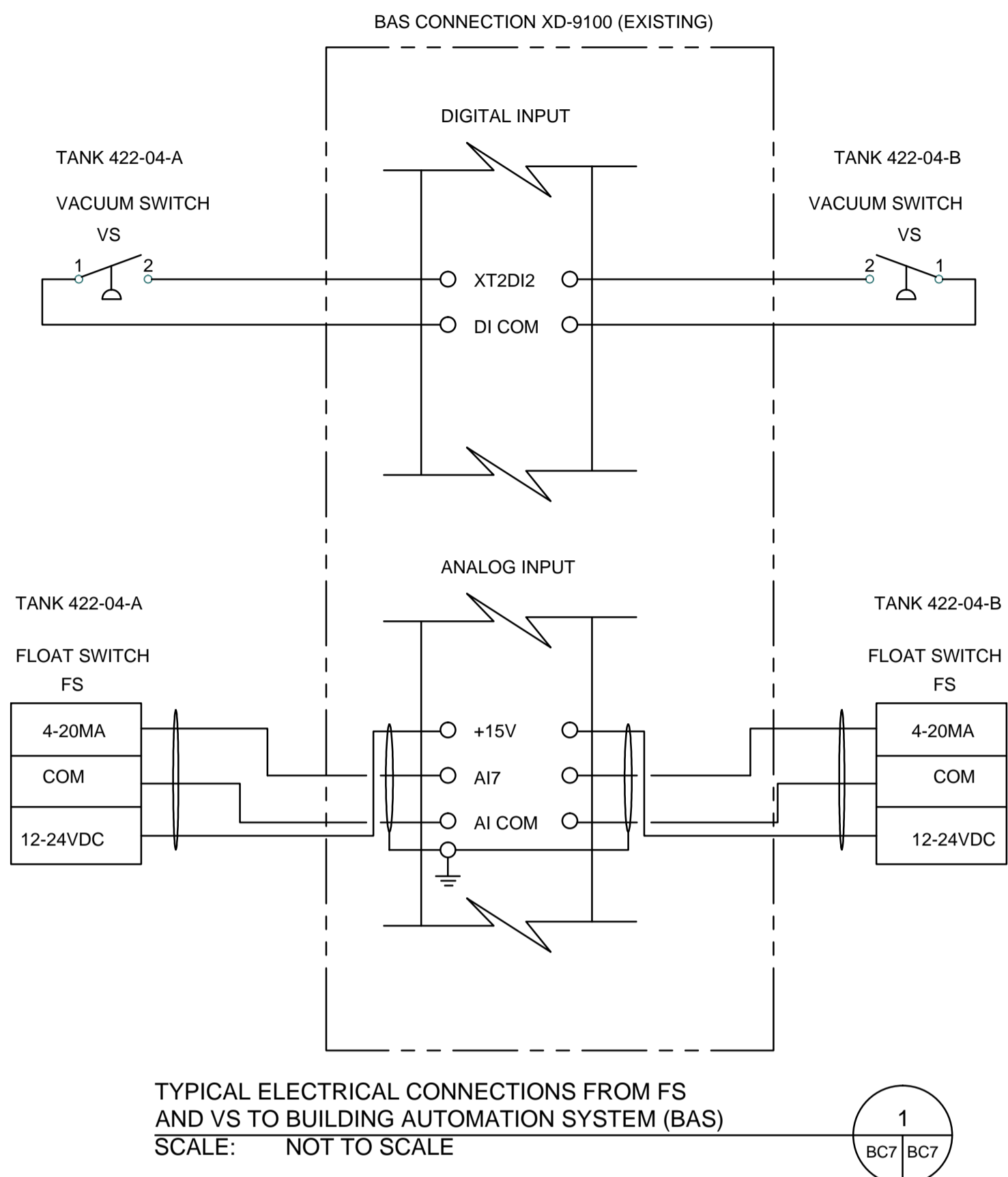
2016/11/30

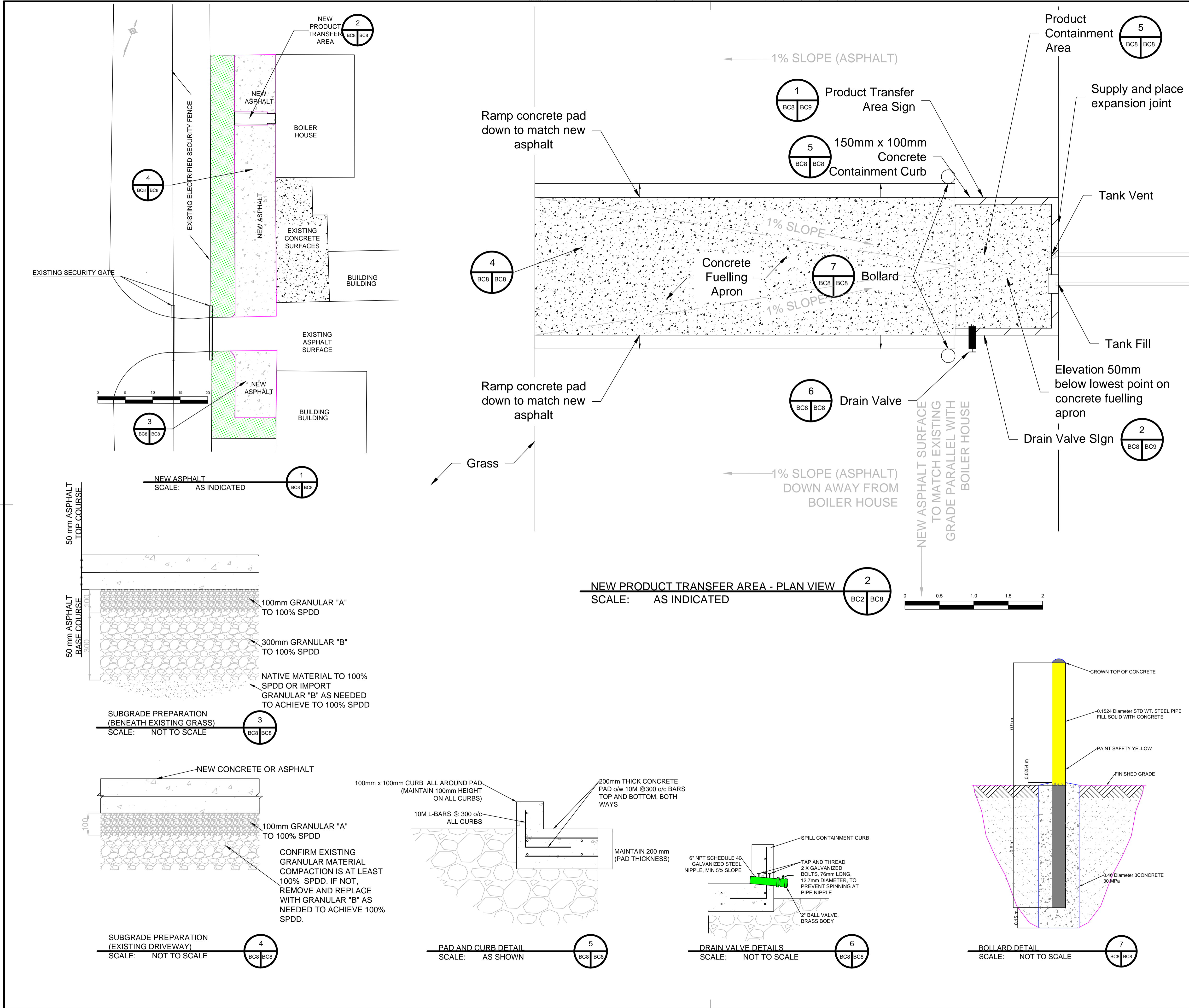
project no.
no. du projet

R.058845.001

drawing no.
dessiné no.

BC7





LEGEND		
— ST —	STORM SEWER	
— W —	WATERMAIN	
— G —	GAS PIPELINE	
— P —	PROPANE PIPE	
— GD —	FUEL TANK PRODUCT PIPE	
— E —	ELECTRICAL CONDUIT	
— FM —	FORCEMAIN	
■ SIB	IRON BAR	
— — — — —	APPROXIMATE PROPERTY BOUNDARY	
— — — — —	APPROXIMATE LIMIT OF ASPHALT SAW-CUT	
— — — — —	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE	

06	Issued for Tender	09 Jun 2017
05	Design Adjustments	24 Apr 2017
04	Design Adjustments	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 99% Review	15 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the engineer of all discrepancies.

A	Detail No.
B	No. du détail
C	drawing no. — where detail required dessin no. — où détail exigé
C	drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
Ontario
FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES
Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin
PRODUCT TRANSFER AREA
DETAILS

drawn by
dessiné par
HET

designed by
conc par
JD

approved by
approuvé par
JD

tender
soumission
Javier Banuelos

project date
date du projet
2016/12/13

project no.
no. du projet
R.058845.001

drawing no.
dessiné no.
BC8



LEGEND

— ST —	STORM SEWER
— W —	WATERMAIN
— G —	GAS PIPELINE
— P —	PROPANE PIPE
— GO —	FUEL TANK PRODUCT PIPE
— E —	ELECTRICAL CONDUIT
— FM —	FORCEMAIN
■ SIB	IRON BAR
— — — — —	APPROXIMATE PROPERTY BOUNDARY
— — — — —	APPROXIMATE LIMIT OF ASPHALT SAW-CUT
— — — — —	CONTRACTOR SUPPLIED TEMPORARY CHAIN-LINK FENCE ENCLOSURE

06	Issued for Tender	09 Jun 2017
05	Design Adjustments	24 Apr 2017
04	Design Adjustments	21 Feb 2017
03	Issued for Tender	18 Jan 2017
02	Issued for 99% Review	19 Dec 2016
01	Issued for 99% Review	01 Dec 2016
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the engineer of all discrepancies.

	A Detail No.
	B drawing no. — where detail required dessin no. — où détail exigé
	C drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet

Ontario

**FUEL TANK SYSTEM REMOVALS,
INSTALLATIONS AND UPGRADES**

Correctional Services Canada
2000 Beaver Creek Drive,
Gravenhurst, Ontario

drawing title
titre du dessin

SIGNAGE

drawn by
dessiné par HET

designed by
conc par JD

approved by
approuvé par JD

tender
soumission Javier Banuelos

project manager
administrateur de projets

project date
date du projet 2016/11/30

project no.
no. du projet R.058845.001

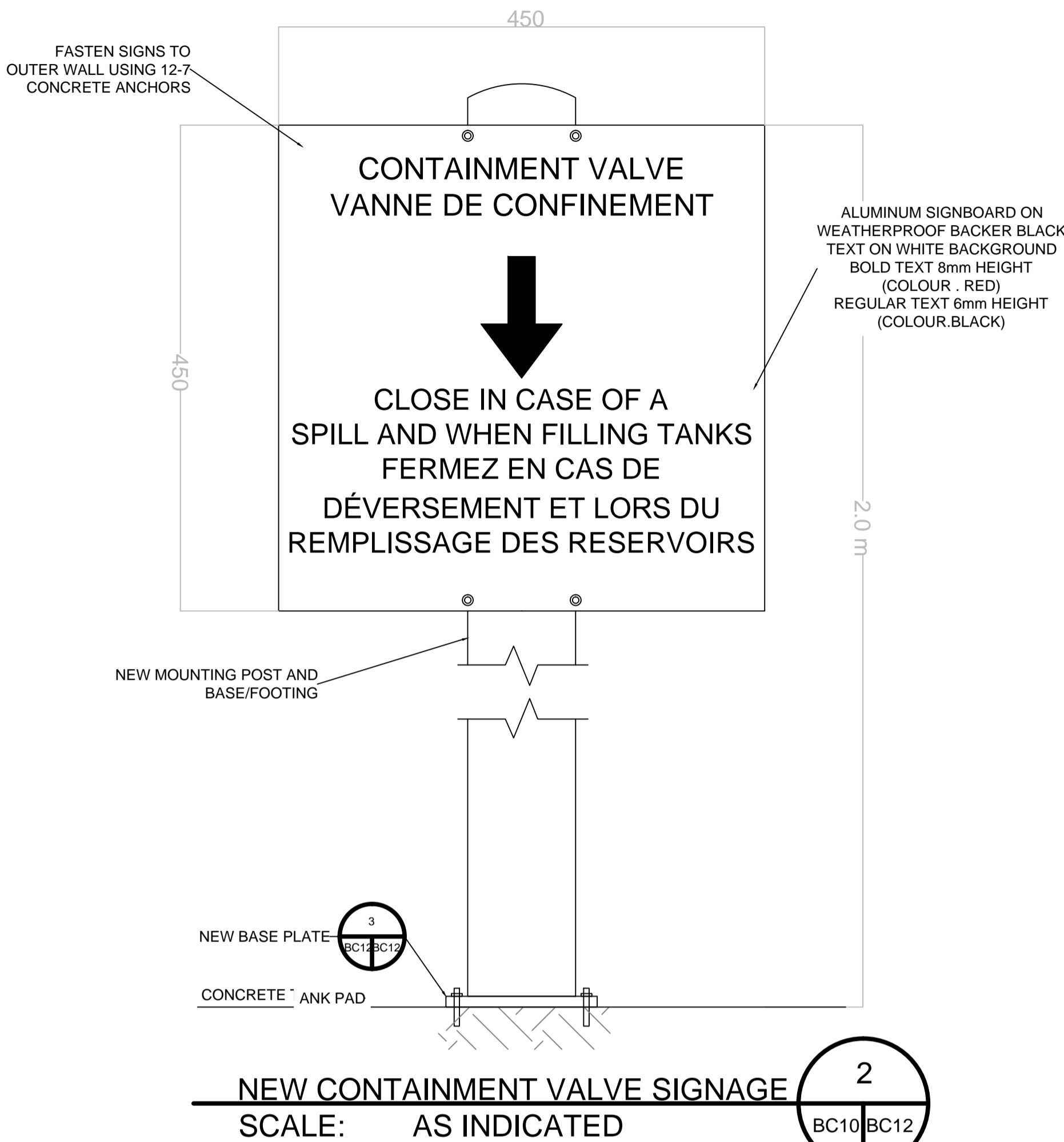
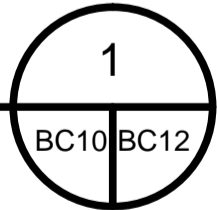
drawing no.
dessiné no. BC9

<p>IN THE EVENT OF A SPILL OR EMERGENCY:</p> <ul style="list-style-type: none">• IN THE EVENT OF A SPILL OR EMERGENCY:• ENSURE PERSONAL AND PUBLIC SAFETY. NOTIFY PEOPLE IN IMMEDIATE AREA OF POTENTIAL DANGER AS REQUIRED.• CLOSE CONTAINMENT CURB VALVE• CONTAIN SPILL USING APPROPRIATE SPILL KITS AND SAFETY EQUIPMENT• ISOLATE AND STOP LEAK, IF POSSIBLE PREVENT SPILLED PRODUCT FROM ENTERING INTO THE ENVIRONMENT• COMPLETE CLEAN UP OF SPILLED PRODUCT USING APPROPRIATE SPILL KITS AND SAFETY EQUIPMENT• CONTACT WORKS AT 705-684-4004 AND THE CORRECTIONAL MANAGER AT 705-687-1780• CONTACT THE ONTARIO SPILL ACTION CENTRE AT 1-800-268-6060• REFER TO SITE INSTITUTIONAL ENVIRONMENTAL EMERGENCY PLAN FOR ADDITIONAL REQUIREMENTS.	<p>EN CAS DE DÉVERSEMENT OU D'URGENCE:</p> <ul style="list-style-type: none">• ASSUREZ VOTRE SÉCURITÉ ET CELLE DU PUBLIC. AU BESOIN, AVISEZ LES GENS DANS LES ENVIRONS IMMÉDIATS DES DANGERS POTENTIELS.• FERMEZ LA VANNE DE CONFINEMENT.• CONTENIR LE DÉVERSEMENT AVEC UNE TROUSSE ANTIDÉVERSEMENT ET L'ÉQUIPEMENT DE SÉCURITÉ APPROPRIÉ• ISOLEZ ET ARRÊTEZ LA FUITE. SI POSSIBLE, EMPÊCHEZ LE PRODUIT DÉVERSÉ DE REJOINDRE L'ENVIRONNEMENT ET LE PORT.• NETTOYEZ LE PRODUIT DÉVERSÉ AVEC UNE TROUSSE ANTIDÉVERSEMENT ET L'ÉQUIPEMENT DE SÉCURITÉ APPROPRIÉS.• COMMUNIQUEZ AVEC LE SERVICE DES TRAVAUX À 705-684-4004 ET LE GESTIONNAIRE CORRECTIONNEL À 705-687-1780• COMMUNIQUEZ AVEC LE CENTRE D'ACTION DÉVERSEMENTS DE L'ONTARIO AU 1-800-268-6060• SE RÉFÉREZ AU PLAN INSTITUTIONNEL D'URGENCE ENVIRONNEMENTALE POUR DES EXIGENCES SUPPLÉMENTAIRES.
--	---

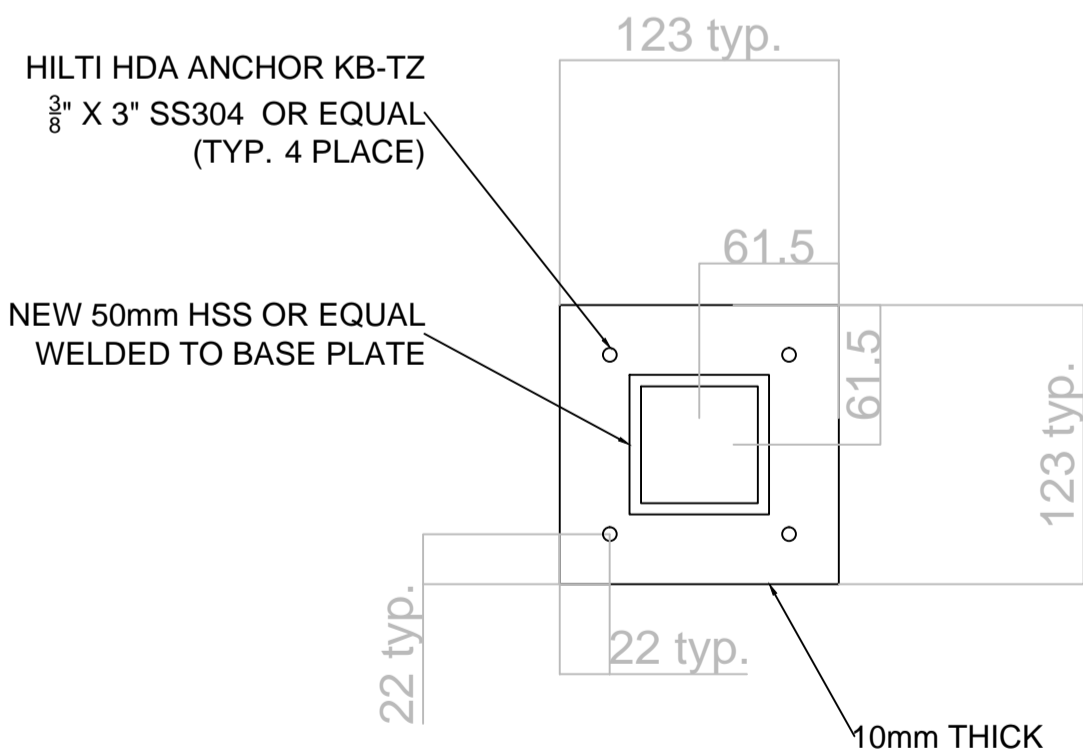
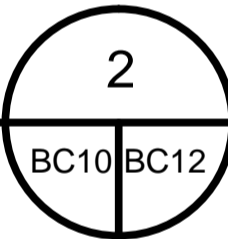
<p>FUEL DELIVERY STANDARD OPERATING PROCEDURES:</p> <ol style="list-style-type: none">1. PRIOR TO PRODUCT TRANSFER:<ul style="list-style-type: none">• PARK FUEL DELIVERY VEHICLE SUCH THAT FUEL HOSE CONNECTION TO TRUCK IS ENTIRELY ABOVE CONCRETE PRODUCT TRANSFER AREA• CONNECT FUEL TRUCK GROUND CABLE TO SPILL BOX GROUND LUG• ENSURE A SPILL KIT WITH SPILL RESPONSE MATERIAL IS PRESENT• SPILL RESPONSE MATERIALS TO INCLUDE:<ul style="list-style-type: none">- ABSORBENT PADS- ABSORBENT/CONTAINMENT SOCKS• ENSURE THAT THE ENVIRONMENTAL PTA CONTAINMENT CURB AREA IS FREE OF SNOW/WATER ACCUMULATION• INSPECT DELIVERY HOSE AND FITTINGS• CONFIRM AVAILABLE TANK VOLUME• ENSURE DELIVERY TRUCK AND HOSE ARE ENTIRELY WITHIN CONCRETE PRODUCT TRANSFER AREA• CLOSE PRODUCT CONTAINMENT AREA VALVE2. DURING PRODUCT TRANSFER:<ul style="list-style-type: none">• ENSURE THE DELIVERY TRUCK OPERATOR USES A LIQUID AND VAPOUR TIGHT CONNECTION• REMAIN IN ATTENDANCE AT FILL CONNECTION AT ALL TIMES• WHEN VENT WHISTLE STOPS SOUNDING, STOP DELIVERY, POSITIVE CLOSING SHUT-OFF VALVE IS SET TO STOP FLOW AT 95% TANK CAPACITY• IF TANK OVERFILL STROBE OR SIREN ACTIVATES, STOP DELIVERY3. AFTER PRODUCT TRANSFER<ul style="list-style-type: none">• VERIFY NO SPILLS/RESIDUAL PRODUCT ARE PRESENT• IF SPILL OR RESIDUAL PRODUCT, CLEAN WITH APPROPRIATE MATERIALS• COMPLETE NECESSARY DOCUMENTATION• OPEN PRODUCT CONTAINMENT AREA VALVE <p>IN CASE OF SPILL</p> <p>CONTACT WORKS AT 705-674-4004 AND THE CORRECTIONAL MANAGER AT 705-687-1780 AND THE SPILL ACTION CENTRE AT 1-800-262-6060</p>	<p>PROCÉDURES D'OPÉRATION NORMALISÉES POUR LA LIVRAISON DE CARBURANT:</p> <ol style="list-style-type: none">1. AVANT LE TRANSFERT DU PRODUIT:<ul style="list-style-type: none">• STATIONNER LE VÉHICULE DELIVRAISON DE CARBURANT DE SORTE QUE LA CONNEXION DU TUYAU D'ESSENCE AU CAMION SOIT ENTièrement AU-DESSUS DE LA ZONE DE TRANSFERT DE PRODUIT EN BETON• REJUEZ LE CABLE DE TERRE AU CAMION DE CARBURANT À LA RONDELLE DE MISE À LA TERRE.• S'ASSUREZ QU'UNE TROUSSE ANTIDÉVERSEMENT CONTENANT LE MATÉRIEL D'INTERVENTION AUCAS D'URGENCE SE TROUVE SUR PLACE• LE MATÉRIEL D'INTERVENTION D'URGENCE DOIT COMPRENDRE:<ul style="list-style-type: none">- DES TAMPONS ABSORBANTS- DES BARRAGES DE RÉTENTION/ABSORBANTS• S'ASSUREZ QUE L'AIRE DE TRANSFERT ET DE RÉTENTION NE CONTIENT PAS DE NEIGE NI D'EAU• INSPECTEZ LE TUYAU DE LIVRAISON ET SES RACCORDS• VÉRIFIEZ LE VOLUME DU RÉSERVOIR• J'ASSUREZ QUE LE CAMION DE LIVRAISON ET LE TUYAU SONT ENTièrement A L'INTÉRIEUR DE LA ZONE DE TRANSFERT EN BETON• FERMEZ LA VANNE DE CONFINEMENT2. PENDANT LE TRANSFERT DU PRODUIT:<ul style="list-style-type: none">• S'ASSUREZ QUE L'OPÉRATEUR DU CAMION DE LIVRAISON UTILISE UNE CONNEXION ÉTANCHE AUX LIQUIDES ET A LA VAPEUR• DEMEUREZ SUR PLACE AU POINT DE REMPLISSAGE PENDANT LE TRANSFERT• LQUAND LE SIFFLET DE VENTILATION CÉSSE DE SONNER, ARRÊTEZ LE TRANSFERT, UN DISPOSITIF D'ARRÊT EST RÉGLÉ POUR ARRÊTER L'ÉCOUEMENT LORSQUE LE RÉSERVOIR EST REMPLI À 95% DE SA CAPACITÉ• SI LE STROBOSCOPE DU RÉSERVOIR OU LA SIRENE EST ACTIVÉE, ARRÊTER LA LIVRAISON3. APRÈS LE TRANSFERT DU PRODUIT:<ul style="list-style-type: none">• VÉRIFIER QU'IL N'Y A PAS DE DÉVERSEMENT NI DE PRODUIT RÉSIDUEL• SI L'Y A UN DÉVERSEMENT OU DU PRODUIT RÉSIDUEL, NETTOYEZ AVEC LE MATÉRIEL APPROPRIÉ• REMPLISSEZ LA DOCUMENTATION REQUISE• OUVREZ LA VANNE CONFINEMENT <p>EN CAS DE DÉVERSEMENT</p> <p>COMMUNIQUEZ AVEC LE SERVICE DES TRAVAUX À 705-684-4004 ET LE GESTIONNAIRE CORRECTIONNEL À 705-687-1780 ET LE CENTRE D'ACTION DÉVERSEMENTS DE L'ONTARIO AU 1-800-268-6060</p>
---	--

ALUMINUM SIGNBOARD ON
WEATHERPROOF BACKER BLACK
TEXT ON WHITE BACKGROUND
BOLD TEXT 8mm HEIGHT
(COLOUR : RED)
REGULAR TEXT 6mm HEIGHT
(COLOUR.BLACK)

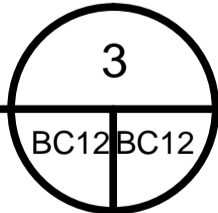
NEW PRODUCT TRANSFER AREA SIGNAGE
SCALE: AS INDICATED



NEW CONTAINMENT VALVE SIGNAGE
SCALE: AS INDICATED



NEW BASE PLATE DETAIL
SCALE: AS INDICATE



APPENDIX A

SITE PHOTOGRAPHS



Photo 1 - View near northwest corner of boiler house looking south. Boiler House on left. Security fence on right. Approximate location of new fill/vent pipes denoted by arrow.

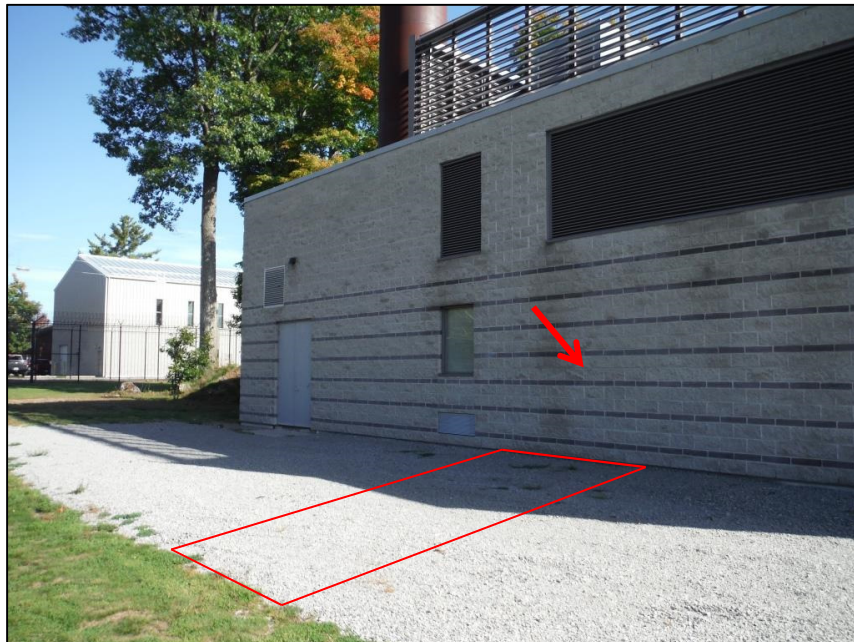


Photo 2 - Approximate location of new tank fill/vent pipes denoted by arrow. Approximate location of new Product Transfer Area pad shown on existing gravel surface (see drawings for detail).



Photo 3 – View looking east at existing fuel tanks to be removed. Chain-link fence segment in foreground to be temporarily removed to allow access to tanks and to facilitate installation of new tank vent piping.



Photo 4 – View looking north. Boiler house on right. Security fence and gate on left. New asphalt-surfaced vehicle turn-around area in foreground.



Photo 5 - Fuel tanks and appurtenances to be removed. Underlying concrete pad to remain.



Photo 6 - Fuel piping and electrical conduit to be removed. Natural gas equipment must be protected against damage by Contractor at all times.



Photo 7 - Existing day tank vent (centre of photo) to be removed, and roof deck penetration to be sealed.

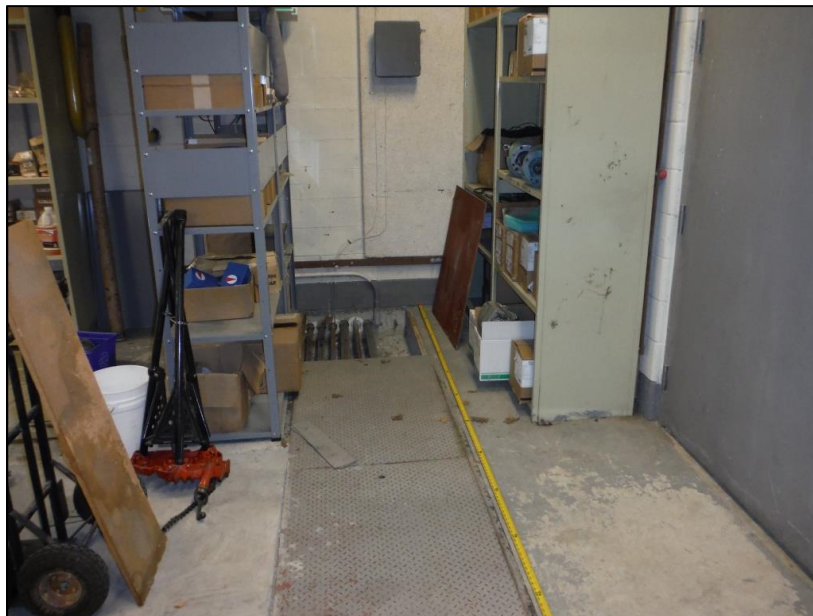


Photo 8 - Boiler house diesel fuel piping trench. Existing piping to be removed and disposed. Pneumatic level gauge on wall above piping along with acoustical tile to be removed and disposed.



Photo 9 - Existing diesel generator. Existing fuel supply and return piping to be removed and replaced.



Photo 10 - Existing day tank, fuel pump sets, pump controls and level switches to be removed (generator controls to remain). New tanks to be installed in existing dike.



Photo 11 – Existing day tank vent to be removed, and roof deck penetration to be sealed.



Photo 12 – Existing diesel supply and return piping to boilers to be removed.

END OF APPENDIX A

APPENDIX B

Environmental Code of Practice for Aboveground and Underground Storage
Tank Systems Containing Petroleum and Allied Petroleum Products.

Note to Reader - Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (PN 1326)

This code references Underwriters Laboratories of Canada (ULC) standards which are periodically updated. With this note CCME attempts to provide information on ULC updates, replacements and withdrawals since publication of the Code. Confirm all standards with ULC.

October 2015 – ULC Update

ULC Standards has published the Second Edition of CAN/ULC-S655-15, Standard for Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids.

January 2013 – ULC Replacements and Withdrawals Update

Underwriters Laboratories of Canada (ULC) has published the First Edition CAN/ULC-S661-10, Standard for Overfill Protection Devices for Flammable and Combustible Liquid Storage Tanks. This standard supersedes ULC/ORD-C58.15-1992, Overfill Protection Devices for Flammable Liquid Storage Tanks, referenced in Table 1 and Sentences 3.3.4(1)(e) (ii), 3.6.2, and 4.3.2 of the Code. Refer to ULC Standard Bulletin 2011-09 for further information.

Underwriters Laboratories of Canada (ULC) has published the First Edition CAN/ULC-S663-11, Standard for Spill Containment Devices for Flammable and Combustible Liquid Aboveground Storage Tanks. This standard replaces and supersedes ULC/ORD-C142.19.94, Spill Containment Devices for Aboveground Flammable and Combustible Liquid Storage Tanks, referenced in Table 1 and Sentence 8.7.2(b) of the Code. Refer to ULC Standard Bulletin 2011-10 for further information.

Underwriters Laboratories of Canada (ULC) has published the First Edition CAN/ULC-S667-11, Metallic Underground Piping for Flammable and Combustible Liquids Standard which complements current referenced standards within the Code. Refer to ULC Standard Bulletin 2011-23 for further information.

Underwriters Laboratories of Canada (ULC) has published the First Edition CAN/ULC-S668-12, Standard for Liners Used for Secondary Containment of Aboveground Flammable and Combustible Liquid Tanks which complements current referenced standards within the Code. Refer to ULC Standard Bulletin 2012-09 for further information.

Effective August 23, 2012, Underwriters Laboratories of Canada (ULC) have withdrawn Technical Supplements for the Refurbishing of Underground and Aboveground Tanks:

ULC-601(A) - 2001, referenced in Table 1 and Sentence 3.7.1(1)(a) and 9.7.2(2)(b)

ULC-603(A) - 2001, referenced in Table 1 and Sentence 9.7.1(1)(a)

ULC-615(A) - 2002 and

ULC-630(A) - 2001, referenced in Table 1 and Sentence 3.7.1(1)(b), and 9.7.2(2)(a) of the Code.

Refer to ULC Standards Bulletin No. 2012-11 for further information.

May 2009 – ULC Updates

Underwriters Laboratories of Canada (ULC) has published the First Edition CAN/ULC-S660-08, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids. This standard replaces, ULC/ORD-C971-2005, Nonmetallic Underground Piping for Flammable and Combustible Liquids, which had itself replaced the following ORDs referenced in Table 1 and Sentence 5.2.1(1) of the Code:

- ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems"
- ORD-C107.7-1993, "Glass-Fibre Reinforced Plastic Pipe and Fittings"
- ORD-C107.14-1992, "Non-Metallic Pipe and Fittings"

Effective March 19, 2009, Underwriters Laboratories of Canada (ULC) have exited from the testing and certification of secondary containment liners, refer to ULC Certification Bulletin No. 2009-04 for further information.

Effective March 31, 2009, Underwriters Laboratories of Canada (ULC) have withdrawn ULC/ORD-C58.9-1997, Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquid Tanks, referenced in Table 1 and Sentence 3.9.2(1) of the Code, refer to ULC Certification Bulletin No. 2009-04 for further information.

July 2005 – ULC Update

Effective July 1, 2005, the Underwriters' Laboratories of Canada's (ULC's) Other Recognized Document (ORD), *ULC/ORD-C971-2005, Nonmetallic Underground Piping for Flammable and Combustible Liquids*, replaces the following ORDs referenced in Table 1 and Sentence 5.2.1(1) of the Code:

- ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems"
- ORD-C107.7-1993, "Glass-Fibre Reinforced Plastic Pipe and Fittings"
- ORD-C107.14-1992, "Non-Metallic Pipe and Fittings"



Canadian Council of Ministers
of the Environment Le Conseil canadien
des ministres
de l'environnement

Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products

PN 1326

CCME Canadian Council of Ministers of the Environment

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national, international and global concern. The 14 member governments work as partners in developing nationally consistent environmental standards, practices, and legislation.

Canadian Council of Ministers of the Environment

123 Main, Suite 360

Winnipeg, Manitoba R3C 1A3

Ph: (204) 948-2090

Fax: (204) 948-2125

For additional copies, contact:

CCME Documents

Toll free: 1 (800) 805-3025

www.ccme.ca

Aussi disponible en français

La présente publication est également offerte en français sous le titre Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage hors sol et souterrains de produits pétroliers et de produits apparentés. PN 1327

ISBN 1-896997-33-3

© Canadian Council of Ministers of the Environment, 2003

*Printed on
recycled paper*



*Imprimé sur du
papier recyclé*

Abstract

The Canadian Council of Ministers of the Environment's (CCME) "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products" has been prepared for owners of storage tank systems, the petroleum marketing and distribution industry, and federal, provincial, and territorial departments which have the authority to regulate storage tanks containing petroleum or allied petroleum products.

The Code is a model set of technical requirements and only comes into effect if adopted, in whole or in part, by an authority having jurisdiction. It provides technical requirements for registration and approval of storage tank systems, design and installation of new storage tanks and piping, monitoring and leak detection, upgrading of existing systems, operation and maintenance, and the withdrawal from service of storage tank systems.

This publication updates, combines, and replaces CCME's 1993 "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" and the 1994 "Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products." It reflects the advances in technology and the experience gained by industry and government regulators in proactively managing storage tanks systems in the intervening years.

Résumé

Le document du Conseil canadien des ministres de l'environnement (CCME) intitulé Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage hors sol et souterrains de produits pétroliers et de produits apparentés a été préparé à l'intention des propriétaires de systèmes de stockage, de l'industrie de la commercialisation et de la distribution du pétrole ainsi que des ministères fédéraux, provinciaux et territoriaux qui ont le pouvoir de réglementer les systèmes de stockage contenant des produits pétroliers et des produits apparentés.

Le Code est un ensemble type d'exigences techniques; il n'entre en vigueur que s'il a été adopté, en tout ou en partie, par l'autorité compétente. Il formule des exigences techniques pour l'enregistrement et l'approbation des nouveaux systèmes de stockage; la conception et l'installation des nouveaux réservoirs de stockage et de la tuyauterie; la surveillance et la détection des fuites; l'amélioration des systèmes existants; l'exploitation et l'entretien; et la mise hors service des systèmes de stockage.

La présente publication met à jour, combine, et remplace le document du CCME de 1993 intitulé Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage souterrains de produits pétroliers et de produits apparentés et le document de 1994 intitulé Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage hors sol de produits pétroliers. Elle tient compte des progrès de la technologie et de l'expérience acquise par l'industrie et les organismes de réglementation gouvernementaux dans la gestion des systèmes de stockage depuis la parution des deux premiers codes.

Table of Contents

Abstract.....	ii
Resume	iii
List of Tables	vi
Preface.....	vii
National Task Force on Storage Tanks.....	viii
Rationale for an Environmental Code of Practice	ix
A Guide to the Use of this Code	x
Part 1 Application and Definitions	1
Section 1.1 Application	1
Section 1.2 Equivalents	1
Section 1.3 Alternatives.....	1
Section 1.4 Definitions	1
Section 1.5 Reference Documents.....	5
Section 1.6 Abbreviations.....	9
Part 2 Registration and Approval of Storage Tank Systems.....	10
Section 2.1 Scope	10
Section 2.2 Registration of Existing Storage Tank Systems	10
Section 2.3 Approval to Construct Storage Tank Systems.....	10
Section 2.4 Registration of New Storage Tank Systems	10
Section 2.5 Product Supply and Registration	10
Part 3 Design and Installation of New Aboveground Storage Tanks	11
Section 3.1 Scope	11
Section 3.2 General Requirements	11
Section 3.3 Field-erected Storage Tank Systems	12
Section 3.4 Shop-fabricated Storage Tank Systems.....	12
Section 3.5 Aboveground Storage Tank Systems for Storing Used Oil.....	13
Section 3.6 Design Standards	13
Section 3.7 Repair, Alteration, Reconstruction, and Relocation	14
Section 3.8 Corrosion Protection of Aboveground Steel Storage Tank Systems.....	14
Section 3.9 Secondary Containment Requirements	14
Section 3.10 Spill Containment and Runoff Collection	15
Part 4 Design and Installation of New Underground Storage Tank Systems.....	17
Section 4.1 Scope	17
Section 4.2 General Requirements	17
Section 4.3 Design Standards	18
Section 4.4 Installation	19
Section 4.5 Corrosion Protection of Underground Steel Storage Tank Systems	19

Part 5	Design and Installation of New Piping Systems	21
	Section 5.1 Scope	21
	Section 5.2 General Requirements	21
	Section 5.3 Product Transfer	21
	Section 5.4 Design Standard for Underground Piping Systems	21
	Section 5.5 Installation	22
Part 6	Monitoring and Leak Detection of Storage Tank Systems	23
	Section 6.1 Scope	23
	Section 6.2 General Requirements	23
	Section 6.3 Leak Detection Interlocks and Alarms	25
	Section 6.4 Monitoring Wells.....	25
	Section 6.5 Groundwater Monitoring Wells.....	25
	Section 6.6 Vapour Monitoring Wells.....	26
	Section 6.7 Frequency and Method	27
Part 7	Upgrading of Existing Storage Tank Systems	30
	Section 7.1 Scope	30
	Section 7.2 General Requirements	30
	Section 7.3 Aboveground Storage Tank Systems	30
	Section 7.4 Underground Storage Tank Systems	31
Part 8	Operation and Maintenance	32
	Section 8.1 Scope	32
	Section 8.2 General Requirements	32
	Section 8.3 Inventory Control	32
	Section 8.4 Inspections and Maintenance of Storage Tank Systems	33
	Section 8.5 Product Transfer Operations.....	34
	Section 8.6 Cathodic Protection Monitoring	34
	Section 8.7 Oil-water Separators	35
	Section 8.8 Transfer of Ownership.....	36
	Section 8.9 Leak and Spill Response.....	36
	Section 8.10 Precision Leak Detection Test.....	36
	Section 8.11 Records	37
	Section 8.12 Tank Bottom Water	37
	Section 8.13 Storage.....	37
	Section 8.14 Transfer of Oil-contaminated Water.....	37
Part 9	Withdrawal from Service of Storage Tank Systems	38
	Section 9.1 Scope	38
	Section 9.2 General Requirements	38
	Section 9.3 Temporary Withdrawal from Service.....	38
	Section 9.4 Removal from Service.....	38
	Section 9.5 Abandonment In-Place	39
	Section 9.6 Disposal of Storage Tank Systems	40
	Section 9.7 Reuse of Storage Tanks	40

Appendices

Appendix A	Authorities Having Jurisdiction.....	41
Appendix B	Explanatory Material	43
Appendix C	Minimum Information Required for Registration of Storage Tank Systems	49
Appendix D	Spill Reporting.....	50

List of Tables

Table 1	Reference Documents.....	6
Table 2	Leak Detection and Monitoring Methods.....	27
Table 3	New Underground Storage Tanks	28
Table 4	Aboveground Storage Tanks	28
Table 5	Underground Piping	28
Table 6	Aboveground Piping.....	29
Table 7	Turbine, Transition, and Dispenser Sumps	29
Table 8	Existing Single-Wall Underground Storage Tanks	29
Table 9	Existing Single-Wall Underground Piping.....	29
Table 10	Tank Components and Leak Detection Test Requirements	45

Preface

The “Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products” (hereafter referred to as “the Code”) is published by the Canadian Council of Ministers of the Environment (CCME) through its National Task Force on Storage Tanks.

The Code comprises a model set of technical requirements designed to protect the environment by preventing product releases from aboveground and underground storage tank systems. The Code was written in a form suitable for adoption by legislative authorities in Canada.

The membership of the National Task Force was representative of provincial, territorial, and federal agencies which have the authority to regulate storage tank systems containing petroleum and allied petroleum products. The Code was developed with the voluntary assistance of many industry experts who have contributed to the work of the National Task Force on Storage Tanks. The National Task Force was assisted in its work by the staff of the CCME Secretariat.

The National Task Force recommends that the Code be reviewed by CCME within five years of its publication.

Comments and inquiries on the use of the Code and suggestions for its improvement are welcomed and should be sent to:

CCME Secretariat
123 Main Street, Suite 360
Winnipeg, Manitoba
R3C 1A3
Tel: (204) 948-2090
Fax: (204) 948-2125
Email: info@ccme.ca

Acknowledgements

The National Task Force on Storage Tanks acknowledges the many individuals and organizations that have contributed to the production of this Code.

National Task Force on Storage Tanks

Bob Chandler, Alberta Environment (Co-Chair)

Maurice Mazerolle, Manitoba Conservation (Co-Chair)

Michael Gilbertson, Canadian Council of Ministers of the Environment

Don Edgecombe, Petroleum Tank Management Association of Alberta

Gordon Harper, Cantest Solutions, Inc.

Kelly Karr, Karr and Associates Ltd.

Bill Trussler, Shell Canada Ltd.

Duncan Ferguson, British Columbia Ministry of Water, Land & Air Protection

Anne MacKinnon, Environment Canada

Benoit Ouellette, New Brunswick Environment and Local Government

John Dutton, Newfoundland and Labrador Department of Environment

Charles Henderson, C-CORR Solutions

Gerard Chisholm, Nova Scotia Department of Environment and Labour

Ann-Marie Barker, Ontario Technical Standards and Safety Authority (Observer)

Michael Dodd, Canadian Standards Association

Elson Fernandes, Elfent Ltd.

Jim Mackie, Fuel Safety Consultants Ltd.

Gordana Nikolic, Underwriters Laboratories of Canada

Philip Rizcallah, National Research Council of Canada

Danny MacInnis, Prince Edward Island Department of Fisheries, Aquaculture and Environment

Guy Robichaud, Québec Ministère des Ressources naturelles

Scott Robinson, Saskatchewan Environment

Folkie Johnson, Yukon Environment

Rationale for an Environmental Code of Practice

Historically, the National Fire Code of Canada (NFCC) and Canadian Standards Association (CSA) requirements have been used in Canada for the installation and operation of underground storage tanks containing petroleum products. These codes were written from the viewpoint of fire prevention and primarily cover the elements of fire prevention and fire safety. In the late 1980s, the Canadian Council of the Ministers of the Environment (CCME) saw a need to provide recommended practices that went beyond the scope of these documents and provided an environmental perspective on the management of storage tanks containing petroleum and allied petroleum products.

As a result, CCME's "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" was first published in 1988 and revised in 1993. This was followed in 1994 with the publication of the "Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products."

Federal, provincial, and territorial jurisdictions agreed that the existing underground and aboveground codes of practice should be updated to keep pace with changes in the NFCC, reflect new CSA requirements, and take advantage of advances in technology. It was also decided to combine the existing aboveground and underground CCME codes into one comprehensive document.

A Guide to the Use of this Code

Purpose

This Code presents a model set of technical requirements to protect the environment from existing, new, or proposed storage tank systems that contain petroleum and allied petroleum products. Its primary purpose is the promotion of environmentally sound management of petroleum and allied petroleum product storage tank systems through the application of uniform performance standards throughout Canada.

Relation to Federal, Provincial, and Territorial Regulations

This Code is a model set of technical requirements and only comes into effect if adopted, in whole or in part, by an authority having jurisdiction. Where this Code has been adopted, in whole or in part, by an authority having jurisdiction, it shall be subject to any restrictions or conditions added by the regulatory authority. Readers of this Code are therefore advised to check with the federal, provincial, or territorial authority having jurisdiction to see whether this Code applies in their area of interest. (See Appendix A for contact information for federal, provincial, and territorial authorities having jurisdiction.)

Relation to Other Codes

This Code is written as a complementary document to the National Fire Code of Canada (NFCC) and to CAN/CSA B139, “Installation Code for Oil Burning Equipment”.

National Fire Code of Canada

This Code has been developed in conjunction with the National Research Council, publisher of the National Fire Code of Canada (NFCC), to minimize the possibility of conflict between the respective contents of the two codes.

While this Code provides minimum requirements for the prevention of petroleum and allied petroleum product losses from storage tank systems that may lead to environmental problems (primarily groundwater contamination), the NFCC sets technical requirements for the storage and handling of flammable and combustible liquids from the point of view of preventing fires or explosions.

In order to ensure effective application, fire officials, environmental officials, or other authorities having the jurisdiction to regulate petroleum and allied petroleum product storage tanks should be fully conversant with the technical requirements in both codes. This is the only way to ensure that storage tanks are built, installed, operated, and removed in a manner that is acceptable from both a fire safety and environmental point of view.

CSA Standard B139, Installation Code for Oil-Burning Equipment

This Code was developed in cooperation with the Canadian Standards Association, publishers of CAN/CSA-B139. Storage tank systems that fall within the scope of CAN/CSA B139 are predominantly furnace oil tanks and storage tanks containing diesel fuel and connected to standby emergency power generators.

The CAN/CSA-B139 Code was revised and published in 2000. This Code provides additional requirements that address concerns, such as environmental sensitivity or upgrading of existing storage tank systems, which are beyond the scope of CAN/CSA-B139-00.

Regulatory authorities, owners, and installers of storage tanks should be fully conversant with the technical requirements of CAN/CSA-B139-00, this Code (where it is in force), and all federal/provincial/territorial regulations that apply.

Structure and Content

This Code is drafted in such a way that it may be adopted or enacted for legal use by any jurisdictional authority in Canada.

A decimal numbering system is used throughout this Code. The first number indicates the Part of the Code, the second the Section within the Part, the third the Article within the Section. An Article may be broken down further into Sentences, Clauses, and Subclauses, each of which is in brackets, as shown here:

4	Part
4.5	Section
4.5.1	Article
4.5.1 (1)	Sentence
4.5.1 (1)(a)	Clause
4.5.1 (1)(a)(i)	Subclause

Sentence 3.2.8(1) is an example of a requirement in which all three clauses must be met to be in conformance with the Code.

3.2.8(1) No person shall install an *aboveground storage tank* system unless:

- (a) required permits or approvals have been obtained from the *authority having jurisdiction*;
- (b) plans, drawings and specifications of the system or equipment have been examined by the *authority having jurisdiction*; **and**
- (c) the plans, drawings and specifications referred to in Clause (b) bear the stamp and signature of a professional engineer licensed to practice in the province/territory.

Sentence 5.4.2(1) is an example of a requirement in which only one of the clauses must be met to be in conformance with the Code.

5.4.2(1) Underground *piping* larger than 75 mm in diameter shall be designed, installed and maintained to meet the requirements of:

- (a) *secondary containment* in conformance with Sentence 5.4.4(1);
- (b) *leak detection* in conformance with Part 6; **or**
- (c) API RP 1632-96, “Cathodic Protection of Underground Storage Tank and Piping Systems” and API Std 2610-94, “Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities”.

The following is a summary of the contents of this Code.

Part 1 Application and Definitions

Part 1 defines terms and stipulates to what the Code applies. It includes the necessary administrative details to ensure that the technical requirements can be applied with a minimum of difficulty.

Part 2 Registration and Approval of Storage Tank Systems

Part 2 contains the requirements for the registration and approval of storage tank systems. It includes the scope of the tank systems that are required to be registered as well as provisions regarding storage tank system identification.

Part 3 Design and Installation of New Aboveground Storage Tank Systems

The design and installation of new aboveground storage tank systems is covered in Part 3. The recommendations are intended to ensure that equipment is designed and installed properly in order to minimize the possibility of leaks and spills.

Part 4 Design and Installation of New Underground Storage Tank Systems

The design and installation of new underground storage tank systems are covered in Part 4. The recommendations are intended to ensure that equipment is designed and installed properly in order to minimize the possibility of leaks and spills.

Part 5 Design and Installation of New Piping Systems

Part 5 outlines the requirements for new piping systems for storage tank systems. It includes recommendations for product transfer, design standards, and installation.

Part 6 Monitoring and Leak Detection of Storage Tank Systems

The frequency and method of monitoring and leak detection for all new and existing storage tank systems are specified in Part 6. The recommendations are intended to prevent or minimize the environmental impact of spills or leaks.

Part 7 Upgrading of Existing Storage Tank Systems

Part 7 specifies how and when existing storage tank systems must be upgraded to be in conformance with this Code. It also defines those storage tank systems that are exempt from the upgrading requirement.

Part 8 Operation and Maintenance

Part 8 addresses the ongoing operation and maintenance of storage tank systems. The intention is to prevent product releases. When they do occur, however, the recommendations in this Part are designed to help operators of storage tank systems detect, terminate, and mitigate releases as quickly as possible.

Part 9 Withdrawal From Service of Underground Storage Tank Systems

Part 9 contains the requirements for the closure and withdrawal from service of storage tank systems, either temporarily or permanently. Provisions for tank removal and disposal are provided to ensure that abandoned storage tanks do not cause environmental problems.

Appendix A Authorities Having Jurisdiction

This Appendix lists the contact information for the various federal, provincial, and territorial authorities having jurisdiction.

Appendix B Explanatory Material

Appendix B contains explanations to assist the user in understanding these Code requirements. The numbering system used in the Appendix corresponds with the appropriate Article in this Code.

Appendix C Minimum Information Required for Registration of Storage Tank Systems

This appendix outlines the minimum information required by authorities having jurisdiction for the registration of storage tank systems.

Appendix D Spill Reporting

This Appendix lists the federal, provincial, and territorial environmental emergency reporting telephone numbers.

Part 1 Application and Definitions

Section 1.1 Application

- 1.1.1(1) Unless otherwise permitted by the *authority having jurisdiction*, the *owner* of a *storage tank system* shall comply with the provisions of this Code.
- 1.1.1(2) When additional environmental, public health, or safety concerns have been identified, the *authority having jurisdiction* may require measures above and beyond the provisions of this Code.
- 1.1.2 Except as provided in Article 1.1.3(1), this Code applies to *aboveground* and *underground storage tank* systems used for the storage of *petroleum* and *allied petroleum products*.
- 1.1.3(1) This Code does not apply to:
- (a) a *storage tank system* containing raw production *petroleum and allied petroleum products*;
 - (b) a *storage tank system* located within the fence line of a refinery or in an area contiguous with the refinery process units;
 - (c) an *aboveground storage tank system* having a capacity of 2 500 L or less that is connected to a heating appliance or emergency generator; or
 - (d) a *mobile tank*.
- 1.1.4 Notwithstanding the requirements of Parts 7 and 8, an *owner* or *operator* shall not directly or indirectly cause or allow a *leak* or *spill* of *petroleum* or *allied petroleum products* from a *storage tank system* or vehicle.

Section 1.2 Equivalents

- 1.2.1 The provisions of this Code are not intended to limit the appropriate use of materials, systems, or equipment not specifically described herein.

- 1.2.2 Materials, systems, equipment, and procedures not specifically described herein, or that vary from the specific requirements in this Code, or for which no recognized test procedure has been established, may be used if it can be shown to the *authority having jurisdiction* that these alternatives are equivalent to those specifically described herein and will perform in an equivalent manner acceptable to the *authority having jurisdiction*.

Section 1.3 Alternatives

- 1.3.1 Alternatives to the materials, systems, equipment, and procedures or standards specified in this Code may be used if the *authority having jurisdiction* is satisfied that those alternatives provide a level of performance, public health, safety, or environmental protection that is equivalent to or exceeds the levels of performance or protection provided by this Code.

Section 1.4 Definitions

- 1.4.1 Words and phrases that are not included in the list of defined terms in this Part shall have the meanings that are commonly assigned to them in the context in which they are used in this Code, taking into account the specialized use of terms by various trades and professions to which the terminology applies.
- 1.4.2 The words and terms that are in *italics* in this Code shall have the following meanings unless otherwise indicated by the context:

Abandoned or *abandonment* means a *storage tank system* that has been *out-of-service* for more than one year.

Aboveground storage tank means a *storage tank* with all the *storage tank* volume above grade.

Aboveground storage tank system means one or more commonly connected *aboveground storage tanks* including all connected *piping*, both aboveground and underground, pumps, dispensing, and product transfer apparatus, dyking, *overflow protection devices*, and associated spill containment and collection apparatus.

Allied petroleum product means a mixture of hydrocarbons other than a *petroleum product* that may be water miscible and may have a density greater than water, and includes the following (See Appendix B, note B.1.4.2 *Allied Petroleum Product*):

- (a) Thinners and solvents used by the paint and varnish industry specified under the Canadian General Standards Board (CGSB):

CAN/CGSB-1.124-99	Thinner for Vinyl Coatings
CAN/CGSB-1.136-92	Antiblush Thinner for Cellulose Nitrate Lacquer
CAN/CGSB-1.2-89	Boiled Linseed Oil
CAN/CGSB-1.4-2000	Petroleum Spirits Thinner
CAN/CGSB-1.70-99	High Solvency Thinner
CAN/CGSB-1.94-M89	Xylene Thinner (Xylol)
CAN/CGSB-1.110-M91	General Purpose Thinners for Lacquers
CAN/CGSB-1.164-92	Solvent for Vinyl Pretreatment Coating

- (b) Solvents and chemicals used by chemical and manufacturing industry specified under CGSB (15), and benzene and toluene:

CAN/CGSB-15.50-92	Technical Grade Acetone
CAN/CGSB-15.52-92	Methyl Ethyl Ketone, Technical Grade

- (c) Inks used by printing industry specified under CGSB (21):

CAN/CGSB-21.1-93	Offset Lithographic Printing Ink
------------------	----------------------------------

- (d) Products specified under CGSB (3):

3-GP-525Ma	Isopropanol
3-GP-531M	Methanol, Technical Grade
3-GP-855M	Ethylene Glycol, Uninhibited

Alter or **alteration** means to enlarge, reduce, refurbish, upgrade, or remove a *storage tank system*.

Approved means, when used in reference to a *storage tank*, component, or accessory, that the product has been investigated by a testing agency, accredited by the Standards Council of Canada, or is acceptable to the *authority having jurisdiction* and has been found to comply with specific requirements and is identified with an authorized marking of the testing agency, as appropriate.

Authority having jurisdiction means the federal, provincial, or territorial officer(s) with the legal authority to regulate storage tank systems in the area of interest. (See Appendix A.)

Cathodic protection or **cathodically protected** means a method of reducing or preventing *corrosion* of a metal surface by making that surface the cathode of an electrochemical cell.

Combustible liquid or **product** means any liquid having a closed cup *flash point* at or above 37.8 °C and below 93.3 °C.

Contingency plan means planned procedures for reporting, containing, removing, and cleaning up a *spill* or *leak*.

Construction means erection or installation.

Containment sump means a dispenser, pump, transition, or turbine sump.

Corrosion means the deterioration of a metal resulting from a reaction with its environment.

Corrosion expert means a person recognized by NACE International (formerly the National Association of Corrosion Engineers) as a *corrosion specialist*, *cathodic protection specialist*, or a registered professional engineer experienced in *corrosion protection*.

Corrosion protection means a method of reducing or preventing *corrosion* of a *storage tank system* through *cathodic protection*, the application of *protective coatings*, or the use of a non-corroding material in its construction.

Day means any continuous 24 hour period.

Discharge means releasing, *spilling*, *leaking*, pumping, pouring, emitting, *emptying*, or dumping of *petroleum* or *allied petroleum products* into the environment, whether intentional or unintentional.

Dispenser sump means a container located underneath or near a dispenser or self-contained suction pump that collects or contains *leaks*.

Effective date means the date this Code is adopted by an *authority having jurisdiction* or a date specified by an *authority having jurisdiction*.

Empty means to remove the contents of a *storage tank system* as far as is practicable by such means as draining, suction, pouring, or pumping.

Existing means that which was in place or commenced operation on or before the *effective date* of this Code.

Flammable liquid or product means any liquid having a closed cup *flash point* below 37.8 °C and a vapour pressure not exceeding 275.8 kPa (absolute) at 37.8 °C.

Flash point means the minimum temperature at which a liquid within a container gives off vapour in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

Free oil means the non-soluble, non-emulsified *petroleum* and *allied petroleum* product layer that accumulates in an *oil-water separator*.

Fuel oil means kerosine or any hydrocarbon oil as classified in CAN/CGSB-3.2-99, "Fuel Oil, Heating" and CAN/CGSB-3.3-99, "Kerosine".

Handling means the storing, transmitting, transporting, or distributing of *petroleum* or *allied petroleum products* and includes putting *petroleum*

products into a container or into the fuel tank of a motor vehicle, vessel, or aircraft.

Impermeable barrier means a secondary *storage tank* wall, synthetic membrane *liner*, or other equivalent material in conformance with this Code.

Internal coating means a coating or lining of a non-corrodible material bonded firmly to the interior surface of a *storage tank* that does not chemically or physically degrade when in contact with the *petroleum* or *allied petroleum products* stored therein.

Interstitial space means the space between the primary *storage tank* or *pipng* wall and the *impermeable barrier* within a *secondary containment system*. (See Appendix B, note B.1.4.2 *Interstitial space*)

Leak means any loss of liquid *petroleum* or *allied petroleum products* because of a defect in a *storage tank system*.

Leak detection means a device or method that is capable of detecting *leaks* in a *storage tank system*.

Liner means a material used as the outer barrier of a *secondary containment system*, but does not include the outer wall of double-wall *pipng* or *storage tanks*.

Line-leak detector means a device used in pressure *pipng* systems to detect a *leak* in the *pipng*.

Mobile tank means a mobile refueling tank as described by ORD-C142.13-1977, Mobile Refueling Tanks.

Motive fuel means any fuel used to power a vehicle, aircraft, or vessel.

Oil-water separator means a device for collecting and separating non-soluble, non-emulsified *petroleum* and *allied petroleum products* from water.

Operator means the person who is responsible for the day-to-day operation of an installation where an *aboveground* or *underground storage tank* is located or, when referring to a vehicle, the driver in charge of the vehicle.

Out-of-service means that a *storage tank system* or portion thereof is no longer serving its intended use.

Overfill protection device means a mechanical device, electrical device, or fill procedure system that is intended to prevent a *storage tank* from being overfilled.

Owner means the Crown, an institution, corporate entity, Indian band, government department or agency, or a person who has legal ownership of the *storage tank system* or who has been assigned custody to control, care for, manage, or dispose of the *storage tank system*.

Petroleum product means a single product or mixture of at least 70% hydrocarbons, by volume, refined from crude oil, with or without additives, that is used, or could be used, as a fuel, lubricant, or power transmitter and without restricting the foregoing, such products include gasoline, diesel fuel, aviation fuel, kerosine, naphtha, lubricating oil, *fuel oil*, engine oil and *used oil*, and exclude propane, paint, and solvents.

Piping means fuel conduits, including fittings and valves that are necessary for the safe *handling* and storage of *petroleum products* and *allied petroleum products* and are specified by a nominal inside diameter.

Precision leak detection test means a test capable of detecting a *storage tank leak* as small as 0.38 L/h with a probability of detection of 0.95 or greater and a probability of false alarm of 0.05 or less, within a period of 24 hours, accounting for variables such as vapour pockets, thermal expansion of product, temperature stratification, groundwater level, evaporation, pressure and end deflection.

Pressure liquid media leak detection test means a test utilizing a device to pressurize *piping* with a suitable test liquid to determine the presence of *leaks*.

Product transfer area means the area around the connection point between a delivery truck, railcar, or vessel and a *storage tank system* with a capacity of 2 500 L or more.

Protected means having impact, projectile, and fire resistance qualities for an *aboveground storage tank system*.

Protective coating means a coating applied to a surface to protect the substrate from *corrosion*.

Secondary containment means an *impermeable barrier* that prevents *leaks* from the primary *storage tank system* from reaching outside the containment area.

Separated solid means the particulate material that settles at the bottom of an *oil-water separator*.

Site means a lot or property where there is one or more *underground storage tank systems* within 100 m of each other, or one or more *aboveground storage tank systems* within 200 m of each other, and all *storage tanks* on the property are owned by the same owner(s).

Sludge means the *petroleum* or *allied petroleum product* residue or material that accumulates at the bottom of a *storage tank*.

Spill means any loss of liquid *petroleum* or *allied petroleum product* from a *storage tank system* that is not attributable to a *leak* in the *storage tank system*.

Spill containment device means a container fitted to the inlet of a *storage tank* or to the suction coupling of a used *oil storage tank* that helps prevent *spills* from entering the environment.

Static liquid media leak detection test means a *leak detection* test in which a suitable test liquid is placed into the containment device and is monitored for a change in the liquid level and the rate of change.

Storage tank means a closed container for the storage of *petroleum* or *allied petroleum products* with a capacity of more than 230 L that is designed to be installed in a fixed location.

Storage tank system means a system for the storage and dispensing of *petroleum* or *allied petroleum product* and is not limited to *storage tanks*, associated *piping*, *vents*, pumps, and dispensing equipment.

Tank bottom water means water that accumulates at the bottom of a *storage tank*.

Underground storage tank means a *storage tank* with all of the *storage tank* volume below grade and the primary tank or double-wall completely surrounded by or in intimate contact with backfill.

Underground storage tank system means one or more commonly connected *underground storage tank(s)*, including all underground and aboveground connections, *piping*, pumps, and dispensers.

Used oil means oil from industrial and non-industrial sources that has been acquired for lubricating or other purposes and has become unsuitable for its original purpose due to the presence of impurities or the loss of original properties. *Used oil* does not include oils derived from animal or vegetable fats, crude oil or recovered *fuel oils spilled* onto land or water and wastes from petroleum-refining operations. The following categories of *used oil* are covered by this Code (See Appendix B, note B.1.4.2 *Used Oil*):

- a) lubricating oils (engine, turbine, or gear);
- b) hydraulic fluids (including transmission fluids);
and
- c) insulating oils.

Vent means an opening in a *storage tank system* that is specifically designed to relieve excess internal pressure or vacuum within a *storage tank system*.

Section 1.5 Reference Documents

- 1.5.1 Where there is a conflict between the provisions of this Code and those of a reference document, the provisions of this Code shall apply.
- 1.5.2 Unless otherwise specified herein, the documents listed in Table 1 shall include the latest editions, amendments, revisions, and supplements effective to December 31, 2002.

Table 1 - Reference Documents

Issuing Agency – American Petroleum Institute	
Document Number	Title of Document
API Spec 12B-95	Bolted Tanks for Storage of Production Liquids
API Spec 12D-94	Field Welded Tanks for Storage of Production Liquids
API Spec 12F-94	Shop Welded Tanks for Storage of Production Liquids
API 570-98	Piping Inspection Code: Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems
API Std 650-98	Welded Steel Tanks for Oil Storage
API RP 651-97	Cathodic Protection of Aboveground Petroleum Storage Tanks
API RP 652-97	Lining of Aboveground Petroleum Storage Tank Bottoms
API Std 653-01	Tank Inspection, Repair, Alteration, and Reconstruction
API RP 1632-96	Cathodic Protection of Underground Storage Tank and Piping Systems
API RP 2350-96	Overfill Protection for Storage Tanks in Petroleum Facilities
API Std 2610-94	Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities

Issuing Agency – Canadian Council of Ministers of the Environment	
Document Number	Title of Document
CCME PN 1057	Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks (1991)
CCME PN 1180	Environmental Guideline for Controlling Emissions of Volatile - Organic Compounds from Aboveground Storage Tanks (1995)
CCME PN 1299	Canadian Environmental Quality Guidelines (1999)
CCME CWS for PHC	Canada-wide Standards for Petroleum Hydrocarbons in Soil (2001)

Issuing Agency – Canadian General Standards Board	
Document Number	Title of Document
CAN/CGSB-1.124-99	Thinner for Vinyl Coatings
CAN/CGSB-1.136-92	Antiblush Thinner for Cellulose Nitrate Lacquer
3-GP-525M	Isopropanol
3-GP-531M	Methanol, Technical
3-GP-855M	Ethylene Glycol, Uninhibited
CAN/CGSB-15.50-92	Technical Grade Acetone
CAN/CGSB-15.52-92	Methyl Ethyl Ketone, Technical Grade
CAN/CGSB-21.1-93	Offset Lithographic Printing Ink
CAN/CGSB-1.2-89	Boiled Linseed Oil
CAN/CGSB-1.4-2000	Petroleum Spirits Thinner
CAN/CGSB-1.70-99	High Solvency Thinner
CAN/CGSB-1.94-M89	Xylene Thinner (Xylol)
CAN/CGSB-1.110-M91	General Purpose Thinners for Lacquers
CAN/CGSB-1.164-92	Solvent for Vinyl Pretreatment Coating
CAN/CGSB-3.2-99	Fuel Oil, Heating
CAN/CGSB-3.3-99	Kerosine

Issuing Agency – Canadian Petroleum Products Institute	
Document Number	Title of Document
CPPI/PACE Report 87-1	Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks
CPPI (1995)	Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles January 1990 for Product Identification
CPPI (1992)	Professional Driver's Manual
CPPI	Code of Practice for Management of Water Effluent Quality at Petroleum Storage and Distribution Facilities
CPPI (2000)	Recommended Practices: Operation of Shop-Fabricated Aboveground Petroleum Storage Tank Systems

Issuing Agency – Canadian Standards Association	
Document Number	Title of Document
CAN/CSA-B139-00	Installation Code for Oil Burning Equipment
CAN/CSA-Z245.1-98	Steel Line Pipe

Issuing Agency – Environmental Protection Agency	
Document Number	Title of Document
EPA/530/UST-90/007	Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods
EPA 510-B-95-009	Introduction to Statistical Inventory Reconciliation

Issuing Agency – NACE International	
Document Number	Title of Document
NACE RP0169-2002	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0285-2002	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection.
NACE RP0193-2001	External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms
NACE TM0101-2001	Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Tank Systems
NACE No. 10/SSPC-PA6	Fiberglass-Reinforced Plastic (FRP) Linings Applied to Bottoms of Carbon Steel Aboveground Storage Tanks

Issuing Agency – National Research Council	
Document Number	Title of Document
NRCC 38727	National Fire Code of Canada (NFCC) - 1995

Issuing Agency – Steel Tank Institute	
Document Number	Title of Document
STI SP001-00	Standard for Inspection of In-service Shop Fabricated Aboveground Tanks for the Storage of Flammable and Combustible Liquids.
STI R831-98	Optional Recommended Practice for Control of Localized Corrosion Within Underground Steel Petroleum Storage Tanks.
STI R893-89	Recommended Practice for External Corrosion Protection of Shop Fabricated Aboveground Tank Floors.
STI RP011-01	Recommended Practice for Anchoring of Steel Underground Storage Tanks.

Issuing Agency – Underwriters’ Laboratories of Canada	
Document Number	Title of Document
ULC-S601-2000	Aboveground Horizontal Shop Fabricated Steel Tanks
ULC-S601(A)-2001	Shop Refurbishing of Aboveground Horizontal Shop Fabricated Steel Tanks
CAN/ULC-S602-1992	Aboveground Steel Tanks for Fuel Oil and Lubricating Oil
CAN/ULC-S603-1992	Underground Steel Tanks
CAN/ULC-S603.1-1992	Galvanic Corrosion Protection Systems for Underground Steel Tanks
ULC-S603(A)-2001	Refurbishing of Underground Steel Tanks
ULC-S615-1998	Underground Reinforced Plastic Tanks
ULC-S615(A)-1987	Refurbishing of Underground Reinforced Plastic Tanks
ULC-S618-2000	Magnesium and Zinc Anodes and Zinc and Copper/Copper Sulphate Reference Electrodes
ULC-S630-2000	Aboveground Vertical Shop Fabricated Steel Tanks
ULC-S630(A)-2001	Shop refurbishing of Aboveground Vertical Shop Fabricated Steel Tanks
CAN/ULC-S633-1999	Flexible Underground Hose Connectors
CAN/ULC-S643-2000	Aboveground Shop Fabricated Steel Utility Tanks
CAN/ULC-S651-2000	Emergency Valves
ULC-S652-1993	Tank Assemblies for Collection of Used Oil
ULC-S653-1994	Contained Aboveground Steel Tank Assemblies
ULC-S655-1998	Aboveground Protected Tank Assemblies
ULC-S656-2000	Oil-Water Separators
ORD-C58.9-1997	Secondary Containment Liners for Underground and Aboveground Tanks
ORD-C58.10-1992	Underground Jacketed Steel Tanks
ORD-C58.12-1992	Leak Detection Devices (Volumetric Type) for Underground Storage Tanks
ORD-C58.14-1992	Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks
ORD-C58.15-1992	Overfill Protection Devices for Flammable Liquid Storage Tanks
ORD-C58.19-1992	Spill Containment Devices for Underground Tanks
ORD-C58.20-1996	Special Corrosion Protection Underground Tanks
ORD-C80.1-2000	Aboveground Non-Metallic Tanks for Fuel Oil
ORD-C107.4-1992	Ducted Flexible Underground Piping Systems
ORD-C107.7-1993	Glass-Fibre Reinforced Plastic Pipe and Fittings
ORD-C107.12-1992	Line Leak Detection Devices for Flammable Liquid Piping
ORD-C107.14-1992	Non Metallic Pipe and Fittings
ORD-C107.19-1992	Secondary Containment of Underground Piping
ORD-C107.21-1992	Under-Dispenser Sumps
ORD-C142.5-1992	Aboveground Concrete Encased Steel Tank Assemblies
ORD-C142.6-2000	Storage Vaults
ORD-C142.13-1997	Mobile Refueling Tanks
ORD-C142.15-2000	Precast Concrete Tanks
ORD-C142.17-1998	Aboveground Special Purpose Relocatable Vertical Tanks
ORD-C142.18-1995	Aboveground Rectangular Steel Tanks
ORD-C142.19-1994	Spill Containment Devices for Aboveground Tanks
ORD-C142.20-1995	Aboveground Secondary Containment Tanks
ORD-C142.21-1995	Aboveground Used Oil Systems
ORD-C142.22-1995	Contained Aboveground Vertical Steel Tank Assemblies
ORD-C142.23-1991	Aboveground Waste Oil Tanks
ORD-C536-1998	Flexible Metallic Hose

Section 1.6 Abbreviations

- 1.6.1 The abbreviations used in this Code for the names of associations or other codes shall have the meanings assigned to them in this Article. The addresses of the associations or code-sponsoring organizations are provided as follows:

API	American Petroleum Institute 1220 L Street N.W. Washington, D.C. 20005 Phone: 202-682-8375 FAX: 202-962-4776 E-mail: publications@api.org Web Page: www.pei.org
CAN	National Standards of Canada 1200-45 O'Connor Street Ottawa, Ontario K1P 6N7 Phone: 613-238-3222 FAX: 613-995-4564 E-mail: info@scc.ca Web Page: ww.scc.ca
CCME	Canadian Council of Ministers of the Environment 123 Main Street, Winnipeg, Manitoba R3C 1A3 Phone: 204-948-2090 FAX: 204-948-2125 Web Page: www.ccme.ca
CGSB	Canadian General Standards Board 1402 - 222 Queen Street Ottawa, Ontario K1A 1G6 Phone: 819-956-0425 FAX: 819-956-5644 E-mail: CGSB@Piper.PWGSC.gc.ca Web Page: www.pwgsc.gc.ca/cgsb
CPCA	Canadian Petroleum Contractors Association PO Box 415 Markham, Ontario, L3P 3J8 Tel: 705 735-9437 Fax 705 735-9418 Web Page: www.CPCAonline.com
CPPI	Canadian Petroleum Products Institute 1000 - 275 Slater Street Ottawa, Ontario K1P 5H9 Phone: 613-232-3709 FAX: 613-236-4280
CSA	Canadian Standards Association 178 Rexdale Blvd. Toronto, Ontario M9W 1R3 Phone: 416-747-4000 FAX: 416-747-4149 E-mail: sales@csa.ca Web Page: www.csa.ca

EPA U.S. Environmental Protection Agency,
Office of Underground Storage Tanks
401 M Street S. W., Mail Code 5401G
Washington, D.C., U.S.A. 20460
Phone: 703-603-9900 FAX: 703-603-9163
Web Page: www.epa.gov/swerust1/index.htm

NACE NACE International (formerly National
Association of Corrosion Engineers)
1440 South Creek Drive
Houston, Texas, USA 77084-4906
Phone: 281-228-6200 FAX: 281-228-6329
Web Page: www.nace.org

NFCC National Fire Code of Canada,
published under the auspices of the
National Research Council of Canada
National Research Council of Canada
Ottawa, Ontario K1A 0R6
Phone: 613-993-2463 FAX: 613-952-7673
E-mail: Irc.Client-Services@nrc.ca
Web Page: www.nrc.ca/irc/

STI Steel Tank Institute
570 Oakwood Road
Lake Zurich, Illinois 60047
Phone 847-438-8265 FAX 847-438-8766
E-mail: wgeyer@steeltank.com
Web Page: www.steeltank.com

ULC Underwriters' Laboratories of Canada
7 Crouse Road
Scarborough, Ontario M1R 3A9
Phone: 416-757-3611 FAX: 416-757-9540
E-mail: ulcinfo@ulc.ca
Web Page: www.ulc.ca/

- 1.6.2 Abbreviations of words and phrases in this
Code shall have the following meanings:

cm	centimetre(s)
°C	degree(s) Celsius
h	hour(s)
kPa	kilopascal(s)
L	litre(s)
m	metre(s)
min	minute(s)
mL	millilitres
mm	millimetre(s)
mV	millivolt(s)
s	second(s)
µm	micrometre(s) or micron(s)

Part 2 Registration and Approval of Storage Tank Systems

SECTION 2.1 Scope

- 2.1.1 This Part applies to the registration and approval to construct a *storage tank system*.

SECTION 2.2 Registration of Existing Storage Tank Systems

- 2.2.1 The *owner* of an *existing storage tank system* shall register all *storage tanks* of the system with the *authority having jurisdiction* in a manner and timeframe prescribed by the *authority having jurisdiction*.
- 2.2.2 Registration of an *existing storage tank system* shall be conducted by completing and filing a registration form in a manner specified by the *authority having jurisdiction*. (See Appendix C)
- 2.2.3 The *owner* of an *existing storage tank system* shall identify registered tanks in a manner and time frame specified by the *authority having jurisdiction*.
- 2.2.4 The *authority having jurisdiction* may deem the age of an *existing storage tank system* to be unknown unless the *owner* provides the *authority having jurisdiction* with either the date of installation and/or the date of manufacture.

SECTION 2.3 Approval of Storage Tank Systems

- 2.3.1 No person shall construct or cause to construct, install, *alter*, or operate a *storage tank system* unless all required permits and approvals have been obtained from the *authority having jurisdiction*.

SECTION 2.4 Registration of New Storage Tank Systems

- 2.4.1 The *owner* of a *new storage tank system* installed after a date specified by the *authority having jurisdiction* shall register the *storage tank system*.
- 2.4.2 The new *storage tank system* shall be registered by completing and filing a registration form as specified by the *authority having jurisdiction*. (See Appendix C)
- 2.4.3 The *owner* of a *new storage tank system* shall identify registered tanks in a manner specified by the *authority having jurisdiction*.

SECTION 2.5 Product Supply and Registration

- 2.5.1 After a date specified by the *authority having jurisdiction*, no person shall transfer or cause to be transferred *petroleum* or *allied petroleum products* to a *storage tank system* unless the *storage tank system* has been registered with the *authority having jurisdiction*.

Part 3 Design and Installation of Aboveground Storage Tank Systems

Section 3.1 Scope

- 3.1.1(1) This Part applies to the design and installation of a new *aboveground storage tank system*.
- 3.1.1(2) A *storage tank* installed in a concrete vault located below grade with the interior of the vault not filled with backfill material shall be considered an *aboveground storage tank* for the purpose of this Code.

Section 3.2 General Requirements

- 3.2.1 Except as provided in this Part, the design, fabrication and installation of an *aboveground storage tank system* shall be in conformance with the NFCC.
- 3.2.2 Except as provided in this Part, the design and installation of an *aboveground storage tank system* connected to an oil-burning appliance and equipment that comes within the scope of CAN/CSA-B139-00, "Installation Code for Oil Burning Equipment" shall be in conformance with that Code.
- 3.2.3 An *aboveground storage tank*, components, and accessories, for which there is a recognized standard, shall be *approved* only for the uses indicated under the standard.
- 3.2.4 A company or individual that is authorized by the *authority having jurisdiction* shall verify that the design and installation of an *aboveground storage tank system* meets the requirements of this Code or other requirements as specified by the *authority having jurisdiction*.
- 3.2.5 An *aboveground storage tank system* shall be installed by a company or individual that is authorized by the *authority having jurisdiction*.

- 3.2.6 An *aboveground storage tank* shall be equipped to control emissions of volatile organic compounds in conformance with CCME PN 1180, "Environmental Guideline for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks". (See Appendix B, note B.3.2.6)
- 3.2.7(1) The *owner* of an *aboveground storage tank system* shall provide an as-built drawing to the *authority having jurisdiction* in the manner and time frame as specified by the *authority having jurisdiction*.
- 3.2.7(2) As-built drawings for an *aboveground storage tank system* shall include, as a minimum:
- (a) the outline of all *storage tanks*;
 - (b) the centerline of all *pipings* or *pipings* groups;
 - (c) the centerline of all underground electrical power and monitor sensor conduit;
 - (d) building foundation outlines;
 - (e) *secondary containment* systems; and
 - (f) property lines.
- 3.2.8(1) No person shall install an *aboveground storage tank system* unless:
- (a) required permits or approvals have been obtained from the *authority having jurisdiction*;
 - (b) plans, drawings and specifications of the system or equipment have been examined by the *authority having jurisdiction*; and
 - (c) the plans, drawings and specifications referred to in Clause (b) bear the stamp and signature of a professional engineer licensed to practice in the province/territory.
- 3.2.9 An *aboveground storage tank system* shall be designed and installed in accordance with the manufacturer's instructions, the appropriate standards, and this Code.

Section 3.3 Field-erected Storage Tank Systems

3.3.1(1) A field-erected *storage tank system* shall:

- (a) have *corrosion protection* in conformance with Section 3.8;
- (b) have a *secondary containment* system in conformance with Section 3.9;
- (c) have *leak detection* in conformance with Part 6;
- (d) have *containment sumps*, as applicable;
- (e) be provided with overfill protection:
 - (i) for pipeline delivery, in the form of an alarm system that will automatically alert pipeline or terminal personnel so that action can be taken to prevent the *storage tank* from being overfilled;
 - (ii) for truck, rail, ship, or barge delivery, in the form of a visual and audible alarm system for detecting a high level that will activate and alert personnel in enough time to terminate the flow of the product to the storage tank and prevent an overfill (See Appendix B, note B.3.3.1(1)(e)(ii)); or
 - (iii) in conformance with API RP 2350-96, “Overfill Protection for Storage Tanks in Petroleum Facilities”; and
- (f) have *piping* in conformance with Part 5, as applicable

3.3.2 If vapour balancing or vapour recovery systems are required, they shall be designed and built in conformance with CCME PN 1057, “Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks”.

Section 3.4 Shop-fabricated Storage Tank Systems

3.4.1(1) A shop-fabricated *storage tank system* shall:

- (a) have *corrosion protection* in conformance with Section 3.8;
- (b) have a *secondary containment* system in conformance with Section 3.9;

- (c) have *leak detection* in conformance with Part 6;
- (d) have *containment sumps*, as applicable;
- (e) except as specified in Sentence 3.4.1(2), be provided with overfill protection:
 - (i) compatible with the intended method of filling;
 - (ii) designed, built, and approved in conformance with ORD-C58.15-1992, “Overfill Protection Devices for Flammable Liquid Storage Tanks,” which will prevent filling the tank beyond 95% of the tank’s capacity or activate an audible or combined audible/visual alarm at a product level of 90% of the tank’s capacity; and
 - (iii) where a high-level alarm system is used, with audible and visual alarms located where personnel are constantly on duty during the product transfer operation and can promptly stop or divert delivery to the *tank*; and
- (f) have *piping* in conformance with Part 5, as applicable.

3.4.1(2) A shop-fabricated *storage tank system* having a capacity of less than 5 000 L may be provided with overfill protection in the form of visual monitoring and gauging of the level in the *storage tank system* by trained employees in constant attendance throughout the transfer operation and who are located so as to be able to promptly shut down the flow, or communicate immediately with the person controlling the delivery so that the flow can be shut down promptly.

3.4.2 A horizontal *storage tank* shall be supported above grade level.

3.4.3 Where there is a dispenser, *leak detection* for the dispenser and related components shall be in conformance with Part 6.

Section 3.5 Aboveground Storage Tank Systems for Storing Used Oil

- 3.5.1(1) An *aboveground used oil storage tank* that is manually filled shall be designed, built, and approved in conformance with:
- (a) ORD-C142.23-1991, "Aboveground Waste Oil Tanks"; or
 - (b) ULC-S652-1993, "Tank Assemblies for Collection of Used Oil".
- 3.5.1(2) A *used oil storage tank* that is not manually filled shall be designed, built, and approved in conformance with ULC-S652-1993, "Tank Assemblies for Collection of Used Oil". (See Appendix B, Note B.3.5.1(2))

Section 3.6 Design Standards

- 3.6.1(1) Based on the design, an *aboveground storage tank* shall be designed, built, and approved in conformance with the following, as applicable:
- a) API Std 650-98, "Welded Steel Tanks for Oil Storage";
 - b) ULC-S601-2000, "Aboveground Horizontal Shop Fabricated Steel Tanks";
 - c) CAN/ULC-S602-1992, "Aboveground Steel Tanks for Fuel Oil and Lubricating Oil";
 - d) ULC-S630-2000, "Aboveground Vertical Shop Fabricated Steel Tanks";
 - e) CAN/ULC-S643-2000, "Aboveground Shop Fabricated Steel Utility Tanks";
 - f) ULC-S652-1993, "Tank Assemblies for Collection of Used Oil";
 - g) ULC-S653-1994, "Contained Aboveground Steel Tank Assemblies";
 - h) ORD-C142.5-1992, "Aboveground Concrete Encased Steel Tank Assemblies";
 - i) ORD-C142.18-1995, "Aboveground Rectangular Steel Tanks";
 - j) ORD-C142.21-1995, "Aboveground Used Oil Systems";

- k) ORD-C142.22-1995, "Contained Aboveground Vertical Steel Tank Assemblies"; or
- (l) ORD-C142.23-1991, "Aboveground Waste Oil Tanks".

- 3.6.2 An *overflow protection device* shall be designed, built, and approved in conformance with ORD-C58.15-1992, "Overfill Protection Devices for Flammable Liquid Storage Tanks".
- 3.6.3 A *containment sump* shall be designed, built, and approved in conformance with ORD-C107.21-1992, "Under-Dispenser Sumps".
- 3.6.4 A *liner* shall be designed, built, and approved in conformance with ORD-C58.9-1997, "Secondary Containment Liners for Underground and Aboveground Tanks".
- 3.6.5 An *aboveground storage tank* designed to contain an *allied petroleum product* shall be designed, built, and approved for use with that product.
- 3.6.6(1) An *aboveground storage tank* built in conformance with:
- (a) API Spec 12B-95, "Bolted Tanks for Storage of Production Liquids";
 - (b) API Spec 12D-94, "Field Welded Tanks for Storage of Production Liquids"; or
 - (c) API Spec 12F-94, "Shop Welded Tanks for Storage of Production Liquids"
- shall be used only for the storage of production petroleum and allied petroleum products.

Section 3.7 Repair, Alteration, Reconstruction, and Relocation

- 3.7.1(1) The repair, *alteration*, reconstruction, or relocation of an *aboveground storage tank system* shall be done in conformance with the technical requirements of, as applicable:
- (a) ULC-S601(A)-2001, “Shop Refurbishing of Aboveground Horizontal Shop Fabricated Steel Tanks”;
 - (b) ULC-S630(A)-2001, “Shop Refurbishing Aboveground Vertical Shop Fabricated Steel Tanks”;
 - (c) API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”;
 - (d) STI SP001-00, “Standard for Inspection of In-service Shop Fabricated Aboveground Tanks for the Storage of Flammable and Combustible Liquids”; or
 - (e) the special acceptance procedures of ULC or API.
- 3.7.2 The owner of an *aboveground storage tank system* shall provide a revised as-built drawing in conformance with Sentence 3.2.7(2) to the *authority having jurisdiction* in a time frame specified by the *authority having jurisdiction* whenever new construction, alteration, or site upgrade occurs.

Section 3.8 Corrosion Protection of Aboveground Steel Storage Tank Systems

- 3.8.1(1) When *cathodic protection* is used, it shall be designed by a *corrosion expert* (See Appendix B, note B.3.8.1(1)) and be in conformance with:
- (a) API RP 651-97, “Cathodic Protection of Aboveground Petroleum Storage Tanks”;
 - (b) API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”;
 - (c) NACE RP0193-2001, “External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms”; or
 - (d) STI R893-89, “Recommended Practice for External Corrosion Protection of Shop Fabricated Aboveground Tank Floors.”
- 3.8.2(1) Atmospheric *corrosion* of an *aboveground storage tank system* shall be controlled by:
- (a) a *protective coating* applied in conformance with the coating manufacturer’s instructions;
 - (b) a *corrosion* control program in accordance with API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”; or
 - (c) the use of a non-corroding material in its construction.

Section 3.9 Secondary Containment Requirements

- 3.9.1(1) Subject to Sentences (2) and (3), a *secondary containment system* for an *aboveground storage tank* shall:
- (1) for a *storage tank system* that consists of a single *storage tank*, have a volumetric capacity of not less than 110% of the capacity of the tank; or
 - (2) for a *storage tank system* that consists of more than one *storage tank*, have a volumetric capacity of not less than the sum of:
 - (a) the capacity of the largest *storage tank* located in the contained space; and
 - (b) 10% of the greater of:
 - (i) the capacity specified in Clause (a); or
 - (ii) the aggregate capacity of all other *storage tanks* located in the contained space.
- 3.9.1(2) A *secondary containment system* for a shop-fabricated *storage tank* shall be designed, built, and *approved* in conformance with:
- (a) ULC-S653-1994, “Contained Aboveground Steel Tank Assemblies”;
 - (b) ULC-S655-1998, “Aboveground Protected Tank Assemblies”;
 - (c) ORD-C142.5-1992, “Aboveground Concrete Encased Steel Aboveground Tank Assemblies”; or
 - (d) a recognized standard for double-wall *tanks*.

3.9.1(3) A *secondary containment* system for a field-erected *aboveground storage tank* shall be:

- (a) a single-wall and single-bottom *storage tank* placed entirely within a dyked area, with an *impermeable barrier* in the floor of the containment area and in the dyke walls;
- (b) a single-wall, double-bottom *storage tank* placed entirely within a dyked area, with an *impermeable barrier* in the floor of the containment area and in the dyke walls, sealed to the perimeter of the *storage tank* or pad when the *liner* is not installed under the *tank*;
- (c) a double-wall *storage tank* for a *storage tank* with a capacity of 50 000 L or less; or
- (d) a double-wall *storage tank* placed entirely within a dyked area, with an *impermeable barrier* in the floor of the containment area and in the dyke walls, for a *storage tank* with a capacity of more than 50 000 L.

3.9.2(1) Except as provided in Sentence (2), a *secondary containment impermeable barrier* shall be:

- (a) designed, built, and *approved* in conformance with:
 - (i) ORD-C58.9-1997, “Secondary Containment Liners for Underground and Aboveground Tanks”; or
 - (ii) ORD-C142.20-1995, “Aboveground Secondary Containment Tanks”; and
- (b) installed so that:
 - (i) the *liner* is sealed to the perimeter of the *storage tank* or pad when the *liner* is not installed under the *tank*;
 - (ii) the *liner* extends to the top of the dyke wall;
 - (iii) the *liner* is covered with a non-combustible material of such nature and thickness that it will not fail when the *secondary containment* is exposed to fire; and
 - (iv) *liners* that are intended to be exposed in service are listed for aboveground (exposed) use.

3.9.2(2) A *secondary containment impermeable barrier* that does not conform to Sentence (1) shall:

- (a) use material compatible with the product being stored and acceptable to the *authority having jurisdiction* (See Appendix B, note 3.9.2(2)(a)); and
- (b) be designed, constructed, and maintained to ensure a maximum hydraulic conductivity of 1×10^{-6} cm/s.

3.9.3(1) *Liner* penetrations shall be located at the high point or in a raised part of the dyke floor. (See Appendix B, note B.3.9.3(1))

3.9.3(2) All *liner* penetrations shall be sealed.

3.9.4 Monitoring of the *interstitial space* of the *secondary containment* system shall be provided in conformance with Part 6 of this Code.

Section 3.10 Spill Containment and Runoff Collection

3.10.1 *Spills*, overfills, and storm water from *product transfer areas* shall be contained, treated and disposed of in conformance with the applicable provincial or territorial regulations, guidelines or policies.

3.10.2 Containment area floors within dykes shall slope away from the tank base towards a sump at a slope greater than 1%.

3.10.3(1) An *oil-water separator* used to treat storm water runoff, overfills, or a *spill* from the *product transfer area* shall be sized for a minimum hydraulic flow rate of a ten year return, one hour storm event, with the one hour rainfall intensity data obtained for the nearest weather station, and:

- (a) be designed, built, and *approved* in conformance with ULC-S656-2000, “Oil-Water Separators”; or

- (b) conform to the following:
- (i) be designed to produce a *discharge* of water that does not contain more than 15 mg/L of *free oil* and grease as measured by the partition-gravimetric method or other protocol as defined by the *authority having jurisdiction* ;
 - (ii) be designed for an insoluble-in-water oil with a specific gravity of 0.875 ± 0.025 ; and
 - (iii) be designed based on the hydraulic retention time required to separate oil with a particle droplet size of 60 microns from storm water.

Part 4 Design and Installation of Underground Storage Tank Systems

Section 4.1 Scope

- 4.1.1 This Part applies to the design and installation of a new *underground storage tank system*.

Section 4.2 General Requirements

- 4.2.1 Except as provided in this Part, the design, fabrication and installation of an *underground storage tank system* shall be in conformance with Part 4 of the NFCC.
- 4.2.2 An *underground storage tank*, components, and accessories, for which there is a recognized standard, shall be *approved* only for the uses indicated by the standard.
- 4.2.3 An *underground storage tank system* shall be designed and installed in accordance with the manufacturer's instructions, the appropriate standards, and this Code.
- 4.2.4(1) Except as specified in Sentence (2), an *underground storage tank system* shall be designed and installed to have:
- (a) double-wall *tank(s)* with monitorable *interstitial space*;
 - (b) an *overflow protection device*;
 - (c) a fill pipe *spill containment device*;
 - (d) *containment sumps*, as applicable;
 - (e) *leak detection* in conformance with Part 6;
 - (f) except for *venting* purposes, liquid- and vapour-tight connections, caps and adapters; and
 - (g) *corrosion protection*, as applicable.
- 4.2.4(2) An *underground storage tank system* for storing *used oil* shall be designed and installed to have:
- (a) double-wall *tank(s)* with monitorable *interstitial space*;
 - (b) *corrosion protection*;
 - (c) a 50 mm (2 in) Schedule 40 suction pipe, for product removal that can be removed for the purpose of clearing a blockage;
 - (d) product removal or transfer connections located within a *spill containment device*;
 - (e) an *overflow protection device* where the *storage tank* is filled by pump or remote manual fill;
 - (f) where the fill port is outside, it shall be fitted with a *spill containment device* having a capacity of at least 25 L and the *spill containment device* shall be fitted with:
 - (i) a rain cover; and
 - (ii) a screen to prevent nuts, bolts, rags, and other such objects from entering the *storage tank*;
 - (g) in-take *venting* with an open area at least twice the open area of the suction pipe as specified in 4.2.4(2)(c) to avoid vacuum collapse from high rate of product removal; and
 - (h) *leak detection* in conformance with Part 6.
- 4.2.5 A company or individual that is authorized by the *authority having jurisdiction* shall verify that the design and installation of an *underground storage tank system* meets the requirements of this Code or other requirements as prescribed by the *authority having jurisdiction*.
- 4.2.6 An *underground storage tank system* shall be installed by a company or individual that is authorized by the *authority having jurisdiction*.
- 4.2.7 An *underground storage tank* shall be located and maintained to permit the eventual removal of the *storage tanks* when the *storage tank system* is taken *out-of-service*. (See Appendix B, note B.4.2.7)
- 4.2.8(1) The *owner* of an *underground storage tank system* shall provide an as-built drawing to the *authority having jurisdiction* in the manner and time frame as specified by the *authority having jurisdiction*.

4.2.8(2) As-built drawings for an *underground storage tank system* shall include, as a minimum:

- (a) the outline of all *storage tanks*;
- (c) the centerline of all *pipng* or *pipng* groups;
- (c) the centerline of all underground electrical power and monitor sensor conduit;
- (d) building foundation outlines;
- (e) *secondary containment systems*; and
- (f) property lines.

4.2.9(1) No person shall install an *underground storage tank system* unless:

- (a) required permits or approvals have been obtained from *the authority having jurisdiction*;
- (b) plans, drawings and specifications of the system or equipment have been examined by the *authority having jurisdiction*; and
- (c) the plans, drawings and specifications referred to in Clause 3.2.8(1)(b) bear the stamp and signature of a professional engineer licensed to practice in the province/territory.

Section 4.3 Design Standards

4.3.1(1) An *underground storage tank* shall be designed, built, and *approved* in conformance with the following:

- (a) CAN/ULC-S603-1992, “Underground Steel Tanks”;
- (b) ULC-S615-1998, “Underground Reinforced Plastic Tanks”;
- (c) ORD-C58.10-1992, “Underground Jacketed Steel Tanks”;
- (d) ULC-S652-1993, “Tank Assemblies for Collection of Used Oil”; or
- (e) CAN/ULC-S603.1-1992, “Galvanic Corrosion Protection Systems for Underground Steel Tanks”.

4.3.2 An *overflow protection device* shall be designed, built, and *approved* in conformance with ORD-C58.15-1992, “Overflow Protection Devices for Flammable Liquid Storage Tanks”.

4.3.3 A *spill containment device* shall be designed, built, and *approved* in conformance with ORD-C58.19-1992, “Spill Containment Devices for Underground Tanks”.

4.3.4 A *dispenser sump* shall be designed, built, and *approved* in conformance with ORD-C107.21-1992, “Under-Dispenser Sumps”.

4.3.5 A *Liner* shall be designed, built, and *approved* in conformance with ORD-C58.9-1997, “Secondary Containment Liners for Underground and Aboveground Tanks”.

4.3.6(1) Subject to Part 6, a *leak detection* device shall be designed, built, and *approved* in conformance with one of the following:

- (a) ORD-C58.12-1992, “Leak Detection Devices (Volumetric Type) for Underground Storage Tanks”; or
- (b) ORD-C58.14-1992, “Leak Detection Devices (Nonvolumetric) for Underground Tanks”.

4.3.6(2) Subject to Part 6, a *leak detection* method shall be in conformance with EPA/530/UST-90/007, “Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods”.

4.3.7(1) A *storage tank* designed to contain *allied petroleum products* may be constructed of materials other than steel when necessitated by the properties of the liquid stored and *approved* for use with that liquid.

4.3.7(2) A *storage tank* shall:

- (a) be designed, built, and *approved* in conformance with:
 - (i) CAN/ULC-S603-1992, “Underground Steel Tanks”;
 - (ii) CAN/ULC-S603.1-1992, “Galvanic Corrosion Protection Systems for Underground Steel Tanks”; or
 - (iii) ORD-C58.10-1992, “Underground Jacketed Steel Tanks”.

- (b) be constructed of materials compatible with the liquid to be stored; and
- (c) have *corrosion protection* in conformance with Section 4.5.

4.3.8(1) *Secondary containment* for *underground storage tanks* shall be designed, built, and approved in conformance with:

- (a) for a double-wall steel *storage tank*, CAN/ULC-S603-1992, “Underground Steel Tanks”; or
- (b) for a double-wall fibreglass-reinforced plastic *storage tank*, ULC-S615-1998, “Underground Reinforced Plastic Tanks”; or
- (c) for a jacketed-steel *storage tank*, ORD-C58.10-1992 “Underground Jacketed Steel Tanks”.

Section 4.4 Installation

4.4.1(1) *Petroleum or allied petroleum products* shall not be placed in an *underground storage tank* until:

- (a) a fill pipe and *vent* line have been installed in the tank; and
- (b) all other openings have been sealed or *pipng* systems have been installed in accordance with their operational requirements.

Section 4.5 Corrosion Protection of Underground Steel Storage Tank Systems

4.5.1(1) A steel *underground storage tank system* shall be provided with *corrosion protection* in conformance with:

- (a) CAN/ULC-S603.1-1992, “Galvanic Corrosion Protection Systems for Underground Steel Tanks” including appendices;
- (b) a *storage tank* built in conformance with CAN/ULC-S603-1992, “Underground Steel Tanks” and coated in conformance with CAN/ULC-S603.1-1992, “Galvanic Corrosion Protection Systems for Underground Steel Tanks shall be

provided with a *cathodic protection* system designed by a *corrosion expert* to conform with:

- (i) CPPI/PACE Report 87-1, “Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks”; or
- (ii) NACE RP0285-2002, “Corrosion Control of Underground Storage Tank Systems by Cathodic Protection”; or
- (c) a *storage tank* with the entire primary tank surface encased in the interstice of a non-corrodible jacket built in conformance with ORD-C58.10-1992, “Underground Jacketed Steel Tanks”; or
- (d) a *storage tank* with the entire primary tank surface encased in a non-corrodible jacket built in conformance with ORD-C58.20-1996 “Special Corrosion Protection Underground Tanks.”

4.5.2(1) Except for a *storage tank* jacketed in conformance with ORD-C58.10-1992 “Underground Jacketed Steel Tanks” or ORD-C58.20-1996 “Special Corrosion Protection Underground Tanks” or installed in a vault with backfill, the *cathodic protection* system on all new installations of steel *underground storage tank systems* shall be tested for electrical isolation and system effectiveness after final backfilling in order to allow any corrective measures to be completed before final grading and placement of asphalt or concrete covers, as applicable.

4.5.2(2) A *cathodic protection* system shall meet the requirements of Section 8.6 of this Code.

4.5.2(3) When a *cathodic protection* system does not satisfy the requirements as specified in Section 8.6, the *owner* shall take corrective action in accordance with the recommendations of a *corrosion expert*.

4.5.2(4) The *owner* of a *underground storage tank system* shall, upon completion of the installation, ensure that the *cathodic*

protection system meets the requirements as specified in Section 8.6 and report in writing to the *authority having jurisdiction* the measured voltage potential(s) and whether or not *cathodic protection* has been achieved.

- 4.5.3(1) A new steel *storage tank* added to an *existing* system that already has an impressed current *cathodic protection* system shall:
- (a) be in conformance with CAN/ULC-S603-1992, “Underground Steel Tanks”; and
 - (b) be electrically bonded into the impressed current *cathodic protection* system. (See Appendix B, note B.4.5.3(1)(b))
- 4.5.3(2) When a new *storage tank* built in conformance with CAN/ULC-S603.1-1992, “Galvanic Corrosion Protection Systems for Underground Steel Tanks” is installed near an *existing* CAN/ULC S603.1-1992, “Galvanic Corrosion Protection Systems for Underground Steel Tanks” *storage tank*, precautions shall be taken to ensure both the new and *existing* tanks are adequately *protected*. (See Appendix B, note B.4.5.3(2))

4.5.4(1) Impressed current *cathodic protection* shall be interlocked in such a manner that if the *cathodic-protection* system is turned off or bypassed either:

- (a) power to the pump will be shut off; or
- (b) audible and visual alarms will be turned on.

4.5.5 Impressed current *cathodic-protection* systems shall be equipped with a running time or a downtime totalizer. (See Appendix B, note B.4.5.5)

4.5.6(1) *Cathodically protected storage tanks* shall be installed with:

- (a) test wires brought to the surface and fastened at an accessible location; or
- (b) a permanent reference electrode and *approved* monitoring station, including test wires for each tank.

Part 5 Design and Installation of New Piping Systems

Section 5.1 Scope

- 5.1.1 This Part applies to the design and installation of *piping* associated with a *storage tank system*.

Section 5.2 General Requirements

- 5.2.1(1) *Piping* materials shall, as applicable, be designed, built, and *approved* in conformance with the following:
- (a) ASTM A 53, “Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless”;
 - (b) CAN/CSA Z245.1-98, “Steel Line Pipe”;
 - (c) CAN/ULC-S633-1999, “Flexible Underground Hose Connectors”;
 - (d) ORD-C107.7-1993, “Glass-Fibre Reinforced Plastic Pipe and Fittings”;
 - (e) ORD-C107.4-1992, “Ducted Flexible Underground Piping Systems”;
 - (f) ORD-C107.14-1992, “Non-Metallic Pipe and Fittings”; or
 - (g) ORD-C536-1998, “Flexible Metallic Hose”.
- 5.2.2 Except as provided in this Part, the design and installation of *piping* shall be in conformance with the NFCC.
- 5.2.3 Except as provided in this Part, the design and installation of *piping* connected to an oil-burning appliance and equipment that comes within the scope of CSA Standard B139, “Installation Code for Oil Burning Equipment” shall be in conformance with that Code.
- 5.2.4 *Piping* material shall be installed and maintained in accordance with an *approved* standard, code, or in a manner acceptable to the *authority having jurisdiction*.
- 5.2.5 Single-wall *piping* shall not have buried or concealed mechanical joints. (See Appendix B, note B.5.2.5)

- 5.2.6 *Leak detection* testing and monitoring of *piping* shall be in conformance with Part 6.
- 5.2.7 A thermal relief valve shall *discharge* into the low pressure side of the *piping*.
- 5.2.8(1) *Piping* located below the maximum product level in a tank shall be provided with a means to prevent the release of liquid from the tank by syphon flow.
- 5.2.8(2) Except as provided in Sentence 5.2.8(3), a manual shut-off valve shall be lockable or have a method of locking.
- 5.2.8(3) A manual shut-off valve on the *piping* connecting a *storage tank* and a heating appliance or a stationary combustion engine does not need to be lockable or have a method of locking.

Section 5.3 Product Transfer

- 5.3.1 The fill pipe on a *storage tank* with a capacity of 5 000 L or more shall be equipped for the attachment of a liquid and vapour-tight connection at the time of filling and shall be sealed with a liquid- and vapour-tight cap when not in use.
- 5.3.2 The suction tube of a *used oil* tank shall be equipped for the attachment of a liquid-tight fitting and shall be sealed with a liquid-tight cap when not in use.

Section 5.4 Design Standard for Underground Piping Systems

- 5.4.1 Underground *piping* up to and including 75 mm in diameter shall have *secondary containment* in accordance with Sentence 5.4.4(1).

- 5.4.2(1) Underground *piping* larger than 75 mm in diameter shall be designed, installed and maintained to meet the requirements of:
- (a) *secondary containment* in conformance with Sentence 5.4.4(1);
 - (b) *leak detection* in conformance with Part 6; or
 - (c) API RP 1632-96, "Cathodic Protection of Underground Storage Tank and Piping Systems" and API Std 2610-94, "Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities".
- 5.4.3(1) Non-metallic *piping* may be used for underground installations provided the *piping* and fittings are designed, built, and *approved* in conformance with the requirements of:
- (a) ORD-C107.7-1993, "Glass Fibre Reinforced Plastic Pipe and Fittings," or
 - (b) ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems."
- 5.4.4(1) *Secondary containment* for underground *piping* shall:
- (a) be designed, built, and *approved* in conformance with ORD-C107.7-1993, "Glass-Fibre Reinforced Plastic Pipe and Fittings";
 - (b) be designed, built, and *approved* in conformance with ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems";
 - (c) consist of a single-wall fibreglass-reinforced plastic, or single-wall steel *piping*, contained within a duct designed, built, and *approved* in conformance with ORD-C107.19-1992, "Secondary Containment of Underground Piping"; or
 - (d) be double-wall steel *piping* provided with a *cathodic protection* system designed by a *corrosion expert*.

- 5.4.5(1) *Secondary containment* systems for *piping* shall be designed and installed such that *leaks*:
- (a) accumulate in a *containment sump* that is readily available for visual inspection; or
 - (b) are detected by a monitoring system.

Section 5.5 Installation

- 5.5.1 *Piping* shall be installed by a company or individual that is authorized by the *authority having jurisdiction*.
- 5.5.2 *Piping* shall be located and maintained to permit the eventual removal of the *piping* when the *storage tank system* is permanently withdrawn from service.
- 5.5.3 *Piping* shall be located in a manner that will prevent allowable design stress from being exceeded.
- 5.5.4 *Piping* located aboveground shall be *protected* from physical damage due to impact.

Part 6 Monitoring and Leak Detection of Storage Tank Systems

Section 6.1 Scope

- 6.1.1 This Part applies to monitoring and *leak detection* for a *storage tank system*.

Section 6.2 General Requirements

- 6.2.1(1) A *storage tank system* shall be tested for *leaks* in conformance with Sections 6.2 and 6.3:
- (a) at the time of final installation:
 - (i) for an *underground storage tank system*, final installation shall be when final surface materials have been installed and prior to being put into service; or
 - (ii) for an *aboveground storage tank system*, final installation shall be before the *storage tank system* is put into service; and
 - (b) whenever a *leak* is suspected in the primary or *secondary containment* of the *storage tanks, piping, containment sumps* or related components.

- 6.2.2 A *line-leak detector* shall be designed, built, and *approved* in conformance with ORD-C107.12-1992, "Line Leak Detection Devices for Flammable Liquid Piping."

- 6.2.3 Manual or electronic dip or inventory reconciliation shall be in conformance with Section 8.3.

- 6.2.4(1) Statistical inventory reconciliation shall be in conformance with:
- (a) EPA/530/UST-90/007, "Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods"; and
 - (b) EPA 510-B-95-009, "Statistical Inventory Reconciliation."

- 6.2.5 An automatic tank gauge system with a precision *leak detection* capability shall be designed, built, and *approved* in conformance with ORD-C58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks".

- 6.2.6 A continuous in-tank *leak detection* system shall conform to good engineering practice and shall meet the requirements of a *precision leak detection test*. (See Appendix B, Note B6.2.6.)

- 6.2.7(1) High-technology *secondary containment* monitoring shall continuously monitor the *interstitial space* and include the use of an automatic device designed, built, and *approved* in conformance with:
- (a) ORD-58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks", or
 - (b) ORD-58.14-1992, "Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks",.

- 6.2.8 Visual *leak detection* procedures shall be performed in conformance with Sentence 8.4.1(3).

- 6.2.9(1) A *pressure liquid media leak detection* test shall be in conformance with the requirements of a *precision leak detection test* and:
- (a) the test device shall be third-party performance certified; and
 - (b) testing technicians shall be trained in the care and use of the test device

- 6.2.10(1) A *static liquid media leak detection* test shall be in conformance with the following requirements:
- (a) leak rate shall not exceed 0.38 L/h;
 - (b) the duration of the test shall be a minimum of 1 hour;
 - (c) there shall be no visual evidence of a *leak*; and

- (d) the test fluid shall exceed the elevation of *piping* and electrical conduit openings installed in sumps at the time of the *leak detection* test.

6.2.11(1) A high-pressure inert gas or vacuum *leak detection* test for *piping* shall be in conformance with the following procedures, as applicable:

- (a) a high-pressure decline test using an inert gas or a vacuum test may be used as a *leak detection* test for *piping* systems that are in use and that have a volume of less than 1,000 L;
- (b) whenever permitted by the equipment design and installation, product contained in the *piping* system shall be drained prior to conducting the high-pressure inert gas or vacuum test procedure;
- (c) pumps, dispensers or other auxiliary equipment connected to the *piping* that cannot be subjected to the pressure of the test shall be isolated from the test procedures to prevent equipment damage;
- (d) a test pressure or vacuum shall, as applicable:
 - (i) be more than 350 kPa (gauge) or 1.5 times the maximum operating pressure, whichever is greater;
 - (ii) not exceed 700 kPa (gauge), except when the *piping* system is designed for such pressures; and
 - (iii) not exceed the equipment manufacturer's design limitations.
- (e) stabilization is required after pressurization or vacuum is achieved;
- (f) a *piping* system with a volume of less than or equal to 500 L shall have the pressure or vacuum maintained for a period of at least 60 min after stabilization;
- (g) a *piping* system with a volume of greater than 500 L but less than or equal to 1,000 L shall have the test pressure or vacuum maintained for a period of at least two hours after stabilization;
- (h) a *piping* system with a volume greater than 1000 L shall be tested using a

procedure acceptable to the *authority having jurisdiction* (See Appendix B, Note B6.2.11 (1) (h); and

- (i) a *piping* system shall be considered to be *leaking* when pressure variations that occur after stabilization and within the test time period are greater than two percent of the test pressure or vacuum.

6.2.12(1) A low-pressure inert gas or vacuum *leak detection* test for *piping* shall be conducted in conformance with the following procedures, as applicable:

- (a) a low-pressure decline test using an inert gas or a vacuum test may be used to conduct a *leak detection* test on the *secondary containment* of double-wall tanks and double-wall pipe;
- (b) product contained in the *secondary containment* system shall be drained prior to conducting the low-pressure decline or vacuum test procedure;
- (c) a test pressure or vacuum shall, as applicable:
 - (i) be between 20 kPa and 35 kPa; and
 - (ii) not exceed the equipment manufacturer's design limitations;
- (d) stabilization is required after pressurization or vacuum is achieved;
- (e) *secondary containment* shall have the test pressure or vacuum maintained for a period of at least two hours after stabilization; and
- (f) a *piping* system shall be considered to be *leaking* when pressure variations that occur after stabilization and within the test time period are greater than two percent of the test pressure or vacuum.

6.2.13(1) A *precision leak detection* test shall be in conformance with (See Appendix B, note B.6.2.13(1)):

- (a) ORD-C58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks;" or
- (b) ORD-58.14-1992, "Leak Detection Devices (Nonvolumetric Type) for Underground Tanks."

Section 6.3 Leak Detection Interlocks and Alarms

- 6.3.1(1) Subject to Sentence (2), an automatic *leak detection* device, including a high-technology *secondary containment* monitoring device and precision line *leak detection* device, shall be electrically interlocked in such a manner that:
- (a) when the automatic *leak detection* device is activated, product flow shall be shut off; and
 - (b) except for on-site maintenance activities, when the automatic *leak detection* device is turned off or bypassed for more than one minute, product flow shall be terminated.
- 6.3.1(2) When an electrical interlock as specified in Sentence (1) is not possible, the *authority having jurisdiction* shall be notified whenever the *leak detection* device or method indicates a *leak*. (See Appendix B, note B.6.3.1(2))
- 6.3.2 A suction pump shall be equipped with a single check valve installed directly below the suction pump and *pipng* shall slope so the contents of the pipe will drain back to the storage tank if the suction is broken.
- 6.3.3 A *leak detection* alarm shall be located where the staff routinely work and in a place where such alarms can be readily heard and seen.

Section 6.4 Monitoring Wells

- 6.4.1 When more than one monitoring well is necessary to monitor an installation effectively, the monitoring wells shall be numbered so that all monitoring and testing results can be easily correlated to a specific monitoring location.
- 6.4.2 A monitoring well shall be equipped with a liquid-proof cap.
- 6.4.3 A monitoring well shall be distinguished from a fill pipe and marked in conformance with CPPI (1995), "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification"
- 6.4.4 A monitoring well shall be secured to prevent unauthorized access and tampering.
- 6.4.5 A monitoring well located in a traffic area shall be cut off at ground level and/or properly *protected* from vehicles.
- 6.4.6 A monitoring well installed within the *interstitial space* shall not penetrate the *liner*.
- 6.4.7 A damaged monitoring well shall be repaired or replaced within 30 *days* after discovery of the damage.
- 6.4.8 A monitoring well shall be checked for liquid product and/or vapours at least monthly.

Section 6.5 Groundwater Monitoring Wells

- 6.5.1(1) When a vertical groundwater monitoring well is to be used, a professional hydrogeologist or other person authorized by the *authority having jurisdiction* shall:
- (a) assess the *site* and establish the number and positioning of the monitoring wells so that product releases from any portion of the *storage tank system* that routinely contains a *petroleum* or *allied petroleum product* will be detected; and
 - (b) ensure compliance with the requirements of this Section.
- 6.5.2 The product stored in a *storage tank* shall be immiscible in water and shall have a specific gravity of less than one.
- 6.5.3 The hydraulic conductivity of the soil between a *storage tank system* and the monitoring wells shall not be less than 0.01 cm/s. (See Appendix B, note B 6.5.3)
- 6.5.4 The monitoring wells shall intercept the excavation zone of an *underground storage tank* or be as close as technically possible.

- 6.5.5 A monitoring well shall be a minimum of 50 mm in diameter.
- 6.5.6 Subject to Sentence 6.5.11(1), if a monitoring well is to be used as a recovery well, the screened zone shall extend at least 1.5 m into the water table and at least 1.5 m above the groundwater surface, as determined at the time of installation.
- 6.5.7 Subject to Sentence 6.5.11(1), the screened portion of a monitoring well shall be a minimum of 3.0 m in length and shall be factory slotted with a slot size of 0.25 mm or as *approved by the authority having jurisdiction*.
- 6.5.8 The area around the screened portion of a monitoring well shall be surrounded by a filter pack. (See Appendix B, note B.6.5.8)
- 6.5.9 Subject to Sentence 6.5.11(1), the filter pack shall extend to 0.5 m above the top of the screened portion of monitoring wells.
- 6.5.10 Subject to Sentence 6.5.11(1), the outside of a monitoring well shall be sealed from the ground surface to the top of the filter pack using bentonite, grout, or other material with equivalent performance.
- 6.5.11(1) Where the groundwater surface is less than 2.5 m from the ground surface, a professional hydrogeologist or other person authorized by the *authority having jurisdiction* shall determine the length and position of:
- (a) the screened portion of a well;
 - (b) the filter pack; and
 - (c) the bentonite, grout, or other material with equivalent performance seal.
- 6.5.12 A monitoring well shall be installed with a cap or plug at the bottom of the screened section of the well.
- 6.5.13 A monitoring well shall be constructed of flush joint, threaded, or bell and spigot

Schedule 40 PVC or equivalent. (See Appendix B, note B.6.5.13)

- 6.5.14 A continuous monitoring device or a manual method shall detect a minimum of 3 mm of free product on top of the groundwater surface in the monitoring well.

Section 6.6 Vapour Monitoring Wells

- 6.6.1(1) Where vapour monitoring is to be used, a professional hydrogeologist or other person authorized by the *authority having jurisdiction* shall:
- (a) assess the *site* and establish the number and positioning of the monitoring wells so that product releases from any portion of the *storage tank system* that routinely contains a *petroleum* or *allied petroleum product* will be detected; and
 - (b) ensure compliance with the requirements of this Section.
- 6.6.2 The product stored or tracer compound placed in the *storage tank system* shall be sufficiently volatile to result in a vapour level that is detectable by the monitoring devices.
- 6.6.3 The measurement of vapours by the monitoring device shall not be rendered inoperative by the groundwater, rainfall, soil moisture, or other known interferences so that a *leak* could go undetected for more than 30 *days*.
- 6.6.4 The level of background contamination shall not interfere with the method used to detect *leaks* from the *storage tank system*.
- 6.6.5 A vapour monitor shall have its performance validated by a third-party testing organization in conformance with ORD-C58.14-1992, "Leak Detection Devices (Nonvolumetric) for Underground Tanks".

- 6.6.6(1) A vapour monitor shall be designed and installed to detect any significant increase in concentration above the background level of:
- (a) the *petroleum* or *allied petroleum product* stored;
 - (b) a component or components of the *petroleum* or *allied petroleum product*; or
 - (c) a tracer compound placed in the *storage tank system*.

Section 6.7 Frequency and Method

- 6.7.1 The reference letters in Table 2 represent the *leak detection* and monitoring methods specified in Tables 3 through 9.
- 6.7.2(1) Tables 3 through 9 specify the frequencies and methods of *leak detection* and monitoring that shall be used upon installation and, as applicable (See Appendix B, note B.6.7.2(1)):
- (a) for in-service monitoring;
 - (b) for periodic *leak detection* testing; or
 - (c) if a leak is suspected.

Table 2 - Leak Detection and Monitoring Methods

Abbreviation	Leak detection and Monitoring Method Description ⁽¹⁾⁽²⁾
ATG	Automatic tank gauge with monthly <i>precision leak detection</i> test
CITLD	Continuous in-tank <i>leak detection</i> system with monthly <i>leak detection</i> test (results are limited to an evaluation of the <i>storage tank</i> only)
CITLDS	Continuous in-tank <i>leak detection</i> system with monthly <i>leak detection</i> test (results provide an evaluation of the <i>storage tank</i> and <i>piping system</i>)
ELLD	Electronic line <i>leak detection</i> device
HPVLDT	High-pressure inert gas or vacuum <i>leak detection</i> test
HTSCM	High-technology <i>secondary containment</i> monitoring
IR	Manual dip and inventory reconciliation; electronic dip and electronic inventory reconciliation; or electronic dip and manual inventory reconciliation in conformance with Section 8.3
LPVLDT	Low-pressure inert gas or vacuum <i>leak detection</i> test
MLLD	Mechanical line <i>leak detection</i> device
OWM	Observation well vapour or groundwater monitoring (monthly)
PLDT	<i>Precision leak detection</i> test of a <i>storage tank</i> (See Appendix B, note B.6.2.13(1))
PLMLDT	<i>Pressure liquid media leak detection</i> test
SIR	Statistical inventory reconciliation (monthly reporting)
SLMLDT	<i>Static liquid media leak detection</i> test
SVCV	Single, vertical check valve
VLD	Visual <i>leak detection</i> (weekly)

⁽¹⁾See Section 6.2 for definition and performance requirements of the prescribed methods.

⁽²⁾See Appendix B, note B.6.3.2(1)

Table 3 – New Underground Storage Tanks

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Double-wall tanks	PLDT	SIR; VLD; ATG; HTSCM; CITLDS; or CITLD	Not required	PLDT

Table 4 – Aboveground Storage Tanks

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Double-wall tanks	VLD	HTSCM; or VLD	Not required	VLD ⁽¹⁾ ; PLDT; or LPVLD ⁽¹⁾
API Std 650-98 (within approved secondary containment)	API 650 standard	IR and VLD; or HTSCM	API 653	PLDT; or API 653
API Std 650-98 (within non-approved secondary containment)		IR and VLD	API Std 653-01; or PLDT (annually)	PLDT; or API Std 653-01
Single wall vertical tanks (within approved secondary containment)	VLD	IR and VLD ; or HTSCM	API Std 653-01	PLDT; or API Std 653-01
Single-wall vertical tanks (within non-approved secondary containment)		IR and VLD	API Std 653-01; or PLDT (annually)	PLDT; or API Std 653-01
Horizontal tanks	VLD	IR and VLD	Not required	VLD ⁽²⁾ ; or PLDT

⁽¹⁾on the interstice only

⁽²⁾where entire system including piping is visible

Table 5 - Underground Piping

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Single-wall (greater than 75mm)	PLMLDT; or HPVLDT	OWM	PLMLDT; or HPVLDT (every year)	PLMLDT; or HPVLDT
		CITLDS; or ELLD	Not required	
Double-wall	PLMLDT; or HPVLDT and LPVLDT	ELLD; Sensor; CITLDS; or SVCV ⁽¹⁾	Not required	PLMLDT; or HPVLDT

⁽¹⁾Suction style system only

Table 6 - Aboveground Piping

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
All types	PLMLDT; or HPVLDT	VLD	Not required	PLMLDT; or HPVLDT

Table 7 – Turbine, Transition and Dispenser Sumps

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Dispenser Sumps	SLMLDT	HTSCM; or VLD	Not required	SLMLDT
Turbine and transition sumps	SLMLDT		VLD (annually) ⁽¹⁾	SLMLDT

⁽¹⁾In conformance with Clause 8.4.1(4)(g)

Table 8 - Existing Single-Wall Underground Storage Tanks

Type	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Steel without CP ⁽¹⁾	IR; and OWM or SIR	PLDT (annually)	PLDT
Steel with CP ⁽¹⁾ , or FRP ⁽²⁾ ;	IR	PLDT (every 2 years)	
	IR; and OWM or SIR	PLDT (every 5 years)	
	ATG; or CITLDS	Not required	
	OWM and SIR	Not required	

⁽¹⁾CP - Cathodic protection

⁽²⁾FRP - Fibreglass-reinforced-plastic

Table 9 – Existing Single-Wall Underground Piping

Type	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Steel without CP ⁽¹⁾	IR; and OWM or SIR	PLMDT; or HPVLDT (annually)	PLMDT; or HPVLDT
Steel with CP ⁽¹⁾ , plastic, or FRP ⁽²⁾	IR; and OWM or SIR	PLMDT; or HPVLDT (every 2 years)	
	CITLDS; or OWM and SIR	Not required	
	SVCV ⁽³⁾ ; or ELLD ⁽⁴⁾	Not required	

⁽¹⁾CP - Cathodic protection

⁽²⁾FRP - Fibreglass reinforced plastic

⁽³⁾Suction style system only

⁽⁴⁾Pressure Piping

Part 7 Upgrading of Existing Storage Tank Systems

Section 7.1 Scope

- 7.1.1 This Part applies to an *existing storage tank system*.

Section 7.2 General Requirements

- 7.2.1 No person shall upgrade, or cause to be upgraded, an *existing storage tank system* unless approval has been obtained from the *authority having jurisdiction*.
- 7.2.2(1) Where an *existing storage tank system* is upgraded to be in conformance with this Code, the *owner* shall provide a revised as-built drawing to the *authority having jurisdiction* in the manner and time frame as specified by the *authority having jurisdiction*.
- 7.2.2(2) A revised as-built drawing shall be in conformance with Sentence 3.2.7(2) or 4.2.8(2), as applicable.
- 7.2.3 A partially buried *storage tank* is considered neither an *aboveground* nor *underground storage tank* and shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.

Section 7.3 Aboveground Storage Tank Systems

- 7.3.1 An *existing aboveground storage tank system* not in conformance with Section 3.6 shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.
- 7.3.2(1) Where underground *piping* connected to an *aboveground storage tank* has *corrosion protection* in conformance with Section 4.5 at the *effective date* of this Code, the *piping* may continue in service.

- 7.3.2(2) Where underground *piping* connected to an *aboveground storage tank* does not have *corrosion protection* in conformance with Section 4.5 at the *effective date* of this Code:
- (a) the *piping* must be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code; or
 - (b) best management practices shall be implemented within two years of the *effective date* of this Code in conformance with:
 - i) API Std 2610-94, “Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities”; and
 - ii) API 570-98, “Piping Inspection Code: Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems”.

- 7.3.3(1) Except as specified in Sentence (2), an *aboveground storage tank system* shall be upgraded within two years of the *effective date* of this Code to include, as applicable:
- (a) liquid and vapour-tight connections, caps and adapters for a *storage tank* with a capacity of 5 000 L or more;
 - (b) *overflow protection* in conformance with Article 3.6.2 for a *storage tank* with a capacity of 5 000 L or more;
 - (c) underground *piping* in conformance with Section 5.4;
 - (d) *dispenser sumps* in conformance with Article 3.6.3, where an underground *piping* run terminates under a dispenser; and
 - (e) *secondary containment* in conformance with Section 3.9 and Sentences 7.3.4(1) and (2).

- 7.3.3(2) Where *secondary containment* is not upgraded as provided in Clause (1)(e), an annual *precision leak detection* test shall be performed.

7.3.4(1) Except as provided in Sentence (2), an *existing* field-erected *aboveground storage tank* not upgraded to be in conformance with Section 3.3 shall be withdrawn from service and removed in conformance with Part 9 within five years of the *effective date* of this Code.

7.3.4(2) Where authorized by the *authority having jurisdiction*, an *existing* field-erected *aboveground storage tank* may be exempt from adding an *impermeable barrier* under the tank to meet the *secondary containment* requirements of Section 3.9 provided that within two years of the *effective date* of this Code:

- (a) best management practices are followed in conformance with API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”; or
- (b) if inspection requires replacing or lining the tank bottom, then 3.9.2(1)(b) shall apply (See Appendix B, note B.7.3.4(2)(b)).

7.3.4(3) In the event that a *storage tank owner* chooses the exemption provided in Clause 7.3.4(2)(b) and the *storage tank* bottom or shell becomes perforated, then all other *storage tanks* with equal or more years of similar service at that *site* that are being managed under API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”, shall be:

- (a) inspected within one year; or
- (b) re-evaluated within the time frame specified by the new corrosion rate.

7.3.5 An *existing aboveground storage tank* not upgraded with *spill* containment and runoff collection in conformance with Section 3.10 shall be withdrawn from service and removed in conformance with Part 9 within five years of the *effective date* of this Code.

7.3.6 An *existing* shop fabricated *aboveground storage tank system* not upgraded to be in conformance with Sections 3.4, 3.5, and this Section shall be withdrawn from service and

removed in conformance with Part 9 within two years of the *effective date* of this Code.

Section 7.4 Underground Storage Tank Systems

7.4.1 An *existing underground storage tank* system that does not have *corrosion protection* shall be withdrawn from service and removed in conformance with Part 9 within 2 years of the *effective date* of this Code.

7.4.2 Where an *existing underground storage tank* system with *corrosion protection* is not upgraded in conformance with Sentences 7.4.3(1) or (2), it shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.

7.4.3(1) Except as provided in Sentence 7.4.3(2), an *existing underground storage tank system* with *corrosion protection* must be upgraded to include:

- (a) liquid and vapour-tight connections, caps and adapters;
- (b) an *overflow protection device*;
- (c) a fill pipe *spill containment device*;
- (d) *dispenser sumps*; and
- (e) *leak detection* in conformance with Part 6.

7.4.3(2) An *existing underground storage tank system* with *corrosion protection* that is used for storing *used oil* shall be upgraded to include:

- (a) liquid-tight connections, caps and adapters;
- (b) a suction pipe in conformance with Clause 4.2.4.(2)(c)
- (c) a *spill containment device* in conformance with Clauses 4.2.4(2)(d) and (f);
- (d) an *overflow protection device* in conformance with Clause 4.2.4.(2)(e);
- (e) *venting* in conformance with Clause 4.2.4(2)(g); and
- (f) *leak detection* in conformance with Part 6.

Part 8 Operation and Maintenance

Section 8.1 Scope

- 8.1.1 This Part applies to the operation and maintenance of a *storage tank system*.

- (b) the water level shall be measured and included in all reconciliation computations in conformance with Clause (a).

Section 8.2 General Requirements

- 8.2.1 Except as provided in this Part, the operation and maintenance of a *storage tank system* shall be in conformance with the NFCC.

- 8.3.2(2) *Storage tank* inventory control measurements shall be reconciled by comparing product and water level measurements with dispenser meter readings, shipments, deliveries and internal transfers.

Section 8.3 Inventory Control

- 8.3.1(1) Except as provided in Sentence 8.3.1(2), the owner of a *storage tank system* shall ensure that inventory control and reconciliation is conducted in conformance with this Section.

- 8.3.2(3) The computation of any gain or loss of product shall be recorded and included with a monthly summary of cumulative losses or gains of product.

- 8.3.1(2) Subject to Sentence 8.3.2(1), inventory control and reconciliation is not required where:

- 8.3.3 Inventory control and reconciliation records shall be kept in a manner and format as prescribed by the *authority having jurisdiction*.

- (a) a *storage tank system* has been temporarily withdrawn from service and the tanks have been emptied; or
- (b) all components designed to contain liquids are secondarily contained and have an *interstitial space* monitored:
 - (i) manually on any *day* the storage system is available for use; or
 - (ii) continuously using electronic sensing that provides a visual or auditory indication of the integrity of the interstice being compromised.

- 8.3.4(1) For an *underground storage tank*, the *authority having jurisdiction* shall be notified immediately, in conformance with Section 8.9, in the event of:

- 8.3.2(1) The owner of a *motive fuel storage tank* shall ensure that:
- (a) the product level is measured and reconciled (See Appendix B, note B.8.3.2(1)(a)) in conformance with Sentence 8.3.2(2):
 - (i) each *day* that product is added or removed from an *underground storage tank*; or
 - (ii) at least weekly where product is added to or removed from an *aboveground storage tank system*; and

- (a) any unexplained loss in excess of the greater of:
 - (i) 0.5% of the throughput in one month from the *tank system*, as indicated by the recording and reconciliation of inventory records over a month recording period done in conformance with Article 8.3.2; or
 - (ii) 0.5% of the *storage tank system* capacity;
- (b) inventory reconciliation showing five or more consecutive *days* of unexplained product losses;
- (c) inventory reconciliation showing 18 or more *days* of unexplained losses in one calendar month; or
- (d) the level of water at the bottom of the tank exceeds 50 mm.

8.3.4(2) For an *aboveground storage tank*, the *authority having jurisdiction* shall be notified immediately, in conformance with Section 8.9, in the event of:

- (a) any unexplained loss in excess of the greater of:
 - (i) 1% of the throughput in one month from the *storage tank system* as indicated by the recording and reconciliation of inventory records done in conformance with Article 8.3.2; or
 - (ii) 1% of the *storage tank system* capacity.
- (b) inventory reconciliation showing five or more consecutive weeks of unexplained product losses; or
- (c) inventory reconciliation showing an unexplained loss in one calendar month.

Section 8.4 Inspections and Maintenance of Storage Tank Systems

8.4.1(1) Routine in-service inspections shall be conducted in conformance with this Section.

8.4.1(2) Visual inspection of a *storage tank* facility to ensure that there has not been a *leak* or deterioration of the facility that could result in a *leak* shall be conducted and documented either:

- (a) each day the facility is in operation; or
- (b) at a frequency specified by the *authority having jurisdiction*. (See Appendix B, note B.8.4.1(2)(b))

8.4.1(3) Visual inspection of a *storage tank* facility to ensure that there has not been a *leak* or equipment failure shall be conducted weekly and documented for:

- (a) foundations, tank walls, roof, and tank attachments;
- (b) dyke capacity, condition of the dyke wall and floor, and water removal systems;
- (c) pumps and product-*handling* equipment;
- (d) tank gauging equipment;
- (e) mechanical and automatic electronic *leak detection* equipment;

- (f) *dispenser sumps* and *spill containment devices*; and
- (g) *overflow protection devices*.

8.4.1(4) Inspection and performance testing in conformance with the manufacturer's requirements and procedures to ensure satisfactory equipment performance and operation of a *storage tank* facility shall be conducted annually and documented by a company or individual that is authorized by the *authority having jurisdiction* for:

- (a) automatic tank gauges and monitoring systems;
- (b) high-technology sensors;
- (c) electronic or mechanical *leak detection* equipment;
- (d) *corrosion protection* equipment;
- (e) pressurized *pipng* emergency valves;
- (f) emergency shut-down devices;
- (g) containment sumps including dispenser, turbine and transition containment devices; and
- (h) *overflow protection devices*.

8.4.1(5) In addition to Sentence (4), a *storage tank* not in service at the time of the inspection shall be noted on the inspection report stating:

- (a) date taken *out-of-service*; and
- (b) whether the tanks:
 - (i) will be *out-of-service* for less than 180 *days*;
 - (ii) will be *out-of-service* for a period exceeding 180 *days*; or
 - (iii) are operated on a seasonal basis.

8.4.2 Where required by Part 6, an *aboveground storage tank system* installed in conformance with API Std 650-98, "Welded Steel Tanks for Oil Storage" shall be inspected in conformance with API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction".

- 8.4.3 Any deficiencies in a *storage tank system* identified as a result of the inspections specified in this Section shall be documented and corrected to be in conformance with this Code by a company or individual that is authorized by the *authority having jurisdiction*.

Section 8.5 Product Transfer Operations

- 8.5.1 A person responsible for transferring *petroleum* or *allied petroleum product* to a *storage tank system* shall take all reasonable steps to prevent *spills*.
- 8.5.2(1) When a tank vehicle is being unloaded, the vehicle *operator* shall remain:
- (a) in constant view of the fill pipe; and
 - (b) in constant attendance at the delivery control valve. (See Appendix B, note B.8.5.2(1)(b))
- 8.5.3(1) Transfer of *petroleum* or *allied petroleum product* into and out of a *storage tank system* shall be in conformance with procedures outlined in:
- (a) the NFCC;
 - (b) API Std 2610-94, "Design, Construction, Operation, Maintenance, and Inspection of Terminal and Tank Facilities"; and
 - (c) CPPI (1992), "Professional Driver's Manual".
- 8.5.3(2) Standard procedures for normal operation, as well as for emergencies, shall be given to an *operator* and posted in printed form for convenient reference. An employee involved with the transfer of *petroleum* or *allied petroleum product* shall be trained in the correct operating procedures for all equipment and shut-down devices. (See Appendix B, note B.8.5.3(2))
- 8.5.4 The *owner* of a *storage tank system* shall ensure that filler ports, monitoring wells, and vapour recovery connections are colour-coded in conformance with CPPI (1995),
- "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification".
- 8.5.5 A *used oil storage tank* shall be fitted with a suction tube and *liquid- and vapour-tight* coupling and shall not have suction hoses dropped or inserted into the *used oil storage tank* during the product removal process.
- 8.5.6 No person shall transfer *used oil* from a *storage tank* unless a connection is made to the coupling at the end of the *storage tank* suction tube.
- 8.5.7(1) Subject to Sentence (2), no person shall transfer *petroleum* or *allied petroleum product* to an *aboveground storage tank* with a capacity of 5 000 L or more unless a liquid- and vapour-tight fill connection is made to the *storage tank*.
- 8.5.7(2) No person shall transfer *petroleum* or *allied petroleum product* to an *underground storage tank* unless a liquid- and vapour-tight fill connection is made to the *underground storage tank*.
- 8.5.8 No person shall cause an *allied petroleum product* to be transferred into a *storage tank* unless the product being transferred is compatible with the internal surface of the *storage tank*.

Section 8.6 Cathodic Protection Monitoring

- 8.6.1(1) Except as provided in Sentence (2), maintenance checks on the operation of a *cathodic protection* system shall be conducted in conformance with:
- (a) CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks" for sacrificial anode systems;
 - (b) NACE RP0169-2002, "Control of Corrosion on Underground or Submerged Metallic Piping Systems";

- (c) NACE RP0285-2002, "Corrosion Control of Underground Storage Tank Systems by Cathodic Protection";
- (d) NACE RP0193-2001, "External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms";
- (e) NACE TM0101-2001, "Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Tank Systems";
- (f) CPPI/PACE Report No. 87-1, "Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks" Clause 5.55(c) and Part 6.0 for impressed current systems; or
- (g) API RP 651-97, "Cathodic Protection of Aboveground Petroleum Storage Tanks".

8.6.1(2) *Cathodic protection* measurements for a *storage tank system* shall be conducted by a person with NACE CP Level 1 (CP tester minimum certification) or otherwise as authorized by the *authority having jurisdiction*, at commissioning, within one year of commissioning, and annually thereafter.

Section 8.7 Oil-water Separators

(see Appendix B, note B.8.7)

- 8.7.1 An *oil-water separator* intended to collect and separate *free oil* from water shall be designed and installed in conformance with Sentence 3.10.3(1).
- 8.7.2 An *oil-water separator* shall be equipped with a *spill containment device* at the point of oil removal in conformance with:
 - (a) ORD-C58.19-1992, "Spill Containment Devices for Underground Tanks"; or
 - (b) ORD-C142.19-1994, "Spill Containment Devices for Aboveground Tanks".
- 8.7.3 The operation, maintenance and inspection of an *oil-water separator* shall be in conformance with the requirements of the manufacturer's instructions or as prescribed by the *authority having jurisdiction*.

8.7.4(1) Subject to Sentence (2), the depth of the *free oil* layer and *separated solids* accumulation in an *oil-water separator* shall be checked and recorded monthly.

8.7.4(2) If a monthly inspection is not possible, an *oil-water separator* shall be electronically monitored.

8.7.4(3) The depth of the *free oil* layer and *separated solids* accumulation in an *oil-water separator* shall be measured as close to the baffle as possible.

8.7.4(4) An *oil-water separator* shall have the *free oil* layer removed:

- (a) continuously by an automatic skimmer; or
- (b) at a maximum depth of 50 mm.

8.7.4(5) After a *spill* or *leak*, the depth of the *free oil* layer and *separated solids* accumulation in an *oil-water separator* shall be checked and recorded.

8.7.5 No person shall *discharge tank bottom water* or gasoline, solvents, *used oil*, glycol, detergents, or *sludges* from outside the *storage tank system* directly to an *oil-water separator*. (See Appendix B, note B.8.7.5)

8.7.6 The amount of solids entering an *oil-water separator* shall be minimized.

8.7.7(1) An *oil-water separator* shall have the *separated solids* removed:

- (a) at a maximum depth of 150 mm; or
- (b) at the maximum depth allowed by an automatic removal device.

8.7.8 *Free oil*, *separated solids*, and water from an *oil-water separator* shall be disposed of in a manner prescribed by the *authority having jurisdiction*.

Section 8.8 Transfer of Ownership

- 8.8.1 The new *owner* of a *storage tank system* shall notify the *authority having jurisdiction* in writing within 30 days of the transfer of ownership and provide the information specified by the *authority having jurisdiction*.
- 8.8.2 When the ownership of a *storage tank system* is transferred, all as-built drawings and records, or copies thereof required by this Code shall be transferred to the new *owner* of the *storage tank system*.
- 8.8.3 The *owner* of real property on which *underground storage tanks* are located shall inform the purchaser of the real property, in writing, of the existence of any *underground storage tanks* on the real property before the sale is closed. (See Appendix B, note B.8.8.3)

Section 8.9 Leak and Spill Response

- 8.9.1 The *owner* of each registered *storage tank system* shall prepare and maintain an emergency response *contingency plan*.
- 8.9.2(1) The *owner* or *operator* of a *storage tank system* shall immediately notify the *authority having jurisdiction* (See Appendix D- Spill Reporting) and provide the information requested when the *owner* or *operator* discovers, suspects, or is notified by any person of:
- (a) any *leak* from a *storage tank system*;
 - (b) any *spill* or overfill that is 100 L or more; or
 - (c) any *spill* or overfill that could threaten fresh water supplies, groundwater, or the health and safety of the public.
- 8.9.3(1) The *owner* of a *storage tank system* where a *leak* or *spill* is known or suspected shall, in consultation with the *authority having jurisdiction*, take such actions as the *authority having jurisdiction* requires to verify, stop, clean up, and mitigate the

impact of the *leak* or *spill*, including but not limited to:

- (a) isolating *leaking* components of the *storage tank system*;
- (b) arranging for immediate removal of the *petroleum* or *allied petroleum product* from the isolated *leaking* components of the *storage tank system*;
- (c) inspecting the *storage tank* or *pipng* and:
 - (i) arranging for a *leak* test in conformance with this Code; or
 - (ii) removing the suspected *leaking storage tank* or *pipng*;
- (d) taking all reasonable steps to establish the extent of the contamination (including vapours), contain the *leaked* or *spilled petroleum* or *allied petroleum product*, and prevent its further migration; and
- (e) taking all reasonable steps to recover or remove escaped *petroleum* or *allied petroleum product* in conformance with Sentence 9.4.2(2).

Section 8.10 Precision Leak Detection Test

- 8.10.1 In addition to the requirements of Part 6, the *owner* of a *storage tank system* shall conduct a *precision leak detection test* when required by the *authority having jurisdiction*.
- 8.10.2(1) A *precision leak detection test* shall be conducted by a company or individual authorized by the *authority having jurisdiction* and shall be conducted by an individual that has been trained in the proper care and use of the test equipment and its operating procedures.
- 8.10.2(2) When a *precision leak detection test* has been required by Part 6 or the *authority having jurisdiction*, a *precision leak test report* shall be forwarded by the *owner* to the *authority having jurisdiction* within ten days of the test.

- 8.10.2(3) A *precision leak detection test* report shall contain as a minimum:
- (a) *storage tank* and *piping* identification number and product type;
 - (b) *owner's* name and mailing address;
 - (c) facility address;
 - (d) test date;
 - (e) test results;
 - (f) test methods;
 - (g) test technician certification number provided by the test equipment manufacturer to verify satisfactory completion of applicable training and certification requirements; and
 - (h) name and address of testing company or technician.

- 8.10.4 Where a *precision leak detection test* or inspection indicates a *leak*, the company or individual performing the test shall immediately notify the *owner* or *operator* of the *storage tank system* and the *authority having jurisdiction*.

Section 8.11 Records

- 8.11.1(1) The *owner* of a *storage tank system* shall maintain records for at least seven years of all:
- (a) inventory control and reconciliation as required by Section 8.3;
 - (b) inspections and maintenance as required by Section 8.4;
 - (c) *cathodic protection* monitoring as required by Section 8.6;
 - (d) *precision leak detection tests* as required by Section 8.10;
 - (f) maintenance and repairs;
 - (g) monitoring well results;
 - (h) construction, *alterations*, or upgrades;
 - (i) as-built drawings; and
 - (j) excavation or nearby *construction* that could affect the integrity of the *storage tank system*.

- 8.11.1(2) Subject to Sentence (3), the *owner* of a *storage tank system* shall maintain records required by this Code on-site.

- 8.11.1(3) The *authority having jurisdiction* may allow computerized records to be stored off-site.

- 8.11.2(1) The *owner* of an *oil-water separator* shall maintain records of:
- (a) the *free oil layer* in the separator;
 - (b) the *separated solids* level, measured at a point where the maximum buildup can be expected;
 - (c) the date and quantity of oil removed;
 - (d) the date and quantity of *separated solids* removed;
 - (e) the name of the contractor; and
 - (f) all inspections and maintenance.

Section 8.12 Tank Bottom Water

- 8.12.1(1) *Tank bottom water* shall:
- (a) not be drained onto the ground or into an *oil-water separator* (See Appendix B, note B8.12.1(1)(a); and
 - (b) be segregated from rainwater and disposed of in conformance with the applicable provincial or territorial regulations, guidelines and policies.

Section 8.13 Storage

- 8.13.1 In an *aboveground storage tank system*, the space created by *secondary containment* shall not be used for storage purposes.

Section 8.14 Transfer of Oil-contaminated Water

- 8.14.1 Centrifugal-type pumps shall not be used to transfer oil-contaminated water from dykes or sumps to the *oil-water separator*.

Part 9 Withdrawal from Service of Storage Tank Systems

Section 9.1 Scope

- 9.1.1 This Part applies to procedures to be followed when a *storage tank system* is removed, relocated, *abandoned*, disposed of, refurbished, or temporarily taken *out-of-service*.

- (a) pass an internal inspection conducted by an individual authorized by the *authority having jurisdiction* in conformance with API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”; or
- (b) pass a *precision leak detection test*.

Section 9.2 General Requirements

- 9.2.1 Except as provided in this Part, the withdrawal from service and removal of a *storage tank system* shall be in conformance with the NFCC and with any other requirements of the *authority having jurisdiction*.

- 9.2.2(1) A *storage tank system* shall be removed by a company or individual that is authorized by the *authority having jurisdiction*.

- 9.2.2(2) A company or individual removing a *storage tank system* shall ensure that the system is removed in conformance with the requirements of this Part.

- 9.3.2(3) For a field-erected *aboveground storage tank* that has been returned to service as specified in Sentence (2), the next internal inspection shall be the earlier of:

- (a) within ten years of the most recent internal inspection; or
- (b) at the date specified by API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction”.

- 9.3.3(1) Except for a *storage tank system* that has been registered with the *authority having jurisdiction* as operating on a seasonal basis, when a *storage tank system* is to be *out-of-service* for more than 180 days, the *owner* or *operator* shall notify the *authority having jurisdiction* in writing, within seven days after the *storage tank system* goes out-of-service, providing:

- (a) the name and mailing address of the *owner*;
- (b) the name and mailing address of the *operator*;
- (c) the location of the *storage tank system*;
- (d) a description of the nature and quantity of the contents; and
- (e) the registration number of the *storage tank*.

Section 9.3 Temporary Withdrawal from Service

- 9.3.1 If a *cathodic protection* system is provided, it shall be maintained and operated while the *storage tank system* is temporarily withdrawn from service (See Appendix B, note B.9.3.1).

- 9.3.2(1) A shop-fabricated *aboveground storage tank system* shall pass an annual inspection in conformance with Sentence 8.4.1(4) before the *storage tank system* is returned to service.

- 9.3.2(2) A field-erected *aboveground storage tank* that has been *out-of-service* for more than one year shall, before being returned to service:

Section 9.4 Removal from Service

- 9.4.1 The *owner* of a *storage tank system* shall notify the *authority having jurisdiction* within 30 days of a decision to remove a *storage tank system* and provide the information requested by the *authority having jurisdiction*.

9.4.2(1) When a *storage tank system* has been permanently removed from service, the *owner* of a *storage tank system* shall ensure that:

- (a) *petroleum* and *allied petroleum products* are removed and vapours purged from the *storage tank, piping*, dispensing, and transfer equipment; and
- (b) the *storage tank, piping*, dispensing, and transfer equipment are removed.

9.4.2(2) If the *site* is contaminated with *petroleum* or *allied petroleum products*, the *site* shall be remediated to the criteria defined by:

- (a) CCME PN 1299, “Canadian Environmental Quality Guidelines”;
- (b) CCME CWS for PHC, “Canada-wide Standards for Petroleum Hydrocarbons in Soil”; or
- (c) other criteria prescribed by the *authority having jurisdiction*.

Section 9.5 Abandonment In-place

9.5.1 An aboveground *storage tank system* shall not be *abandoned* in-place.

9.5.2(1) In accordance with Articles 4.2.7 and 5.5.2, an *underground storage tank system* installed after the *effective date* of the Code shall not be *abandoned* in-place

9.5.2(2) Subject to Sentence 9.5.3(1), and Article 9.5.4, an existing *underground storage tank system* shall not be abandoned in-place.

9.5.3(1) An *owner* of an existing *underground storage tank system* may apply to the *authority having jurisdiction* for approval to *abandon* a *storage tank system* in-place by:

- (a) describing fully in the application, the circumstances relating to the *storage tank system* location that would justify *abandoning* the *storage tank system* in-place;
- (b) satisfying the *authority having jurisdiction* that the soil under and around the *storage tank system* has not

been contaminated with a *petroleum* or *allied petroleum* product (see Appendix, note B9.5.3(1)); and

- (c) providing confirmation that the *owner* of the property is aware and in agreement with the plan and procedures to *abandon* the *storage tank system* in-place.

9.5.4 When the *authority having jurisdiction* considers it impractical to remove an *underground storage tank system*, approval in writing may be granted to the *owner* to *abandon* the system in-place (See Appendix B, note B.9.5.4).

9.5.5(1) When the *authority having jurisdiction* has granted approval in writing to an *owner* to *abandon* an *underground storage tank system* in-place, the *abandonment* procedures shall ensure that:

- (a) any liquid or sludge in the *underground storage tank system* is removed and disposed of by an acceptable method;
- (b) the *underground storage tank system* is purged of vapours to less than 10% of the lower flammable limit and that the presence of vapours is checked with a *combustible* gas meter;
- (c) sufficient holes are cut along the top of the *underground storage tank* to enable the complete filling of the storage tank with an inert material acceptable to the *authority having jurisdiction* (See Appendix B, Note B9.5.5(1));
- (d) the *underground storage tank* is completely filled with an inert material acceptable to the *authority having jurisdiction* (See Appendix B, Note B9.5.5(1));
- (e) a record of the size, description, and location of the *underground storage tank* is;
 - (i) permanently appended to the deed of the property;
 - (ii) submitted to the *authority having jurisdiction*; and
- (f) associated *piping* not *abandoned* in place is removed from service in conformance with the NFCC.

Section 9.6 Disposal of Storage Tank Systems

- 9.6.1(1) When a *storage tank system* is to be disposed of:
- (a) liquid *petroleum* or *allied petroleum product* shall be removed from the *storage tank system*;
 - (b) *sludge* in the *storage tanks* shall be removed and disposed of in a manner prescribed by the *authority having jurisdiction*;
 - (c) the *storage tank* shall be purged of vapours to less than 10% of the lower *flammable* limit and the presence of vapours shall be checked with a *combustible* gas meter;
 - (d) sufficient openings shall be cut in the *storage tank* to render it unfit for further use;
 - (e) the *storage tank* shall be transported in conformance with the Transportation of Dangerous Goods Act and in a manner prescribed by the *authority having jurisdiction* to an *approved* disposal facility; and
 - (f) an affidavit of destruction shall be provided by the *approved* disposal facility and shall be forwarded by the *owner* or by an authorized company or individual to the *authority having jurisdiction*.

Section 9.7 Reuse of Storage Tanks

- 9.7.1(1) A *cathodically protected steel underground storage tank* may be reused for the storage of *petroleum* or *allied petroleum products* after being:
- (a) refurbished in accordance with ULC-S603(A)-2001, “Refurbishing of Underground Steel Tanks”; or
 - (b) inspected and relabeled in accordance with the Special Acceptance Program of Underwriters Laboratories of Canada.
- 9.7.2(1) A fibreglass-reinforced plastic *underground storage tank* may be reused for the storage of *petroleum* or *allied petroleum products* after being:
- (a) refurbished in accordance with ULC-S615(A)-1987, “Refurbishing of Reinforced Plastic Underground Tanks”; or
 - (b) inspected and relabeled in accordance with the Special Acceptance Program of Underwriters Laboratories of Canada.
- 9.7.2(2) A shop-fabricated *aboveground storage tank* may be reused for the storage of *petroleum* or *allied petroleum products*:
- (a) for a vertical *aboveground storage tank*, after being refurbished in accordance with ULC-S630(A)-2001, “Shop Refurbishing of Aboveground Vertical Shop Fabricated Steel Tanks”;
 - (b) for a horizontal *aboveground storage tank*, after being refurbished in accordance with ULC-S601(A)-2001, “Shop Refurbishing of Aboveground Horizontal Shop Fabricated Steel Tanks”; or
 - (c) after being inspected and relabeled in accordance with the Special Acceptance Program of Underwriters Laboratories of Canada.
- 9.7.3 A field-erected *aboveground storage tank* may only be reused for the storage of *petroleum* or *allied petroleum products* after being refurbished in accordance with API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction.”
- 9.7.4 An *underground storage tank* removed from service shall not be reused as an *aboveground storage tank*.

Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products PN 1326

APPENDIX A Authorities Having Jurisdiction (Revised October 2015)

Federal Government

ENVIRONMENT CANADA

Waste Reduction Management Division
Public and Resources Sector Directorate
Environmental Stewardship Branch
Place Vincent Massey
Gatineau, QC K1A 0H3
Phone: 1-844-672-8038
Fax: 819-938-4454

Provincial and Territorial Authorities

ALBERTA

Office of the Chief Fire Administrator
Safety Services - Public Safety Division
Alberta Municipal Affairs
16th Floor Commerce Place
10155 - 102 Street
Edmonton, AB T5J 4L4
Phone: 1- 866-421-6929
Fax: 780-427-8686

Petroleum Tank Management
Association of Alberta
980, 10303 Jasper Avenue
Edmonton, AB T5J 3N4
Phone: 780-425-8265
Fax: 780-425-4722

BRITISH COLUMBIA

Ministry of Environment
Environmental Standards Branch
PO Box 9341 Stn Prov Govt
Victoria, BC V8W 9M1
Phone: 250-387-9950
Fax: 250-381-9921

Office of the Fire Commissioner
Ministry of Public Safety and Solicitor General
PO Box 9201 Stn Prov Govt
Victoria, BC V8W 9J1
Phone: 250-952-4913
Fax: 250-356-7197

MANITOBA

Manitoba Conservation and Water Stewardship
1007 Century Street
Winnipeg, MB R3H 0W4
Phone: 204-945-2458 or 204-4708315
Fax: 204-948-2338

NEW BRUNSWICK

Environmental Management Division
Department of the Environment
and Local Government
P.O. Box 6000
20 McGloin St.
Fredericton, NB E3B 5H1
Phone: 506-453-7945
Fax: 506-453-2390

NEWFOUNDLAND AND LABRADOR

Pollution Prevention Division
Department of Environment
P.O. Box 8700
St. John's, NL A1B 4J6
Phone: 709-729-2561
Fax: 709-729-6969

NOVA SCOTIA

Nova Scotia Environment
Industrial Management Unit
Sustainability & Applied Science Division
Barring Tower, Suite 1800
P.O. Box 442
Halifax, NS B3J 2P8
Phone: 902-424-2534
Fax: 902-424-0503

NORTHWEST TERRITORIES

Office of the Fire Marshal
Department of Municipal and Community
Affairs
Government of the Northwest Territories
600 – 5201 50 Avenue
Yellowknife, NT X1A 3S9
Phone: 867-873-7469
Fax: 867-873-0622

NUNAVUT

Fire Marshal
Community and Government Services
Government of Nunavut
P.O. Box 1000, Station 700
Iqaluit, NU X0A 0H0
Phone: 867-975-5310
Fax: 867-979-4221

ONTARIO

Technical Standards & Safety Authority
Fuels Safety Program
Clarica Centre, West Tower
14th Floor 3300 Bloor Street West
Toronto, ON M8X 2X4
Phone: 416-734-3300
Fax: 416-231-1626

PRINCE EDWARD ISLAND

Department of Communities, land and
Environment
31 Gordon Drive
P.O. Box 2000
Charlottetown, PE C1A 7N8
Phone: 902-368-5280
Fax: 902-368-5526

QUÉBEC

Réglementation en équipements pétroliers
Régie du bâtiment du Québec
Direction de la réglementation et du soutien
technique
800, place D'Youville, 15e étage
Québec QC G1R 5S3
Téléphone: 418-643-9896
Télécopieur: 418-646-9280
Courriel: pierre.gauthier@rbq.gouv.qc.ca
Site internet: www.rbq.gouv.qc.ca

SASKATCHEWAN

Saskatchewan Environment
Environmental Protection Branch
102-112 Research Drive
Saskatoon, SK S7K 2H6
Phone: 306-933-7940
Fax: 306-933- 8442

Corrections and Public Safety
Office of the Fire Commissioner
310-1855 Victoria Avenue
Regina, SK S4P 3T2
Phone: 306-787-3774
Fax: 306-787-7107

YUKON

Community Services
Protective Services Branch.
P.O. Box 2703 (C-20)
Whitehorse, YT Y1A 2C6
Phone 867-667 5217 or 5230
Fax 867-393 6249

Appendix B Explanatory Material

B.1.4.2 *Allied petroleum product* - It is understood that a number of chemicals not included in this definition may be stored in *underground storage tanks*. This definition, however, represents *combustible* and *flammable* products that are directly petroleum-based and are the most widely used *petroleum products* in the manufacturing sector.

B.1.4.2 *Interstitial space* includes the following space:

- (a) outside the *storage tank* bottom and above a synthetic membrane *liner* or prepared soil layer;
- (b) between the *storage tank* bottom and a secondary bottom creating a *leak-containment space*;
- (c) between two pipes of a double-wall *pipng system*;
- (d) between a pipe and a synthetic membrane *liner*; or
- (e) space between a *storage tank* and a *secondary containment system*.

B.1.4.2 *Used oil* - The definition of *used oil* was taken from the 1989 CCME publication, PN 1042, "Code of Practice for Used Oil Management in Canada" with the following modifications.

- (a) the category of "metal-working fluids" has been removed as this product class is considered to be sufficiently different from the definition of *petroleum products*. Since metal-working fluids may include a substantial amount of water, further consideration would have to be given to the need to line steel tanks.
- (b) the category of "insulating fluids or coolant" has been modified for similar reasons, and now reads as "insulating oils".

Used oil contains primarily hydrocarbons; however, it may also contain additives (e.g., a total of 14% by volume of detergents and

viscosity-improvers in lubricating oils for gasoline engines). It contains physical and chemical impurities (e.g., solids, metals, and chlorinated organics) due to physical contamination and chemical reactions occurring during its use. Contamination of *used oil* may also occur from mixing with other oily fluids or fluid wastes when it is collected for recycling.

This Code does not treat *used oil* exclusively as a hazardous waste. *Used oil* may or may not be designated as a hazardous waste depending on the types and amounts of chemical impurities it contains. For example, *used oil* containing 50 ppm or more of PCBs is designated as a hazardous waste in most Canadian jurisdictions. If the *used oil* is designated as a hazardous waste, other requirements for its storage may apply. Consult the *authority having jurisdiction*.

B.3.2.6 The CCME "Guideline for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks" applies to *storage tanks* having a capacity of more than 4 000 L, designed to contain a *petroleum product* that has a vapour pressure of 10 kPa or greater. The published document is available from Manitoba Statutory Publications.

B.3.3.1(1)

- (e)(ii) The overfill alarm system required shall be in addition to the alarm or gauging system that is routinely used. This system shall be used as a back-up system when the primary means of detecting a high level has failed.

B.3.5.1

- (2) It is important to note that the requirements of the fire authorities must be met if any *used oil* collection tank is considered for use indoors.

B3.8.1(1) The use of certain *secondary containment* techniques may preclude the use of *cathodic protection* and in some cases cause accelerated *corrosion* of the *storage tank* bottom. A *corrosion expert* shall be consulted.

B3.9.2

(2)(a) The *authority having jurisdiction* may specify an acceptable material for a *secondary containment impermeable barrier* based on local conditions or previous experience. Regardless of material, proper installation and ongoing maintenance of a *secondary containment impermeable barrier* is important.

B3.9.3

(1) The installer shall advise the electrical contractor that synthetic membrane *liners* have been used and ensure that the *liner* is not punctured by grounding rods. It is recommended that grounding rods not be inserted within the dyked areas where a synthetic membrane or clay *liner* has been used for *secondary containment*. If penetrations are required, locating the penetrations at a high point reduces the likelihood of *leaks*.

B.4.2.7 *Abandonment* in-place of an *out-of-service storage tank* is not normally an acceptable practice. *Storage tanks* shall not be located near or under building foundations or in locations where the ultimate removal of the *storage tank* would be impractical.

B.4.5.3

(1)(b) Stray current from an impressed current system can cause *corrosion* to *storage tank* systems that are *cathodically protected* by sacrificial anodes.

B.4.5.3

(2) The anodes on a *cathodically protected storage tank* that conforms with CAN/ULC-S603.1, “Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks”, are designed to protect the tank only. Inadequate *corrosion protection* of

such *cathodically protected storage tanks* can occur if the *storage tank* is not electrically isolated from the *piping* or other *storage tanks*.

B.4.5. Rectifier shall have a non-resettable 115V. AC elapsed time indicator with 99,999 hour capacity. A battery powered downtime counter of the same hour capacity is an optional alternative.

B.5.2.5 Mechanical joints, such as flanged joints or couplers, shall not be used below ground. Additionally, it is good practice to minimize the use of threaded joints below ground.

B.6.2.6 CITLDS method combines use of an Automatic Tank Gauge probe to collect data and sophisticated data analysis used in Statistical Inventory Reconciliation (SIR) techniques. An *underground storage tank* is monitored continuously without interfering with normal tank operations. These systems are designed to meet the monthly monitoring performance standard of detecting a *leak* of 0.76 L/hr or 567 L per month with 95% probability and 5% false alarm.

B6.2.11.

(1)(h) The determination of an appropriate procedure for a *leak detection test* of piping with a volume greater than 1000 L is based on several variables, including the ability to drain and isolate the line, line volume, product characteristics, the availability of test equipment, and the reliability of procedures to detect *leaks*. The best results will be generated when the product is drained from the line, the line is blinded or isolated at each end, and the line is pressurized with an inert gas. The length of time that the line is pressurized should be consistent with its volume. Industry’s best practices should also be taken into consideration. Typically, refineries and terminals will use an inert gas to pressurize a line at one and one half times normal operating pressure and monitor the pressure for four or more hours.

B6.2.13

- (1) Numerous technologies are available to conduct a *precision leak detection test* and determine the presence of *leaks* in a *storage tank*, associated connections, risers, connected equipment and the *vent* system. Commonly used methods include vacutech, mass measurement, volumetric, and acoustics. The various test systems have specific preparation requirements, operating procedures, and technical limitations. These requirements have been determined by the equipment manufacturer and are based on the design of the technology. Failure to follow the procedures or operate within these parameters can impact the accuracy of results and scope of the evaluation.

The test equipment has also been designed to evaluate various areas of the *storage tank* and associated equipment. In some cases, more than one test must be completed in order to evaluate the

underfill area (below the fluid level) and the ullage space (above the fluid level). For example, a mass measurement or volumetric test could be used to evaluate the area below the fluid level. An acoustics test would be used in conjunction with the underfill test to evaluate the ullage space, risers and *vent* system. However, in some cases a test procedure can be used in more than one application. An ullage test could also be used to test an *empty* tank.

Various factors, including *tank* type – *aboveground*, *underground*, single-wall or double-wall, – interstice space design, and product level, must be considered and will influence the selection of an appropriate test. *Underground storage tanks* require an evaluation of the primary containment, connections, risers, connected equipment and the *vent* system. An *aboveground storage tank* requires an evaluation of the floor or any area of the *tank* that cannot be visually inspected for *leaks*. *Tank* components and *leak detection test* requirements are outlined in Table 10:

Table 10 - Tank Components and Leak Detection Test Requirements

Tank description	Product level	Test type
Single-wall <i>underground tank</i>	<i>Empty</i>	Ullage test
Single-wall <i>underground tank</i>	With product	Complete <i>tank</i> test
Double-wall <i>underground tank</i>	<i>Empty</i>	Ullage test
Double-wall <i>underground tank</i>	With product	Ullage test and LPVLDLT on the interstice; or complete <i>tank</i> test
Double-wall <i>underground tank</i> with brine or vacuum interstice monitor	<i>Empty</i>	Ullage test
Double-wall <i>underground tank</i> with brine or vacuum interstice monitor	With product	Ullage test; or complete <i>tank</i> test
Single-wall <i>aboveground tank</i>	With product	Underfill test
Double-wall <i>aboveground tank</i>	<i>Empty</i>	Ullage test
		Ullage test and LPVLDLT on the interstice
Double-wall <i>aboveground tank</i>	With product	Underfill test
		Underfill and LPVLDLT on the interstice

B.6.3.1

- (2) When the *leak detection* device is not an electrical device (such as a monitoring well or statistical inventory reconciliation), electrical interlocks may not be possible.

B.6.3.2 Even with the present mechanical type of *line-leak detectors*, a line *leak* within a submersible pump system can result in large volumes of product being pumped into the ground. *Leaks* from submersible pump systems have been the cause of some of the largest environmental and safety incidents. Where *line-leak detectors* are used, they shall not be bypassed when problems are encountered while dispensing the product.

The *authority having jurisdiction* may choose to prohibit the use of remote or submersible pump systems unless the pipes and pumps are within an acceptable *secondary containment* system.

B.6.5.3 The soil shall consist of gravels, coarse or medium sands, coarse silts, or other permeable material.

B.6.5.8 A filter pack is a porous medium usually consisting of sand or pea gravel.

B.6.5.13 Monitoring wells shall **not** be constructed of Schedule 20 PVC “sewer” or leach field piping.

B.6.7.2

- (1) A mechanical line *leak* detector (MLLD) is unable to reliably detect small *leaks*. From the *effective date* of this Code and at the discretion of the *authority having jurisdiction*, an MMLD is not recognized as a method of detecting *leaks* in pressurized piping. Additional methods of *leak detection* may be used, or alternatively, the MMLD can be replaced by an *electronic line leak detector* (ELLD).

Inventory control for a *storage tank* is a form of inventory monitoring for *motive fuel storage tanks*. However, inventory control by itself is not an acceptable form of *leak detection*.

Inventory control combined with acceptable statistical inventory reconciliation is an acceptable form of *leak detection* for the entire *storage tank system*.

An under-pump check valve is located directly below the pump of a suction system and is the only check valve installed on the system. With continuous slope back to the tank, a *leak* in the pipe will cause product to drain into the tank.

B.7.3.4

- (2)(b) Allows a field-erected *storage tank* to simply follow the requirements of API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction.” Strict adherence to API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction.” is required. API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction.” requires periodic *corrosion* monitoring. Once a *corrosion* rate is established, subsequent *corrosion* monitoring and repairs to the tank bottom can be performed prior to the occurrence of any perforations. If perforations do occur, it can be assumed that the provisions of API Std 653-01, “Tank Inspection, Repair, Alteration, and Reconstruction.” have not been strictly followed. If this occurs, stronger preventive steps are specified.

B.8.3.2

- (1)(a) To facilitate early detection of *leakage* from an *underground storage tank system*, proper inventory records must be developed, maintained, and reviewed continuously for any developing trends that may signify a loss of product. The traditional method of doing this has been to “dip” the *storage tanks*. Dipping is the actual measurement of the liquid contents of the *storage tank* with a graduated stick (dip stick). This measurement combined with the *storage tank* chart (suitable for use with the specific tank) can be converted to the liquid volume of the *storage tank*. A measuring device (generally a recording type of pump) that will measure the amount of product

withdrawn from the *storage tank* is also an integral part of the inventory control system. Finally, it is necessary to reconcile the product in storage with the amount recorded (daily/weekly) as having been withdrawn. Any continuous discrepancy (shortage) must be investigated as a possible *leak* from the *underground storage tank system*.

B.8.4.1

- (2)(b) Frequent visual inspections of an *aboveground storage tank system* is required to provide early detection of equipment failures and product *spills*. The *authority having jurisdiction* may decide that *operators* of tanks of 5000 L and less capacity do not have to do daily checks. In addition, it may not be possible or practical to inspect a *storage tank* at unattended remote *sites*.

B.8.5.2

- (1)(b) The NFCC requires that a vehicle *operator* remain in close proximity to the *discharge* control valve. There is concern that a vehicle *operator* may interpret ‘close proximity’ to include sitting in the cab of the tank vehicle, out of sight of the delivery point. Many overfills occur because the tank vehicle *operator* is not observing the filling operation and is unaware that the *storage tank* is overfilling. Therefore Sentence 8.5.2(1)(b) is more specific and requires a vehicle *operator* to be more attentive.

B.8.5.3

- (2) A significant number of the *spills* that occur at *aboveground storage tank* facilities result from improper procedures during routine activities. These accidents can be reduced or eliminated if operating personnel are properly trained about correct safety procedures and the importance of following them to prevent injury and environmental incidents. Training must be periodically followed up to ensure that proper procedures are being followed.

B.8.6.1

- (1) *Cathodically protected* potentials are required on all parts of the tank bottom in order for it to be considered to be *cathodically protected*. When a perimeter anode type *cathodic protection* system is used, the potential at the tank centre can be much different than that measured at the tank perimeter and a *corrosion expert* should be consulted

B.8.7

The CPPI “Code of Practice for Management of Water Effluent Quality at Petroleum Storage and Distribution Facilities” may be useful for anyone who *owns* or operates an *oil-water separator*.

An *oil-water separator* does not remove the soluble fraction of oil that is in the water or storm runoff. Therefore, it shall be noted that even if an *oil-water separator* produces an effluent that has an oil and grease or hydrocarbon content that is below provincial or territorial *discharge* limits, the effluent may still be acutely toxic to fish.

It is recommended that the designer shall ensure that when an *oil-water separator* is to be installed that a proper design basis is used. The *owner* shall control sources to the separator and remove the *free oil* layer and accumulated *separated solids* as required by the manufacturer’s operating instructions.

- B.8.7.5** Detergents and cleaning solutions cause oil to emulsify in water and prevent effective separation. Never wash trucks with such products in areas that drain to an *oil-water separator*.

- B.8.8.3** At the time of a change of ownership, an environmental assessment or investigation of site contamination shall be conducted on real property on which *storage tanks* are located.

B.8.12.1

- (1) The *tank bottom water* from the bottom of a *storage tank* normally contains water, insoluble hydrocarbon, and dissolved hydrocarbons. The concentration of dissolved or soluble hydrocarbons is often sufficiently high that the *tank bottom water* would be considered toxic if a biological toxicity test were conducted. Since *oil-water separators*, such as an API separator, only separate insoluble oil from water, the *tank bottom water* shall be segregated in a holding tank and sent to a wastewater treatment facility either on-site or off-site (and not directly to an *oil-water separator*).

B.9.3.1 *Corrosion* is the major factor which limits the life of a *steel storage tank system* and *corrosion* can be controlled for an indefinite period of time if *corrosion protection* is maintained. When *cathodic protection* system is used it is only effective when the system is “on”. Therefore, the *cathodic protection* system must be maintained and operated continuously.

B.9.5.3

- (1) The *authority having jurisdiction* could consider any of the following as reasonable conditions for allowing the *owner* to *abandon* a *storage tank* in place:
- (a) located in whole or in part beneath a permanent building or other facility so that excavation of the *storage tank* is not practicable;
 - (b) so large or of a type of *construction* that the excavation of the *storage tank* is not practicable;
 - (c) inaccessible to the heavy equipment necessary for removal of the *storage tank*; or
 - (d) situated so that removal of the *storage tank* would endanger the structural integrity of nearby buildings or other facilities.

B.9.5.5

- (1) Sand, gravel, or concrete are examples of what is considered acceptable inert material. Foam shall not be considered an acceptable inert material.

B.9.5.4 A *precision leak detection test* conducted in conformance with Section 8.10, or borehole sampling of the soil may be required to satisfy the *authority having jurisdiction* that the soil under and around the *storage tank* has not been contaminated by a *petroleum product* or *allied petroleum product*.

APPENDIX C Minimum Information Required for Registration of Storage Tank Systems

The registration form prescribed by the *authority having jurisdiction* shall require, as a minimum, the following information:

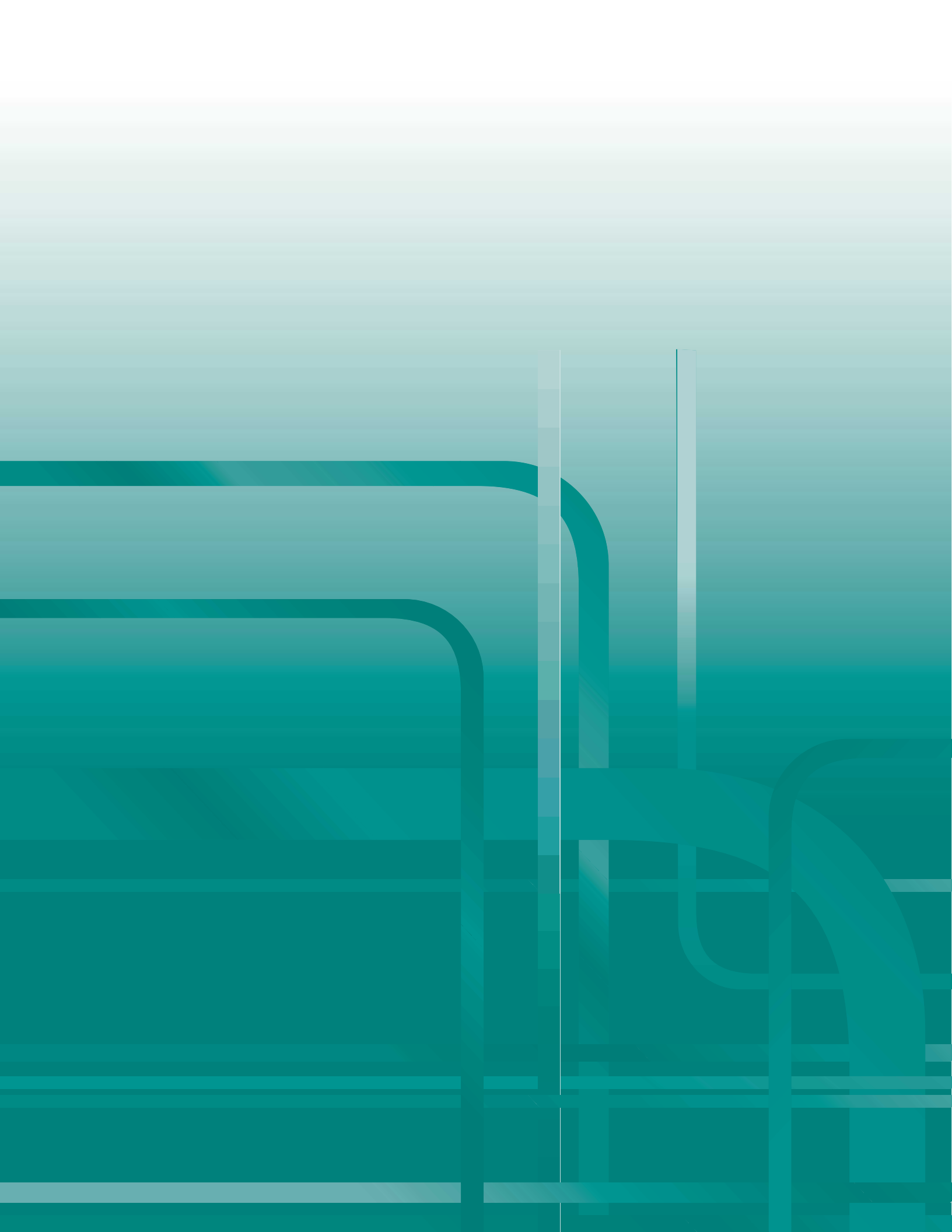
- (a) name of *owner*;
- (b) address of *owner*;
- (c) type of facility;
- (d) location of *storage tanks* (if different than address of *owner*);
- (e) storage capacity of tank;
- (f) type of product stored;
- (g) year of installation;
- (h) ULC standard of tank
- (i) type of *storage tank* material;
- (j) type of *pipng* material;
- (k) *corrosion protection* provided (if applicable);
- (l) type of pump;
- (m) type of *leak detection*;
- (n) type of *secondary containment* (if applicable);
- (o) name of *operator* (if different than *storage tank owner*);
- (p) name of land owner (if different than *storage tank owner*);
- (q) name of installer; and
- (r) manufacturer of *storage tank*.

APPENDIX D Spill Reporting

The *owner* or *operator* of a *storage tank system* who discovers, suspects, or is notified by any person of a *leak* or possible *leak* shall immediately notify the *authority having jurisdiction* by telephone and provide the information requested by the *authority having jurisdiction*.

Listed below are the emergency phone numbers of the federal, provincial, and territorial authorities. Either of the two listed numbers can be called.

PROVINCE / TERRITORY	FEDERAL AUTHORITY	PROVINCIAL / TERRITORIAL AUTHORITY
Newfoundland and Labrador	1-800-563-2444 709-772-2083 Coast Guard	1-800-563-2444 709-772-2083 Coast Guard
Prince Edward Island	1-800-565-1633 Coast Guard (in Maritimes only)	1-800-565-1633 Coast Guard (in Maritimes only)
Nova Scotia	1-800-565-1633 Coast Guard (in Maritimes only)	1-800-565-1633 Coast Guard (in Maritimes only)
New Brunswick	1-800-565-1633 Coast Guard (in Maritimes only)	1-800-565-1633 Coast Guard (in Maritimes only)
Québec	514-383-2333 Environment Canada Emergency Answering Service	514-873-3454 Dept. of Environment Environmental Emergency
Ontario	416-238-6065 Environment Canada Environmental Emergencies	1-800-268-6060 Ministry of the Environment Spills Action Centre
Manitoba	403-468-8020 Environment Canada Environmental Emergencies	204-944-4888 Manitoba Conservation Environmental Emergency Line
Saskatchewan	403-468-8020 Environment Canada Environmental Emergencies	1-800-667-7525 Spill Report Centre Saskatchewan Environment
Alberta	403-499-2432 Environment Canada Spill Reporting	1-800-222-6514 Alberta Environment and Local Fire Department
Nunavut	867-920-8130 Spill Report Line	867-920-8130 Spill Report Line
Northwest Territories	867-920-8130 Spill Report Line	867-920-8130 Spill Report Line
British Columbia	604-666-6100 Environment Canada Environmental Emergencies 604-666-6011 Canada Coast Guard	1-800-663-3456 Provincial Emergency Program
Yukon	403-667-7244 Environmental Protection Services	403-667-7244 Environmental Protection Services



APPENDIX C

Environmental Management of Petroleum Storage Tank Systems (Correctional
Services Canada Internal Services Directive 318-8).



INTERNAL SERVICES DIRECTIVE 318-8

In Effect: 2014-01-20

Last Review: 2014-01-20

Due for Review: 2016-01-20

Environmental Management of Petroleum Storage Tank Systems

PROGRAM ALIGNMENT

Internal Services

OFFICE(S) OF PRIMARY INTEREST

Environmental Protection Programs

ONLINE @

- <http://infonet/cds/cds/318-8-isd-eng.pdf>
- <http://infonet/cds/cds/318-8-isd-fra.pdf>
- <http://www.csc-scc.gc.ca/acts-and-regulations/318-8-isd-eng.shtml>
- <http://www.csc-scc.gc.ca/lois-et-reglements/318-8-isd-fra.shtml>

AUTHORITIES

- *Canadian Environmental Protection Act, 1999* (CEPA)
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, 2008*
- *Fisheries Act, R.S.C. 1985, c. F-14*
- *National Fire Code of Canada, 2010* (NFC)

PURPOSE

- To protect the natural environment, specifically soil and the water resources, from adverse effects that may result as a consequence of operating [storage tank systems](#). This includes avoiding the contamination and negative ecological impacts from potential leaks and spills, and/or fires and explosions resulting from the release of [petroleum products](#) and/or [allied petroleum products](#)
- To mitigate the potential financial impacts, particularly due to spills and leaks as a result of the regular operations of storage tank systems at CSC institutions, facilities, Community Correctional Centres (CCC), Corcan operations, and other buildings that operate storage tank systems (all of the above will be referred to in this directive as institutions)
- To ensure that petroleum storage tank systems are operated, maintained and monitored by CSC in accordance with standardized preventive practices
- To maintain an up-to-date official registry of the petroleum storage tank systems owned and operated by CSC and Corcan

APPLICATION

Applies to staff managing CSC and Corcan owned and/or operated petroleum storage tank systems

CONTENTS	
SECTIONS	
1 – 2	<u>Responsibilities</u>
3 – 29	<u>Procedures</u>
3 – 4	<u>General Requirements</u>
5 – 26	<u>Specific Requirements</u>
5 – 7	<u>Storage Tank Systems Registration</u>
8 – 10	<u>Design and Installation</u>
11	<u>Product Transfer Areas</u>
12 – 15	<u>Risk Assessment and Storage Tank System Emergency Plan</u>
16 – 20	<u>Leak Detection and Monitoring</u>
21 – 26	<u>Withdrawal from Service</u>
27 – 28	<u>Data Management and Reporting</u>
27	<u>Records</u>
28	<u>Reporting</u>
29	<u>Non-Compliance</u>
30	<u>Enquiries</u>
Annex A	<u>Cross-References and Definitions</u>
Annex B	<u>List of Petroleum and Allied Petroleum Products</u>
Annex C	<u>Product Transfer Area Containment Options</u>

NOTE

Environment Canada's ***Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*** (referred to as the "Regulations" henceforward) **will in all cases take precedence over** this Internal Services Directive. Institutions should always refer to the Environment Canada Regulations for detailed clarification on specific storage tank systems management issues pertaining to applicability, scope, and required technical specifications.

RESPONSIBILITIES

1. The Institutional Head, his/her delegates (e.g. the Chief, Facilities Management – CFM) and the Corcan Operations Managers are accountable to adhere to the Regulations and to ensure compliance with this ISD.
2. CSC's Environmental Officers will provide guidance and advice relating to this ISD. NHQ Environmental Protection Programs Division will act as the Registrar for Environment Canada's Federal Identification Registry for Storage Tank Systems ([FIRSTS](#)).

PROCEDURES

General Requirements

3. An inventory of all on-site storage tanks containing petroleum or allied petroleum products must be kept up to date. The inventory will be placed in the appropriate file 590-08 of the institution's [Environmental Management System](#) (EMS). The inventory of all tanks requiring registration must concur with the information found in FIRSTs.
4. Copies of documents that are essential to the management of the institution's petroleum storage tank systems (e.g. registrations, reports of leaks/spills, spill response drills, etc.) must be sent to the CSC's NHQ and RHQs to ensure reporting requirements are met according to the Regulations. These documents should also be placed in the appropriate file of the institution's [EMS](#).

Specific Requirements

Storage Tank Systems Registration

5. In order to obtain an Environment Canada issued storage tank system identification number, it is the responsibility of the institutions to ensure that all storage tank systems meet the following criteria:
 - a. contain (refer to [Annex B](#) for a full listing of products):
 - i. petroleum products, or

- ii. allied petroleum products
 - b. have a capacity greater than 230 L and be located outside
 - c. be vented to the atmosphere (operate at atmospheric pressure)
 - d. be designed and installed in a fixed location.
6. The following storage tank systems are exempt from the Regulations (pursuant to subsection 2(2) of the Regulations):
- a. aboveground storage tank systems (AST) with a capacity of less than 2,500 L that are located outside of a building and connected to a heating appliance or emergency generator
 - b. indoor storage tank systems (i.e. located within a building with a basement) which meet the specified Environment Canada minimum guidelines for secondary containment.
7. The institutions must comply with the following deadlines as outlined in the Regulations:
- a. Environment Canada must be informed within 60 days of the following changes to the existing storage tank system:
 - i. changes to the registration information
 - ii. storage tank system replacement
 - iii. storage tank system modification
 - iv. storage tank system withdrawal from service – temporarily (less than two years) or permanently (two years or more)
 - b. new storage tank systems must be registered with Environment Canada's FIRSTS before the first fill
 - c. it is the responsibility of institutions, via the Regional Coordinator, Environmental Programs, to complete the Registration of a Storage Tank System for Petroleum Products and Allied Petroleum Products (CSC/SCC 1265-02) form for new storage tank systems and to provide this information to NHQ Senior Environmental Officer
 - d. NHQ will register the tank or storage tank system on FIRSTS and will forward the Environment Canada identification number issued for the registration. It is the responsibility of the institution to display the Environment Canada number on or near the storage tank system.

Design and Installation

8. Institutions must include the following design requirements for new field-erected and shop-fabricated AST:
 - a. spill containment (e.g. [spill containment device](#), [product transfer area](#), etc.)
 - b. corrosion protection (e.g. painted, etc.)
 - c. secondary containment (e.g. double walled, etc.)
 - d. overfill protection (e.g. [overfill protection device](#), product transfer area, etc.).
9. Institutions must ensure that the oil found in the oil-water separator (of a storage tank system) is removed automatically or manually:
 - a. free oil layer must not exceed 50 mm in thickness
 - b. separate solids must not exceed 150 mm in thickness.
10. The installation of single-walled [underground storage tanks \(UST\)](#) or underground single-walled piping is prohibited.

Product Transfer Areas

11. All storage tank systems must have product transfer areas that are designed to contain spills and overfills that occur in the area around the connection point between a delivery truck and the storage tank system during the transfer process (refer to [Annex C](#) for examples of containment options).

Risk Assessment and Storage Tank System Emergency Plan

12. Institutions must apply a risk management methodology to their inventory of storage tank systems. A Risk Assessment (RA) must be performed for each storage tank system at the institution (contact NHQ Senior Environmental Officer or RHQ Regional Coordinator, Environmental Programs, for the RA template) in order to:
 - a. identify potential risk sources
 - b. determine potential sources of spread of petroleum or allied petroleum product
 - c. identify the potential consequences of storage tank system emergencies
 - d. identify current storage tank system risk mitigation (reduction) strategies

- e. assess the health and safety and environmental risk consequences of storage tank system emergencies (e.g. leaks and spills, fires and explosions).
13. Following the Risk Assessment, institutions must ensure that storage tank system Emergency Plans are completed, regularly updated and operational at all times (contact NHQ Senior Environmental Officer or RHQ Regional Coordinator, Environmental Programs, for the Emergency Plan template).
14. The storage tank system Emergency Plan will be unique for each storage tank system and must include the following items:
- a. properties and characteristics of the petroleum product or allied petroleum product stored in each tank of the system (refer to the Material Safety Data Sheets, if available)
 - b. the maximum quantity of product stored in the system
 - c. characteristics of the place and surrounding area of where the system is located (including areas sensitive to the environment or human health)
 - d. measures to prevent, respond to, and recover from an emergency spill/overflow
 - e. a list of individuals, with roles and responsibilities, to carry out the plan
 - f. training requirements
 - g. a list of emergency response equipment
 - h. measures to notify public in cases of emergencies.
15. The storage tank system Emergency Plan must be ready to be implemented before the first transfer of petroleum products or allied petroleum products into a storage tank system.

Leak Detection and Monitoring

16. Institutions with underground storage tank system and/or piping must have automatic gauging or continuous leak detection or must conduct annual precision leak detection tests. All methods require recording of the results.
17. Institutions with horizontal aboveground storage tank system without secondary containment must visually inspect the exterior walls of the tanks once per month, perform inventory reconciliation and annual leak detection tests. All methods require recording of the results.
18. Institutions with vertical aboveground storage tank system without secondary containment must initially inspect the walls and afterwards set up an ongoing leak detection or monitoring program.

19. Institutions with a storage tank system that has aboveground piping without secondary containment must:

- a. use continuous external aboveground pipe leak monitoring, or
- b. have a corrosion analysis program
- c. visually inspect the piping monthly, or
- d. annually perform a piping precision leak detection test.

20. Institutions with a storage tank system that has a [sump](#) must:

- a. use continuous leak monitoring, or
- b. visually inspect annually.

Withdrawal from Service

21. If there is a leak in the storage tank system or one of its components, it must be immediately withdrawn from service until the leak is repaired, unless circumstances make it impossible to comply (refer to [section 3\(4\)](#) of the Regulations for the conditions).

22. It is prohibited to abandon a storage tank system in place.

23. For temporary withdrawal of storage tank system (less than two years), institutions must adhere to [section 43](#) of the Regulations, including [cathodic protection](#) on the tank (if the system is equipped), label fill pipe, leak test, avoidance of short and long-term harm to the environment and/or human health. An inspection must be conducted before the tank is put back in service.

24. For permanent withdrawal of storage tank system, institutions must adhere to [section 44](#) of the Regulations, including removal and disposal of liquids and sludge, purging of vapours, labeling fill piping, and withdrawal completed in such a manner that poses no short- or long-term threat to the environment and/or human health [refer to the form [Deregistration of a Storage Tank or System for Petroleum Products and Allied Petroleum Products](#) (CSC/SCC 1265-04)].

25. Institutions must complete without delay a [Deregistration of a Storage Tank or System for Petroleum Products and Allied Petroleum Products](#) (CSC/SCC 1265-04) form and forward it to NHQ and RHQ so that Environment Canada can be notified via FIRSTS.

26. The following tanks or components must be permanently withdrawn from service and removed:

- a. single-walled underground tanks that lack corrosion protection (for steel tanks) and leak detection, groundwater monitoring wells or vapour monitoring wells
- b. single-walled underground piping that lacks corrosion protection (for steel piping), leak detection, groundwater monitoring wells, vapour monitoring wells, single vertical check valves or mechanical line leak detection devices
- c. AST installed underground
- d. UST installed aboveground
- e. partially buried tanks.

Data Management and Reporting

Records

27. Institutions must keep records of operation and maintenance programs, including inventory reconciliation, temporary or permanent withdrawals, oil-water separator measurements, corrosion protection, as-built drawings, as well as all relevant documentation, for a minimum of five years and up to the lifetime of the storage tank system.

Reporting

28. Any episode involving a [major petroleum product leak](#), spill, fire or explosion (i.e. an incident that had or could have significant environmental impact or that requires the intervention of external expertise and equipment to confine and recover the contaminants) requires completion of an [Environmental Incident Report](#) (CSC/SCC 1265-03). This report must be given to CSC's Regional Coordinator, Environmental Programs. Where applicable, depending on the nature and severity of the incident, the appropriate CSC authorities will provide a written report to Environment Canada. In cases of major spill, institutional authorities must advise immediately by telephone Environment Canada (Regional Environmental Emergencies Division).

Non-Compliance

29. In the event of non-compliance with the Regulations, it is the prerogative of the Environment Canada inspector to issue warning letters or non-compliance orders, or to sanction monetary penalties pursuant to [CEPA](#).

ENQUIRIES

30. Environmental Protection Program
National Headquarters
Email: GEN-NHQ-ENV@csc-scc.gc.ca

Assistant Commissioner,
Corporate Services

Original Signed by:

Liette Dumas-Sluyter

ANNEX A

CROSS-REFERENCES AND DEFINITIONS

CROSS-REFERENCES

CD 318 – Environmental Programs

Registration of a Storage Tank System for Petroleum Products and Allied Petroleum Products (CSC/SCC 1265-02)

Deregistration of a Storage Tank or System for Petroleum Products and Allied Petroleum Products (CSC/SCC 1265-04)

The federal government's tank registration and other requirements are summarized in the *Tank Tips* bulletins at: <http://www.ec.gc.ca>.

Canadian Council of Ministers of the Environment

DEFINITIONS

The following definitions apply to this ISD. For additional definitions, refer to the above-mentioned Regulations and authorities.

Aboveground storage tank (AST): a tank that operates at atmospheric pressure and that has all of its volume either above grade or encased within an unfilled secondary containment.

Allied petroleum product: a mixture of hydrocarbons other than a petroleum product, that may be water miscible and may have a density greater than water.

Cathodic protection: a method of preventing or reducing corrosion of a metal surface by making the metal a cathode, using an impressed direct current or attaching sacrificial anodes.

Environmental Management System (EMS): a tool for ensuring that an institution meets all of the environmental legislation and performance requirements.

FIRSTS: the Federal Identification Registry for Storage Tank Systems is Environment Canada's inventory of storage tank systems that are subject to the federal Regulations. All storage tank systems covered by the Regulations must be identified in this inventory.

Major petroleum product leak: if 100 L or more of product is released into the environment (i.e. beyond the secondary containment area), institutions are required to follow up with a written report to Environment Canada.

Overfill protection device: an electrical or mechanical device that is installed in a storage tank, fill tube or vent which helps prevent a storage tank from being overfilled.

Petroleum product: a single product or mixture of at least 70% hydrocarbons, refined from crude oil, with or without additives. It includes such products as gasoline, diesel fuel, aviation fuel, kerosene, naphtha, lubricating oil, fuel oil, and engine oil (new or used), and excludes propane, paints and solvents.

Product transfer area: the area around the connection point between the delivery truck and a storage tank system in which the tanks have an aggregate capacity of more than 2,500 L.

Secondary containment: an area that prevents liquids that leak from a storage tank system from reaching the surrounding environment and includes double-walled tanks and piping, liners, and impermeable barriers.

Spill containment device: a container fitted to the inlet or to the suction coupling of a storage tank that helps prevent spills from entering the environment.

Storage tank system: a tank or commonly connected tanks and all piping, vents, pumps, sumps, diking, overfill protection devices, spill containment devices and oil-water separators.

Sump: means a dispenser, pump, transition, or turbine sump.

Tank: a closed container with a capacity of more than 230 L that is designed to be installed in a fixed location.

Underground storage tank (UST): a tank that operates at atmospheric pressure and that has all of its storage volume below grade and completely surrounded by fill.

ANNEX B**LIST OF PETROLEUM AND ALLIED PETROLEUM PRODUCTS****I. PETROLEUM PRODUCTS**

Heavy fuel oil

Diesel

Gasoline

Heating oil

Kerosene

Other (specify in the "Comments" section)

Used oil

II. ALLIED PETROLEUM PRODUCTS

Benzene

Biodiesel

E-85 fuel

CGSB 1-GP-124, Thinner for vinyl coatings

CGSB 15-GP-136, Antiblush thinner for cellulose nitrate lacquer

CGSB 15-GP-50, Acetone, technical grade

CGSB 15-GP-52, Methyl ethyl ketone, technical grade

CGSB 21.1-93, Offset lithographic printing ink

CGSB 3-GP-525, Isopropanol

CGSB 3-GP-531, Methanol, technical grade

CGSB 3-GP-855, Ethylene glycol, uninhibited

CGSB CAN/CGSB-1.110-91, General purpose thinners for lacquers

CGSB CAN/CGSB-1.164-92, Solvent for vinyl pretreatment coating

CGSB CAN/CGSB-1.2-89, Boiled linseed oil

CGSB CAN/CGSB-1.4-92, Petroleum spirits thinner

CGSB CAN/CGSB-1.70-91, High solvency thinner

Oxygenated gasoline

Toluene

ANNEX C

PRODUCT TRANSFER AREA CONTAINMENT OPTIONS

There are two main types of product transfer areas:

1. **Permanent physical containment** – Contains any spills or leaks and prevents product from reaching the environment. For example, curbed and dyked concrete.
2. **Method** – All reasonable risks of product reaching the environment for a given site are identified and appropriately mitigated using a risk management approach. For example, a five-step approach including: i) a description of the storage tank system, its characteristics and how it's filled; ii) identification of potential incidents and potential receiving environment; iii) evaluation of risks and identification of those that need to be addressed; iv) mitigate risks; and v) confirmation of effectiveness of mitigation measures.

When designing a product transfer area, consider the following:

1. What is the volume of the registered tank system?
 - a. If less than 2,500 L, a product transfer area is not legally required
 - b. If greater than 2,500 L, a product transfer area must be designed to contain spills.
2. What is the frequency of deliveries?
 - a. If three or more per year, consider a permanent (for example, concrete curbed and dyked berm) product transfer area design
 - b. If less than three per year, consider implementing a risk management method (for example, standard operating procedures and preventative spill kits) during product transfer.
3. Does the tank system have a functioning overfill protection device?
 - a. If no, need to update or upgrade existing device immediately.
4. Has this tank system had a previous spill during product transfer?
 - a. If yes, need to modify current methodology employed during the product transfer process.
5. What are the risks associated with this tank system?
 - a. Refer to Storage Tank Risk Assessment for your institution

- b. If high risk, consider a physical confinement design.
- 6. What are the environmental sensitivities and human health risks associated with this tank system?
 - a. Refer to Storage Tank Risk Assessment for your institution
 - b. If tank is located in a sensitive area (for example, near a water body), consider a physical confinement design.
- 7. Is there a CSC representative overseeing the product transfer?
 - a. If no, it is strongly recommended to have a CSC employee present during fuel transfers.

This is not an exhaustive list of considerations. Each site needs to evaluate their own storage tank systems requirements.

In the event of an inspection by Environment Canada, the CSC person designated to guide the enforcement officer at the institution, must be able to substantiate, explain or demonstrate how the product transfer area is designed to contain spills during fuel transfer.

APPENDIX D

TANK SYSTEM DECOMMISSIONING CHECKLISTS

BCI – Tank Decommissioning Compliance Checklist* CSC Tank ID # 422-01 (PWGSC Ontario Reg. Proj. No. R.058845.001)

	TANK DECOMMISSIONING Compliance Checklist Items Pictures must be taken as proof of process	Completed Y/N	Supporting Documentation Collected – Y/N	Supporting Documentation Type (e.g. Photos, recorded vapour levels, disposal weigh bills, copies of certifications, etc)	Comments
1.1	Withdrawn from service by Certified Individual (TSSA, PM certification)				
1.2	Prior to commencing work on the tank, label fill pipe to indicate tank has been <u>Permanently Withdrawn</u> from service, including date. Permanent Withdrawal Notice to remain on tank for removal.				
1.3	Drain and thoroughly flush piping into tank				
1.4	Pump out liquid from tank and ensure no remnants present that can cause future contamination at disposal site or during transport				
1.5	Remove sludge from tank bottom				
	Ensure that all liquids are disposed of in accordance with regulatory requirements (licensed waste hauler/waste manifests to be provided)				
1.6	Disconnect all piping				
1.7	Remove fill tube				
1.8	Disconnect fill gauge, product and vent lines.				
1.9	Cap or plug open ends of lines that are not to be used further.				
1.10	Cap piping				
1.11	Purge washed tank of vapours to less than 10% of lower explosive limit (LEL). Verify with combustible gas metre include the calibration log / photo of the combustible gas meter showing levels.				
1.12	Plug or Cap holes after tank has been freed of vapours and before tank is removed from site.				

1.13	For disposal, dismantle, cut sufficient openings or otherwise render tank unusable as per specs and provide confirmation/ documentation/ photos.				
1.14	Tank Information to be collected: <ul style="list-style-type: none"> ○ Tank system identification number ○ Product last stored ○ Capacity ○ Standard to which the tank or component was fabricated or constructed ○ Material of construction 				
1.15	No long term harmful effects (Withdrawal conducted in such manner that no long term threat to the environment or environmental health)				
1.16	Completed the CSC Deregistration of Storage Tank System Form – Part II – Permanent Withdrawal				

Checklist Completed By:	Signature:	Date Completed:

*This checklist only outlines the requirement for the Tank Decommissioning Portions of the Work covered under the R.058845.001 Specifications, and is intended to be used as an onsite tool.

BCI – Tank Decommissioning Compliance Checklist* CSC Tank ID # 422-02 (PWGSC Ontario Reg. Proj. No. R.058845.001)

	TANK DECOMMISSIONING Compliance Checklist Items Pictures must be taken as proof of process	Completed Y/N	Supporting Documentation Collected – Y/N	Supporting Documentation Type (e.g. Photos, recorded vapour levels, disposal weigh bills, copies of certifications, etc)	Comments
1.1	Withdrawn from service by Certified Individual (TSSA, PM certification)				
1.2	Prior to commencing work on the tank, label fill pipe to indicate tank has been <u>Permanently Withdrawn</u> from service, including date. Permanent Withdrawal Notice to remain on tank for removal.				
1.3	Drain and thoroughly flush piping into tank				
1.4	Pump out liquid from tank and ensure no remnants present that can cause future contamination at disposal site or during transport				
1.5	Remove sludge from tank bottom				
	Ensure that all liquids are disposed of in accordance with regulatory requirements (licensed waste hauler/waste manifests to be provided)				
1.6	Disconnect all piping				
1.7	Remove fill tube				
1.8	Disconnect fill gauge, product and vent lines.				
1.9	Cap or plug open ends of lines that are not to be used further.				
1.10	Cap piping				
1.11	Purge washed tank of vapours to less than 10% of lower explosive limit (LEL). Verify with combustible gas metre include the calibration log / photo of the combustible gas meter showing levels.				
1.12	Plug or Cap holes after tank has been freed of vapours and before tank is removed from site.				

1.13	For disposal, dismantle, cut sufficient openings or otherwise render tank unusable as per specs and provide confirmation/ documentation/ photos.				
1.14	Tank Information to be collected: <ul style="list-style-type: none"> ○ Tank system identification number ○ Product last stored ○ Capacity ○ Standard to which the tank or component was fabricated or constructed ○ Material of construction 				
1.15	No long term harmful effects (Withdrawal conducted in such manner that no long term threat to the environment or environmental health)				
1.16	Completed the CSC Deregistration of Storage Tank System Form – Part II – Permanent Withdrawal				

Checklist Completed By:	Signature:	Date Completed:

*This checklist only outlines the requirement for the Tank Decommissioning Portions of the Work covered under the R.058845.001 Specifications, and is intended to be used as an onsite tool.

BCI – Tank Decommissioning Compliance Checklist* CSC Tank ID # 422-0A (PWGSC Ontario Reg. Proj. No. R.058845.001)

	TANK DECOMMISSIONING Compliance Checklist Items Pictures must be taken as proof of process	Completed Y/N	Supporting Documentation Collected – Y/N	Supporting Documentation Type (e.g. Photos, recorded vapour levels, disposal weigh bills, copies of certifications, etc)	Comments
1.1	Withdrawn from service by Certified Individual (TSSA, PM certification)				
1.2	Prior to commencing work on the tank, label fill pipe to indicate tank has been <u>Permanently Withdrawn</u> from service, including date. Permanent Withdrawal Notice to remain on tank for removal.				
1.3	Drain and thoroughly flush piping into tank				
1.4	Pump out liquid from tank and ensure no remnants present that can cause future contamination at disposal site or during transport				
1.5	Remove sludge from tank bottom				
	Ensure that all liquids are disposed of in accordance with regulatory requirements (licensed waste hauler/waste manifests to be provided)				
1.6	Disconnect all piping				
1.7	Remove fill tube				
1.8	Disconnect fill gauge, product and vent lines.				
1.9	Cap or plug open ends of lines that are not to be used further.				
1.10	Cap piping				
1.11	Purge washed tank of vapours to less than 10% of lower explosive limit (LEL). Verify with combustible gas metre include the calibration log / photo of the combustible gas meter showing levels.				
1.12	Plug or Cap holes after tank has been freed of vapours and before tank is removed from site.				

1.13	For disposal, dismantle, cut sufficient openings or otherwise render tank unusable as per specs and provide confirmation/ documentation/ photos.				
1.14	Tank Information to be collected: <ul style="list-style-type: none"> ○ Tank system identification number ○ Product last stored ○ Capacity ○ Standard to which the tank or component was fabricated or constructed ○ Material of construction 				
1.15	No long term harmful effects (Withdrawal conducted in such manner that no long term threat to the environment or environmental health)				
1.16	Completed the CSC Deregistration of Storage Tank System Form – Part II – Permanent Withdrawal				

Checklist Completed By:	Signature:	Date Completed:

*This checklist only outlines the requirement for the Tank Decommissioning Portions of the Work covered under the R.058845.001 Specifications, and is intended to be used as an onsite tool.