



**Public Works and  
Government Services Canada**

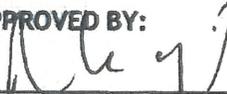
Requisition No. EZ108-161465/A

MERX I.D. No. \_\_\_\_\_

**SPECIFICATIONS**  
For  
**Pumphouse Steel Column Repair**

Project No. R.016116.109      November 2015

**APPROVED BY:**

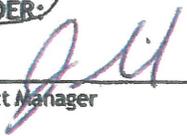
  
\_\_\_\_\_  
Regional Manager, A&E Services

2015-12-10  
Date

  
\_\_\_\_\_  
Construction Safety Coordinator

2015-12-10  
Date

**TENDER:**

  
\_\_\_\_\_  
Project Manager

2015-12-08  
Date

Esquimalt Graving Dock, Victoria, B.C.  
Pumphouse Steel Column Repair

**000001**

**INDEX TO DRAWINGS AND SPECIFICATIONS**

Project No. R.016116.109

November 2015

**SPECIFICATIONS**

**# of Pages**

**DIVISION 1 GENERAL REQUIREMENTS**

011155	General Instructions.....	10
013300	Submittal Procedures.....	2
013301	Shop Drawings, Product Data and Samples.....	4
013533	Health and Safety Requirements.....	11
013543	Environmental Procedures .....	5
015100	Temporary Facilities.....	2
015600	Temporary Barriers and Enclosures .....	2
017830	Closeout Submittals.....	3

**DIVISION 3 CONCRETE**

033000	Cast-in-Place Concrete .....	8
--------	------------------------------	---

**DIVISION 5 METALS**

051223	Structural Steel.....	6
--------	-----------------------	---

**APPENDICES**

Appendix A	Preliminary Hazard Assessment Form .....	4
Appendix B	Lead Paint Risk Assessment .....	18

**DRAWINGS (BOUND SEPARATELY)**

01	Site Plan and Key Plan
02	Pumphouse Plan and Sections
03	Column Repair Details and Sections

**END OF INDEX**



- 1. Codes** .1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.
- 2. Description of Work** .1 Work under this Contract covers the supply and installation of a new steel column, including plates, braces, guards, and reinforced concrete pedestal for the repair of an existing deteriorating steel column located at the Pump Room floor of the Esquimalt Graving Dock, 825 Admirals Road, Victoria, B.C.
- .2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents:
- .1 Abatement of hazardous materials (lead paint)
  - .2 Demolition of existing concrete pedestal and guardrail, and partial demolition of existing steel beam and column.
  - .3 Supply and installation of reinforced concrete pedestal
  - .4 Supply and installation of steel column including base plates, splice plates, anchors, and beam connection plates.
  - .5 Supply and installation of steel channel brace spliced to existing beam.
  - .6 Supply and installation of new guardrail.
- .3 "Green" requirements:
- .1 Use materials/products containing highest percentage of recycled and recovered materials practicable - consistent with maintaining cost effective satisfactory levels of competition.
  - .2 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.
- 3. Contract Method** .1 Construct work under lump sum contract.
- 4. Contract Documents** .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.
- 5. Other Contracts** .1 Other contracts are currently in progress at the site. Concurrent projects adjacent to the work area may include:
- .1 Pump #2 Refurbishment
  - .2 Pumphouse Substation

- .2 Further Contracts may be awarded while this contract is in progress.
- .3 Cooperate with other Contractors on site in carrying out their respective works and carry out instructions from Departmental Representative.
- .4 Coordinate work with that of other Contractors.

**6. Division of Specifications**

- .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
- .2 A division may consist of the work of more than one subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

**7. Time of Completion**

- .1 Complete the project within 7 weeks after Contract Award.

**8. Hours of Work**

- .1 Restrictive as follows:
  - .1 Schedule deconstruction, removal and construction work during normal weekday working hours of the Esquimalt Graving Dock. Normal weekday working hours are 7:00 to 23:00 Monday through Friday, excluding statutory holidays.
  - .2 Submit written request to Departmental Representative for authorization prior to working outside of normal working hours including weekends or holidays.

**9. Work Schedule**

- .1 Carry on work as indicated and as follows:
  - .1 Within 5 working days after Contract award, provide a Master Project Schedule, in the form of a bar chart, showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Schedule to indicate the following:
    - .1 Submission of shop drawings, product data, MSDS sheets and samples.

- 
- .2 Commencement and completion of work of each section of the specifications or trade for each stage of work as outlined.
  - .3 Final completion date within the time period required by the Contract documents.
- 
- .2 Do not change approved Schedule without notifying Departmental Representative.
  - .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to the approval of the Departmental Representative.
- 
- 10. Cost Breakdown**
- .1 Before submitting the first progress claim, submit a breakdown of the contract lump sum price in detail as directed by the Departmental Representative.
- 
- 11. Codes, Bylaws, Standards**
- .1 Perform work in accordance with the National Building Code of Canada (NBC) 2010 (as applicable), and other indicated Codes, Construction Standards and/or any other Code or Bylaw of local application.
  - .2 Comply with applicable local bylaws, and all Esquimalt Graving Dock rules and regulations enforced at the location concerned.
  - .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
  - .4 In any case of conflict or discrepancy, the most stringent requirements shall apply.
- 
- 12. Documents Required**
- .1 Maintain 1 copy each of the following at the job site:
    - .1 Contract drawings.
    - .2 Contract specifications.
    - .3 Addenda to Contract documents.
    - .4 Copy of approved work schedule.
    - .5 Reviewed/approved shop drawings.
    - .6 Change orders.
    - .7 Other modifications to Contract.
    - .8 Field test reports.
    - .9 One set of record drawings and specifications for "as-built"

- purposes.
- .10 Health and Safety Plan and other Safety Related Documents.
- .11 Contractor's Environmental Management Plan
- .12 Other documents as specified.

**13. Regulatory Requirements**

- .1 Obtain and pay for - Building Permit, Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.
- .3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

**14. Owner Occupancy**

- .1 During the entire construction period, the owner will occupy adjacent areas for execution of normal operations.
- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Owner usage of adjacent areas. In the event of a conflict the contractor will accommodate changes to their operations to minimize interference with owner operations.

**15. Contractor's Use of Site**

- .1 The Esquimalt Graving Dock shall be assumed to be fully operational for the duration of the contract.
- .2 Contractors work site is indicated on the drawings.
- .3 The Contractor will assume the role of Prime Contractor as per Section 118 of the Workers Compensation Act
- .4 The use of Contractor's work site is exclusive and complete for the execution of contract work.
- .5 The Contractor shall:
  - .1 Assume responsibility for assigned premises for performance of the work.
  - .2 Coordinate all work activities on the Contractor's work site, including the work of other contractors engaged by Departmental Representative.
  - .3 Provide security of Contractor's work site and all Contractor's and Subcontractor's equipment and material. Secure Contractor's

work site at the end of each work day.

- .5 Ensure the site is not unreasonably encumbered with material or equipment.
- .6 Comply with security restrictions, any area of the Esquimalt Graving Dock property to which access is restricted by sign is a secured or restricted area and shall not be entered.
- .7 Avoid obstruct access to PWGSC property outside of the Contractor's work site. Maintain overhead clearances, keep roadways and walkways clear, and maintain routes for emergency response vehicles.

**16. Existing Services**

- .1 Notify Departmental Representative of intended interruption of services and obtain required permission. Where work involves breaking into or connecting to existing services, contractor shall submit a request to the Departmental Representative a minimum of 48 hours prior to the event. The contractor will not proceed until approval has been granted. The PWGSC Departmental Representative will make all reasonable efforts to accommodate the request; however PWGSC will not accept delay charges should the request not be accepted.
- .2 Minimize duration of interruptions, and where required, provide temporary services to maintain critical systems.
- .3 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in a manner approved by authorities having jurisdiction.

**17. Work by others**

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

**18. Examination**

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

- .2 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .3 At completion of operations the condition of existing work must be equal to or better than that which existed before new work started.
- .4 Protect existing work to prevent injury or damage to portions of existing work which remain.

**19. Cutting and Patching**

- .1 Cut existing surfaces as required to accommodate new work.
- .2 Remove items so shown or specified.
- .3 Except as noted on drawings, do not cut, bore, or sleeve load-bearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .5 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval.
- .6 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5 meters in ambient light.

**20. Setting Out of Work**

- .1 Assume full responsibility for and execute complete layout of work to locations, lines, angles, and elevations indicated.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

**21. Acceptance of Substrates**

- .1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Departmental Representative. Commencement of work shall imply

---

acceptance of prepared work or substrate surfaces.

- 22. Quality of Work**
- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
  - .2 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

- 23. Works Coordination**
- .1 Coordinate work of subtrades:
    - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
  - .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
    - .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
  - .3 Work cooperation:
    - .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
    - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.
  - .4 Ensure disputes between subcontractors are resolved.
  - .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
  - .6 Maintain efficient and continuous supervision.

- 24. Approval of Shop Drawings, Product Data and Samples**
- .1 In accordance with Section 013300, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.

- .2 Allow sufficient time for the following:
  - .1 Review of product data.
  - .2 Approval of shop drawings.
  - .3 Review of re-submission.
  - .4 Ordering of approved material and/or products - refer to technical Specifications.

**25. Relics and Antiquities**

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of the Crown. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of archeological finds are encountered during excavation/construction, and await Departmental Representative's written instructions before proceeding with work in this area.

**26. Security Clearances**

- .1 Personnel employed on this project will be subject to security check. Obtain requisite clearances, as instructed, for each individual required to enter the premises.

**27. Testing and Inspections**

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative and paid for by the Contractor.
- .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:
  - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2 Inspection and testing performed exclusively for Contractor's convenience.

- .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of corrected work.
- .4 Contractor shall notify Departmental Representative in advance of planned testing.
- .5 Contractor shall pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .6 Provide Departmental Representative with 1 electronic copy of testing laboratory reports as soon as they are available.

**28. As-Built Documents**

- .1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the original AutoCAD files for "as-built" purposes.
- .2 As work progresses, record changes in red ink. Maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.
- .3 Refer to Section 01 78 30 Close Out Submittals.

**29. Cleaning**

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
- .2 Ensure cleanup of the work areas each day after completion of work.

**30. Dust Control**

- .1 Provide control measures as specified in Section 01 35 43 Environmental Protection and Section 02 83 10 Lead Coatings Abatement.

**31. Environmental Protection**

- .1 Do not dispose of waste into water courses, storm or sanitary sewers.

- 
- .2 Ensure proper disposal procedures in accordance with all applicable regulations.
  - .3 Refer to Section 013543 Environmental Procedures.
- 32. Additional Drawings**
- .1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
  - .2 Upon request, Departmental Representative may furnish up to a maximum of 3 sets of Contract documents for use by the Contractor at no additional cost. Should more than 3 sets of documents be required the Departmental Representative will provide them at additional cost.
- 33. System of Measurement**
- .1 The metric system of measurement (SI) will be employed on this Contract.
- 34. Familiarization with Site**
- .1 Before submitting tender, visit site - as indicated in tender documents and become familiar with all conditions likely to affect the cost of the work.
- 35. Submission of Tender**
- .1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site, and is fully conversant with all conditions.

**END OF SECTION 011155**

**1. Administrative**

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

- .9 Keep one reviewed copy of each submission on site.
  
- 2. Progress Photographs and Final Photographs**
  - .1 Provide digital photos in “Joint Photographic Experts Group” (.jpg) format for Progress Photographs and Final Photographs
  - .2 Digital photographs to have a minimum of 2,592 x 1,944 pixel (5 Megapixel) resolution.
  - .3 Progress and Final Photographs to be submitted on a compact disc (CD).
  - .4 Quantity-Provide sufficient number of photographs to adequately describe the work activities carried out during the reporting period. A minimum of two photographs taken from two viewpoints are to be provided for each clean-up/construction activity.
  - .5 Submit final photographs with as-built documents.

**END OF SECTION 01 33 00**

**1. Approvals**

- .1 Approval of shop drawings and samples: refer to Section 011155 – General Instructions.

**2. General**

- .1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data and samples in SI Metric units.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
- .5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative
- .8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.

**SHOP DRAWINGS, PRODUCT DATA  
AND SAMPLES**

Project No. R.016116.109

November 2015

- 
- .9 Do not proceed with work until relevant submissions are reviewed and approved by the Departmental Representative.
- 3. Submission Requirements**
- .1 Coordinate each submission with the requirements of the work and the Contract documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow (3) three days for Departmental Representative's review of each submission, unless noted otherwise.
- .3 Accompany submissions with transmittal letter, in duplicate, containing:
- .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .4 Submissions shall include:
- .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract documents.
  - .5 Details of appropriate portions of work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions (including identified field dimensions) and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.

.5 After Departmental Representative's review, distribute copies.

**4. Shop Drawings**

.1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portions of work which are specific to project requirements.

.2 Maximum sheet size: 850 x 1050 mm.

.3 Submit 1 digital file of shop drawings for each requirement requested in the specification sections and/or as requested by the Departmental Representative.

.4 Cross-reference shop drawing information to applicable portions of the Contract documents.

**5. Shop Drawings  
Review**

.1 Review of shop drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.

.2 This review shall not mean that the Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.

.3 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.

.4 Without restricting the generality of the foregoing, the Contractor is responsible for:

.1 Dimensions to be confirmed and correlated at the job site.

.2 Information that pertains solely to fabrication processes or to techniques of construction and installation.

.3 Coordination of the work of all sub-trades.

**6. Product Data**

- .1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.
- .2 Delete information not applicable to project.
- .3 Supplement standard information to provide details applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract documents.
- .5 Submit 1 electronic copy of product data.

**END OF SECTION 01 33 01**

**1. References**

- .1 Government of Canada.
  - .1 Canada Labour Code - Part II
  - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
  - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA) as amended:
  - .1 CSA Z797-2009 Code of Practice for Access Scaffold
  - .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
  - .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
- .4 National Fire Code of Canada 2010 (as amended):
  - .1 Part 5 – Hazardous Processes and Operations Division B as applicable and as required.
- .5 American National Standards Institute (ANSI):
  - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
  - .1 Workers Compensation Act Part 3-Occupational Health and Safety.
  - .2 Occupational Health and Safety Regulation

**2. Related Sections**

- .2 Submittals procedures: Section 013300
- .4 Temporary facilities: Section 015100
- .5 Temporary barriers and enclosures: Section 015600

**3. Workers'  
Compensation Board  
Coverage**

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

**4. Compliance With  
Regulations**

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

**5. Submittals**

- .1 Submit to Departmental Representative submittals listed for review in accordance with Section 013300.
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
  - .1 Health and Safety Plan.
  - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
  - .3 Copies of incident and accident reports.
  - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .5 Emergency Procedures.
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 2 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative for review.

- .5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
  - .1 Be construed to imply approval by the Departmental Representative.
  - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
  - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

**6. Responsibility**

- .1 Assume responsibility as the Prime Contractor for work under this contract.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

**7. Health And Safety  
Coordinator**

- .1 The Health and Safety Coordinator must:
  - .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
  - .2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
  - .3 Be on site during execution of work.

**8. General Conditions**

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
  - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
  - .2 Secure site at night time [or provide security guard] as deemed necessary to protect site against entry.

**9. Project/Site Conditions**

- .1 The Esquimalt Graving Dock is a dry dock and ship repair facility. It is an industrial site wherein industrial, manufacturing, fabrication, heavy construction, and like works are conducted by a variety of contractors and sub-trades for a variety of owners and sub-trades for a variety of owners and/or PWGSC
- .2 Work at site will involve a number of hazards known to PWGSC as noted in the Preliminary hazard Assessment Form.
- .3 Other safety hazards or risks which may be encountered include, but are not limited to:
  - .1 Contact with traveling and mobile cranes, forklifts, manlifts and other motorized vehicles.
  - .2 Overhead hazards such as that created by material transported by cranes.
  - .3 Fall hazards.
  - .4 Drowning hazards.
  - .5 Confined space hazards.
  - .6 Electrical hazards.
  - .7 Contact with operating mechanical, electrical, electronic, pneumatic, thermal, and hydraulic machinery and equipment.
  - .8 Fire hazards.

**10. Regulatory Requirements**

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

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

**11. Work Permits**

- .1 Obtain specialty permits related to project before start of work.

**12. Filing of Notice**

- .1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities.
- .2 Provide copies of all notices to the Departmental Representative.

**13. Health And Safety Plan**

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards. Incorporate Preliminary Hazard Assessment Form provided by PWGSC that identifies those hazards known to PWGSC.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
  - .1 Primary requirements:
    - .1 Contractor's safety policy.
    - .2 Identification of applicable compliance obligations.
    - .3 Definition of responsibilities for project safety/organization chart for project.
    - .4 General safety rules for project.
    - .5 Job-specific safe work, procedures.
    - .6 Inspection policy and procedures.
    - .7 Incident reporting and investigation policy and procedures.
    - .8 Occupational Health and Safety Committee/Representative procedures.
    - .9 Occupational Health and Safety meetings.
    - .10 Occupational Health and Safety communications and record keeping procedures.

- .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
  - .3 List hazardous materials to be brought on site as required by work.
  - .4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
  - .5 Identify personal protective equipment (PPE) to be used by workers.
  - .6 Identify personnel and alternates responsible for site safety and health.
  - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
  - .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
  - .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

**14. Emergency Procedures**

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (names/telephone numbers) of:
  - .1 Designated personnel from own company.
  - .2 Regulatory agencies applicable to work and as per
  - .3 Local emergency resources.
  - .4 Departmental Representative and site staff.
- .2 Include the following provisions in the emergency procedures:
  - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
  - .2 Evacuate all workers safely.

- .3 Check and confirm the safe evacuation of all workers.
  - .4 Notify the fire department or other emergency responders.
  - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
  - .6 Notify Departmental Representative and site staff.
- 
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
    - .1 Work in confined spaces or where there is a risk of entrapment.
    - .2 Work with hazardous substances.
    - .3 Workplaces where there are persons who require physical assistance to be moved.
  - .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
  - .5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

**15. Hazardous Products**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
  - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 013300.
  - .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
  - .3 Provide adequate means of ventilation as required by WorkSafeBC regulations.

**16. Removal of Lead-Containing Paints**

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

- .2 Carry out demolition activities involving lead-containing paints in accordance with applicable Provincial regulations and Specifications.
- .3 Inspection and Air monitoring shall be conducted by a 3<sup>rd</sup> party environmental consultant retained and paid for by the Contractor.
  - .1 All inspection reports shall be provided to the Departmental Representative
  - .2 3<sup>rd</sup> party environmental consultant shall inspect and approve in writing (sign-off) enclosure prior to any work proceeding.
  - .3 All waste manifests shall be provided to the Departmental Representative.

**17. Electrical Lockout**

- .1 Develop, implement and enforce use of established procedures to provide electrical, mechanical, pneumatic, hydraulic, chemical, thermal, or potential energy isolation, and lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative. Site Maintenance Personnel may develop the lockout procedures at some sites since the Contractor may not have the necessary knowledge to develop an effective isolation plan. Comply with site Lockout Policy where one exists.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

**18. Overloading**

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

**19. Falsework**

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

**20. Scaffolding**

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

**21. Confined Spaces**

- .1 Carry out work in confined spaces in compliance with Provincial regulations (B.C. Occupational Health and Safety Regulation, Part 9).

**22. Fire Safety And Hot Work**

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

**23. Fire Safety Requirements**

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

**24. Fire Protection And Alarm System**

- .1 Fire protection and alarm systems shall not be:
  - .1 Obstructed.
  - .2 Shut off.
  - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

**25. Unforeseen Hazards**

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

**26. Posted Documents**

- .1 Post legible versions of the following documents on site:
  - .1 Health and Safety Plan.

- .2 Sequence of work.
  - .3 Emergency procedures.
  - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
  - .5 Notice of Project.
  - .6 Floor plans or site plans.
  - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
  - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
  - .9 Material Safety Data Sheets (MSDS).
  - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
  - .11 Name "Qualified Coordinator" responsible for co-ordination of health & safety activities.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
  - .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

**27. Meetings**

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

**28. Correction Of  
Non-Compliance**

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order"

Esquimalt Graving Dock, Victoria, B.C.  
Pumphouse Steel Column Repair

**013533**

**HEALTH AND SAFETY REQUIREMENTS**  
November 2015

Project No. R.016116.109

---

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

**END OF SECTION**

**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.

**2. Submittals**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .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 comprehensive overview of known or potential environmental issues which must be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 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 contaminated materials and 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 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .6 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
  - .7 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
  - .8 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; 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.
  - .9 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.

**3. Fires**

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

**4. Waste Management and Disposal**

- .1 Accomplish maximum control of construction waste to preserve environment and prevent pollution and environmental damage
  - .1 All disposal, recycling and waste manifests shall be provided to the Departmental Representative.
- .2 Identify opportunities for waste reduction, reuse, and recycling of materials.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials
- .5 Collect handle, store on-site, and transport off-site, salvaged materials in separated condition.
- .6 Store materials to be reused, salvaged, and salvaged in locations as directed by the Departmental Representative.
- .7 Unless otherwise specified, materials for removal become Contractors property.
- .8 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .9 Do not bury rubbish and waste materials on site.
- .10 Do not dispose of wastes into water courses, storm, or sanitary sewers.
- .11 Washout of concrete trucks is prohibited on site

- 5. Work Adjacent to Waterway** .1 Do not dump waste material or debris in waterways.
- 6. 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.
- 7. 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.
- 8. Spills or Release of Deleterious Substances** .1 Measures to be implemented to prevent, control or mitigate spills or release of deleterious substances:
- .1 Contractor shall take due care to ensure no deleterious materials enter watercourses or any surface drainage pathways located in the project area.

- .2 Emergency response procedure for spills of deleterious substances must be in place. In the event of a spill, the contractor will immediately implement their Spill Response Protocol.
- .3 The Contractor is responsible for all costs associated with a spill or release as a result of their actions. This will include but not limited costs of spill response equipment and materials, associated sampling, analysis and any required restoration of the impacted area.
- .4 Response equipment to be on site at all times (i.e. spill kits) and workers trained in their location and use. The resources on hand must be sufficient to respond effectively and expediently to any spill that could occur on site.
- .5 All construction equipment brought onto the site will be clean and properly maintained.
- .6 Any equipment maintenance must occur in a designated area and must be conducted away from any surface water drains or collection points.
- .7 Any equipment remaining on site overnight shall have appropriately placed drip pans.
- .8 Waste generated will be prevented from entering the environment.
- .9 Prevent discharges containing asphalt, grout, concrete or other waste materials from reaching storm drains or the marine environment.

**END OF SECTION 01 35 43**

**1. Access and Delivery**

- .1 Only the designated entrance may be used for access to the site. The designated entry and exit will be via the Main Esquimalt Graving Dock gate on Admirals Road, along the North Main Entrance Roadway, and along the north side of the dry dock. Access to the south side of the dock will be only by special permission from the Departmental Representative.
- .2 Vehicular movement in and out of the Esquimalt Graving Dock will pass through check points and be monitored by EGD security. All Contractor's and Subcontractor's staff must carry current photo identification and a PWGSC security pass.
- .3 Contractor is required to use only the designated entrance to access the work site, for deliveries to site, and as the exit for offsite disposal.
  - .1 Maintain for duration of contract.
  - .2 Make good damage resulting from Contractor's use.
- .4 Use of the Esquimalt Graving Dock facility will be granted to the Contractor through the Departmental Representative.
  - .1 The contractor's work site is to be used for loading and unloading purposes.
  - .2 Parking for Contractor's staff shall be in the contractor's car park on the north side of the PWGSC site adjacent to Munroe Head. Security will be instructed to have unauthorized vehicles towed at the Contractor's expense.
- .5 Provide and maintain access roads, sidewalk crossing ramps and construction runways as may be required for access to the work. All roadways and walkways outside of the Contractor's work site must be kept clear of materials and equipment at all times.
- .6 Provide and maintain competent flag operators, traffic signals, barricades and flares, lights or lanterns as may be required to perform work and protect other users of the Esquimalt Graving Dock.

**2. Storage Facilities**

- .1 Storage space will be limited to the contractor's work area and laydown area as identified on the drawings.

- 3. Power**
- .1 Electrical power may be obtained at site for use during duration of the work free of charge.
    - .1 Contractor shall provide 48 hours written notice to the Departmental Representative requesting use of electrical power at site
- 4. Air**
- .1 Compressed air may be obtained at site for use during duration of the work free of charge.
    - .1 Contractor shall provide 48 hours written notice to the Departmental Representative requesting use of compressed air at site.
- 5. Water Supply**
- .1 Water supply may be obtained at site for use during duration of the work free of charge.
    - .1 Contractor shall provide 48 hours written notice to the Departmental Representative requesting use of water at site.
- 6. Crane Services**
- .1 Crane services may be obtained at site for use during duration of the work free of charge.
  - .2 Contractor shall provide 48 hours written notice to the Department Representative requesting use of crane services at site.
  - .3 Contractor is responsible to provide qualified rigger(s) and spotter(s), all required rigging and associated equipment required below the hook necessary to perform lifts.
- 7. Removal of Temporary Facilities**
- .1 Remove temporary facilities from site when directed by the Departmental Representative.
- 8. Signs and Notices**
- .1 Signs and notices for safety and instruction shall be in both official languages or graphic symbols conforming to CAN/CSA-Z321.
  - .2. Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or when directed by Departmental Representative.

**END OF SECTION 01 51 00**

- 1. References**
- .1 Section 013533 – Health and Safety Requirements.
  - .2 Section 013543 – Environmental Procedures.
  - .3 WorkSafe BC Regulations – Part 6 – Substance Specific Requirements.
  - .4 Canadian Standards Association (CSA International)
    - .1 CSA-O121-[M1978(R2003)], Douglas Fir Plywood.
- 2. Installation and Removal**
- .1 Provide temporary enclosures (lead and silica containment) in order to execute work.
  - .2 Remove from site all such work after use.
- 3. Access to Site**
- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- 4. Public Traffic Flow**
- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.
- 5. Fire Routes**
- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.
- 6. Protection for Off-Site and Public Property**
- .1 Protect surrounding private and public property from damage during performance of Work.
  - .2 Be responsible for damage incurred.

Esquimalt Graving Dock, Victoria, B.C.  
Pumphouse Steel Column Repair

**015600**

**TEMPORARY BARRIERS AND ENCLOSURES**

Project No. R.016116.109

November 2015

---

**7. Protection of Existing Property**

- .1 Provide protection for finished and partially finished property and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

**END OF SECTION 01 56 00**

- 
- 1. Submission**
- .1 Prepare instructions and data by personnel experienced in maintenance of described products.
  - .2 Revise content of documents as required before final submittal.
  - .3 If requested, furnish evidence as to type, source and quality of products provided.
  - .4 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- 2. Format**
- .1 Organize data in the form of an instructional manual.
  - .2 Binders: vinyl, hard covered, 3 "D" ring, loose leaf 219 x 279 mm with spine and face pockets.
  - .3 Cover: identify each binder with type or printed title "Project Record Documents"; list title of project and identify subject matter of contents.
  - .4 Arrange content by product under section numbers and sequence of Table of Contents.
  - .5 Provide tabbed fly leaf for each separate product, with typed description of product and major component parts of equipment.
  - .6 Text: manufacturer's printed data, or typewritten data.
  - .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- 3. Contents, Each Volume**
- .1 Table of Contents – provide the following:
    - .1 Title of project.  
Date of submission.
    - .2 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
    - .3 Schedule of products, indexed to content of volume.
  - .2 For each product, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

CLOSEOUT SUBMITTALS

Project No. R.016116.109

November 2015

- 
- .3 Product data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
  - .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- 4. As-built Documents**
- .1 **Contract drawings and shop drawings:** legibly mark each item to record actual construction, including:
    - .1 Field changes of dimension and detail.
    - .2 Changes made by change orders.
    - .3 Details not on original Contract drawings.
    - .4 References to related shop drawings and modifications.
  - .2 **Contract Specifications:** legibly mark each item to record actual "Workmanship of Construction", including:
    - .1 Manufacturer, trade name, and catalogue number of each "Product/Material" actually installed, particularly optional items and substitute items.
    - .2 Changes made by addenda and change orders.
  - .3 **As-built information:**
    - .1 Record changes in red ink.
    - .2 On site "Red Line" As-Built documents to be reviewed with Departmental Representative at project meetings to ensure up-to-date and accurate As-Built documents at the end of the project.
    - .3 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final inspection.
    - .4 Provide 1 set of CD's in AutoCAD 2009 file format with all as-built information on the CD's.
    - .5 Submit to the Departmental Representative.
- 5. Warranties, Bonds, Test Reports, Inspection Reports**
- .1 Separate each Document with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier and manufacturer with name, address, and telephone number of responsible principal.

- 
- .3 Obtain Warranties, Bonds, Test Results, Inspection Reports executed in duplicate by subcontractors, suppliers, manufacturers, and inspection agencies within 10 days after completion of the applicable item of work.
  - .4 Except for items put into use with the Departmental Representative's permission, leave date of beginning of time of warranty until the date of substantial performance is determined.
  - .5 Verify that documents are in proper form, contain full information, and are notarized.
  - .6 Co-execute submittals when required.
  - .7 Retain warranties and bonds until time specified for submittal.
- 6. Completion**
- .1 Submit a written certificate that the following have been performed:
    - .1 Work has been completed and inspected for compliance with the Contract documents.
    - .2 Defects have been corrected and deficiencies have been completed.
    - .3 Equipment and systems have been tested, adjusted and balanced as required.
    - .4 Work is complete and ready for final inspection.

**END OF SECTION 01 78 30**

## **1. GENERAL**

### **1.1 References**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-2009, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1 CSA-A3001-13, Cementitious Materials for Use in Concrete.
  - .3 CAN/CSA-G30.18-(R2014), Carbon Steel Bars for Concrete Reinforcement.
  - .4 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
  - .5 CSA O121-08(R2003), Douglas Fir Plywood.
  - .6 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
  - .7 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada
- .2 ASTM International
  - .1 ASTM F2329-13 Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
  - .2 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 American Concrete Institute (ACI)
  - .1 SP-66-04, ACI Detailing Manual 2004.
    - .1 ACI 315-99, Details and Detailing of Concrete Reinforcement.
    - .2 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.

### **1.2 Action and Information Submittals**

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide testing and inspection results and reports for review by

Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

- .3 Concrete hauling time: provide 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.
- .3 Submit shop drawings for formwork and falsework.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of BC, Canada.
- .4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.
- .5 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

### **1.3 Quality Assurance**

- .1 Submit to Departmental Representative, minimum 1 week prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .2 Submit in accordance with Section 01 33 00:
  - .1 Mill test report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum of 1 week prior to beginning reinforcing work.

### **1.4 Delivery, Storage and Handling**

- .1 Concrete hauling time: maximum allowable time limit for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
  - .1 Modifications to maximum time limit must be agreed to by the Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
  - .2 Deviations to be submitted for review by Departmental Representative.
- .2 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging

materials in accordance with 013543 Environmental Procedures.

## **2 PRODUCTS**

### **2.1 Design Criteria**

- .1 Alternative 1 – Performance to CSA A23.1/A23.2 and as described in Mixes Section.

### **2.2 Materials**

- .1 Cement: to CAN/CSA-A3000, Type GU.
- .2 Supplementary cementing materials: to CAN/CSA A3000.
- .3 Water: to CSA-A23.1/A23.2.
- .4 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.
- .5 Other concrete materials: to CSA-A23.1/A23.2.
- .6 Adhesive set anchor rods:
  - .1 Anchor rods: to ASTM A307, Hot dipped galvanized to ASTM F2329
  - .2 Anchoring Adhesive: two-component 100% solids based epoxy system supplied in manufacturer's standard side by side cartridge and dispensed through a static mixing nozzle supplied by manufacturer. Epoxy to meet the minimum requirements of ASTM C-881 Specification for type I, II, IV, and V, grade 3, class B and C must develop a minimum 90 MPa compressive yield strength after a seven day cure. Epoxy to have a heat deflection temperature of 58 degrees Celcius.
- .7 Mechanical anchors:
  - .1 Torque controlled expansion anchors to meet Federal Specification A-A 1923, type 4.
  - .2 Anchors to be type 316 stainless steel.
- .8 Cast-in-place anchor rods: to ASTM A307, Hot dipped galvanized to ASTM F2329
- .9 Cold-drawn annealed steel wire ties: to [ASTM A82/A82M].

- .10 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M
- .11 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .12 Formwork materials:
  - .1 Use wood and wood product formwork materials to CSA- O121 and CAN/CSA-O86.
  - .2 Form ties:
    - .1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
  - .3 Form liner:
    - .1 Plywood: medium density overlay Douglas Fir to CSA O121, square edge, 20 mm thick.
  - .4 Form release agent: non-toxic, biodegradable, low VOC.
  - .5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, and free of kerosene.
- .13 Falsework materials: to CSA-S269.1.

### **2.3 Mixes**

- .1 Alternative 1 – Performance Method for specifying concrete: in accordance with CAN/CSA-A23.1/A23.2.
  - .1 Class of exposure: C-1.
  - .2 Intended application: exterior sea wall repair.
  - .3 Minimum Compressive strength at 28 days = 35 MPa
  - .4 Supplementary cementing materials: with 15-20% fly ash replacement.

## **3. EXECUTION**

### **3.1 Preparation**

- .1 Provide Departmental Representative 24 hours notice before each concrete pour.

- .2 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .3 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- .5 Protect epoxy coated portions of bars with covering during transportation and handling.
- .6 Field bending and field welding of reinforcement are not permitted.
- .7 During concreting operations:
  - .1 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .8 Protect previous Work from staining.
- .9 Clean and remove stains prior to application of concrete finishes.
- .10 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .11 Fabricate and erect falsework in accordance with CSA S269.1 and CoFI Exterior Plywood for Concrete Formwork.
- .12 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .13 Align form joints and make watertight.
- .14 Keep form joints to minimum.

- .15 Use 25 mm chamfer strips on external corners.

**3.2 Installation/Application**

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.
- .2 Cast in sleeves, anchors, reinforcement, bolts, joint fillers and other inserts required to be built-in.
- .3 Place reinforcing steel as indicated on drawings and in accordance with CSA-A23.1/A23.2.
- .4 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .5 Ensure cover to reinforcement is maintained during concrete pour.
- .6 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.
- .7 Adhesive set anchor rods/drilled reinforcing:
  - .1 Drill holes are to be drilled with percussion drill using a template to guide the alignment and to accurately locate each hole. Hole diameters to match anchor manufacturer's recommendations.
  - .2 Ream holes with a drill mounted wire brush and blow clean with compressed air immediately before grouting. Ensure that the compressed air is free of oil or other deleterious material detrimental to the bonding of the epoxy. Install anchor dowels in accordance with manufacturer's instructions.
  - .3 Inject epoxy resin into the prepared holes from a nozzle-mix injection tube. Fill each hole with epoxy before inserting the anchor dowel.
  - .4 Immediately following insertion of dowel, strike with several smart blows of a steel hammer to encourage intimate contact with the epoxy.

- .5 Alternatively, twist the anchor after inserting it into the epoxy and “bottom” it in the hole in accordance with the manufacturer’s instructions.
- .6 Take appropriate measures to prevent excess epoxy material from contaminating adjacent surfaces.
  
- .8 Mechanical anchors:
  - .1 Hammer drill hole to same size as anchor, minimum hole depth per manufacturer recommendation.
  - .2 Clean hole in accordance with manufacturer’s instructions.
  - .3 Drive anchor into hole using a hammer, ensure minimum of four threads are below the underside of base plate.
  - .4 Tighten nut to installation torque.

**3.3 Finishes**

- .1 Formed surfaces exposed to view: smooth form finish in accordance with CSA-A23.1/A23.2.

**3.4 Curing**

- .1 Leave forms in place for 7 days and cover the top of wall with wet burlap and polyethylene and cure in accordance with CSA-A23.1/A23.2.

**3.5 Site Tolerances**

- .1 Concrete finishing tolerance in accordance with CSA-A23.1/A23.2.

**3.6 Field Quality Control**

- .1 Concrete testing: to CSA-A23.1/A23.2 by testing laboratory designated by Departmental Representative.
- .2 Contractor to arrange and pay for concrete testing.
- .3 Contractor to provide copies of all concrete delivery slips and testing reports to the Departmental Representative.

**3.7 Cleaning**

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to manage water use and runoff in accordance with Section 013543 Environmental

Procedures.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 013543 Environmental Procedures.
  - .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
  - .2 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.
  - .4 Do not dispose of unused admixtures or additive materials into sewer systems, into lakes, streams, ocean, onto ground or in other location where it will pose a health or environmental hazard.

**END OF SECTION 03 30 00**

**1. GENERAL**

**1.1 References**

- .1 ASTM International
  - .1 ASTM A 36/A 36M-08, Specification for Structural Steel.
  - .2 ASTM A53 “Standard Specification for Pipe, Steel, Black, and Hot Dipped, Zinc Coated, Welded and Seamless”
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
  - .1 Handbook of the Canadian Institute of Steel Construction.
  - .2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA S16-09, Limit States Design of Steel Structures.
  - .4 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
  - .5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
  - .6 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
  - .7 CSA W55.3-1965(R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  - .8 CSA W59-M03 (R2008), Welded Steel

Construction (Metal Arc Welding) Metric.

- .5 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers.
  - .1 NACE No. 3.SSPC SP-606, Commercial Blast Cleaning.

**1.2 Action And  
Informational  
Submittals**

---

- .1 Submit in accordance with Section 01 33 00 Submittals.
- .2 Shop Drawings:
  - .1 Provide drawings sealed and signed by professional engineer registered in Province of British Columbia, Canada.
  - .2 Submit Shop Drawings 1 weeks prior to fabrication.
- .3 Erection drawings:
  - .1 Submit erection drawings indicating details and information necessary for assembly and erection purposes including:
    - .1 Description of methods.
    - .2 Sequence of erection.
    - .3 Type of equipment used in erection.
    - .4 Temporary bracings and shoring of existing members to be modified.
      - .1 Bracing and shoring drawings to be stamped and signed by a qualified professional engineer registered in the Province of British Columbia, Canada.
      - .2 Provide inspection report from shoring engineer prior to proceeding with work involving existing structural members
- .4 Fabrication Drawings:
  - .1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer registered in the Province of British

Columbia, Canada.

- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, penetrations supports, reinforcement, details, and accessories, as applicable.

### **1.3 Quality Assurance**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties upon request, including non-destructive weld tests.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

### **1.4 Delivery, Storage And Handling**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in 013543 Environmental Procedures.

## **2. PRODUCTS**

### **2.1 Materials**

- .1 Steel plates: to CSA G40.20/G40.21, Grade 300W
- .2 Steel sections: to CSA G40.20/G40.21, Grade 350W
- .3 Steel Pipe Sections: to ASTM A53 standard weight galvanized finish.
- .4 Through Bolts to be A325 galvanized
- .5 Anchor bolts to be ASTM F1554 Grade 105 galvanized

- .6 Welding materials: to CSA W59.
- .7 Welding electrodes: to CSA W48 Series.
- .8 Hot dip galvanizing: galvanize all steel to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.

**2.2 Design**

- .1 All welded connections to be full strength, complete penetration welds unless noted otherwise on drawings.

**2.3 Fabrication**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
- .2 Welding: in accordance with CSA W59 and shall be performed by fabricators “fully approved” by the Canadian Welding Bureau under CSA W55.3-08.
- .3 Companies to be certified under Division 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components. Fabricator shall submit proof of certification prior to start of work.
- .4 Continuously seal members by continuous welds where indicated.

**2.4 Shop Painting**

- .1 Clean prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 and MPI INT 5.1 and EXT 5.1.
- .2 Clean members remove loose mill scale, rust, oil, dirt, and foreign matter. Prepare surface as follows:  
Surfaces to be welded shall be prepared in accordance with CAN/CSA S16-09 section 24.4

- .3 Surfaces to be galvanized shall be prepared in accordance with CAN/CSA-G164.

### **3. EXECUTION**

#### **3.1 Connection To Existing Work**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation.
- .2 Visually inspect substrate in presence of Departmental Representative.
- .3 Verify dimensions of existing work, report discrepancies, unacceptable conditions and potential problem areas to Departmental Representative for direction before commencing fabrication.
- .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 Erection**

- .1 Structural steel work: in accordance with CAN/CSA-S16.
- .2 Field cutting or altering structural members not permitted except where noted on drawings.
  - .1 Shoring to be designed by qualified professional engineer registered in the Province of British Columbia.
  - .2 Shoring Engineer to inspect and approve completed shoring work prior to the demolition or modification of any structural elements.

#### **3.3 Protection**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by steel

erection.

**3.4 Field Quality Control**

- .1 Any testing will be arranged and paid for by the contractor.

**3.5 Field Painting**

- .1 Clean and prepare existing steel surfaces connecting to new steel and paint with zinc rich paint containing 65% to 69% metallic zinc by total weight or minimum 93% zinc by weight in dry film. Touch up any damage to new steel with same.

**3.6 Cleaning**

- .1 Progress Cleaning: clean in accordance with Section 011155 – General Instructions
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 013543 – Environmental Procedures.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION 05 12 23**

---

Esquimalt Graving Dock, Victoria, B. C.

Pumphouse Steel Column Repair  
Project No. R.016116.109

# **APPENDIX A**

November 2015

---

## **APPENDIX A**

### **PRELIMINARY HAZARD ASSESSMENT FORM**



### PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	R.016116.109
Location:	Esquimalt Graving Dock
Date:	October 10, 2015
Name of Departmental Representative:	Jon Siska
Name of Client:	EASS-EGD
Name of Client Project Co-ordinator	Tim Aikin

Site Specific Orientation Provided at Project Location    Yes     No

Notice of Project Required    Yes     No

**NOTE:**

PWGSC requires "**A Notice of Project**" for all construction work related activities.

**NOTE:**

OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

*Important Notice: This hazard assessment has been prepared by PWGSC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PWGSC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.*

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
	PWGSC, OGD's, or tenants		General Public or other contractors		
Examples: Chemical, Biological, Natural, Physical, and Ergonomic					Note: When thinking about this pre-construction hazard assessment, remember a <b>hazard</b> is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the <b>risk</b> is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.	Yes	No	Yes	No	

Typical Construction Hazards					
Concealed/Buried Services (electrical, gas, water, sewer etc)	X		X		No natural gas services on site
Slip Hazards or Unsound Footing	X		X		
Working at Heights	X		X		
Working Over or Around Water	X	X		X	
Heavy overhead lifting operations, mobile cranes etc.	X		X		
Marine and/or Vehicular Traffic (site	X		X		



vehicles, public vehicles, etc.				
Fire and Explosion Hazards	X		X	
High Noise Levels	X		X	
Excavations	X		X	
Blasting		X		X
Construction Equipment	X		X	
Pedestrian Traffic (site personnel, tenants, visitors, public)	X		X	
Multiple Employer Worksite	X		X	

<b>Electrical Hazards</b>					<b>Comments</b>
Contact With Overhead Wires		X		X	
Live Electrical Systems or Equipment	X		X		
<b>Other:</b>					
<b>Physical Hazards</b>					
Equipment Slippage Due To Slopes/Ground Conditions		X		X	
Earthquake	X		X		
Tsunami	X		X		
Avalanche		X		X	
Forest Fires		X		X	
Fire and Explosion Hazards	X		X		
Working in Isolation		X		X	
Working Alone	X		X		
Violence in the Workplace	X		X		
High Noise Levels	X		X		
Inclement weather	X		X		
High Pressure Systems	X		X		
<b>Other:</b>					
<b>Hazardous Work Environments</b>					
Confined Spaces / Restricted Spaces		X		X	
Suspended / Mobile Work Platforms	X		X		
<b>Other:</b>	X		X		Overhead cranes
<b>Biological Hazards</b>					
Mould Proliferations		X		X	
Accumulation of Bird or Bat Guano		X		X	
Bacteria / Legionella in Cooling Towers / Process Water		X		X	
Rodent / Insect Infestation		X		X	
Poisonous Plants		X		X	
Sharp or Potentially Infectious Objects in Wastes	X		X		Multiple employer workplace
Wildlife	X		X		Resident deer population



<b>Chemical Hazards</b>					
Asbestos Materials on Site		X		X	
Designated Substance Present		X		X	
Chemicals Used in work	X		X		Active ship repair facility
Lead in paint	X		X		Paint on steel and concrete surfaces contains lead
Mercury in Thermostats or Switches		X		X	
Application of Chemicals or Pesticides		X		X	
PCB Liquids in Electrical Equipment		X		X	
Radioactive Materials in Equipment		X		X	
Other:					
<b>Contaminated Sites Hazards</b>					
Hazardous Waste	X		X		Suspected contaminated soils
Hydrocarbons	X		X		Suspected contaminated soils
Metals	X		X		Suspected contaminated soils
Other:	X		X		Suspected contaminated soils

<b>Security Hazards</b>					<b>Comments</b>
Risk of Assault	X		X		Multiple employer workplace
Other:	X		X		Unauthorized entry to site
<b>Other Hazards</b>					

<b>Other Compliance and Permit Requirements<sup>1</sup></b>	<b>YES</b>	<b>NO</b>	<b>Notes / Comments<sup>2</sup></b>
Is a Building Permit required?	X		
Is a Electrical permit required?	X		Required for any electrical work on site
Is a Plumbing Permit required?			N/A
Is a Sewage Permit required?			N/A
Is a Dumping Permit required?			No dumping allowed on site
Is a Hot Work Permit required?	X		
Is a Permit to Work required?		X	
Is a Confined Space Entry Permit required?			N/A
Is a Confined Space Entry Log required?			N/A
Discharge Approval for treated water required?	X		

**Notes:**

- (1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.
- (2) TBD means To Be Determined by Service Provider.



**Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.**

<b>Service Provider Name</b>	
------------------------------	--

<b>Signatory for Service Provider</b>		<b>Date Signed</b>	
---------------------------------------	--	--------------------	--

**RETURN EXECUTED DOCUMENT TO PWGSC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING**

---

Esquimalt Graving Dock, Victoria, B. C.

Pumphouse Steel Column Repair  
Project No. R.016116.109

# **APPENDIX B**

November 2015

---

## **APPENDIX B**

### **LEAD PAINT RISK ASSESSMENT EGD PUMPHOUSE BUILDING**

The following report "*Lead Paint Risk Assessment Esquimalt Graving Dock – Pump House Building*", May 2012, North West Environmental Group, contains findings based on representative paint samples taken from surfaces in the pumphouse basement. The subject column and beam referred to in the drawings and specifications for this project were not specifically sampled; however it is assumed based on the assessment that the grey and white paint on the column and beam has the same or similar lead content as that of the paints listed in the following report. Specifically:

Page 4 Table 2: Paint Chip Sampling Results

- Sample 17294-03 and 17294-04 (Lower Floor Pumps 1 and 3, Grey)
- Sample 17294-09 (Lower and Mid Level Catwalk "I" Beam, White)
- Sample 17294-10 (Upper Mid Level Catwalk "I" Beam, White)
- Sample 17294-14 (Upper Catwalk Overhead Steel Decking, White)

Pages 5-9

- Sample Locations (representative photographs)

Appendices

- Sample Results (EMSL Analytical Inc)

# *Lead Paint Risk Assessment*

## Esquimalt Graving Dock – Pump House Building



*Prepared for:*



Public Service Commission  
of Canada

Commission de la fonction publique  
du Canada

**Environmental Services**

Prepared by



**North West**  
Environmental Group Ltd.

210-2950 Douglas Street  
Victoria, British Columbia  
NWEG Project: 17294

## EXECUTIVE SUMMARY

North West Environmental Group Ltd. was retained by Public Works and Government Services Canada (PWGSC) Environmental Services to conduct a lead paint risk assessment in the Pump House located within the Esquimalt Graving Dock (EGD), Esquimalt BC.

The following locations were sampled at the request of PWGSC:

- Beams/Columns (existing grey and white paint)
- Interior Walls (white paint)
- Under decking of Pump House Floor (white paint)
- Handrails (light green/dark green paint)
- Stairs/Walkways (expanded metal)

Samples were collected on April 24th, 2012 by Trevor Olsen and Devin Fenwick, Hygiene Technicians from North West Environmental Group.

Samples were sent to a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## Findings

Table 1: Paint Chip Sampling Results

Sample	Description	Lead (% wt)	Lead (mg/kg)
17294- 01	Lower Floor West Wall – Paint Chips White	0.019	190
17294- 02	Lower Floor East Wall – Paint Chips White	0.44	4400
17294- 03	Lower Floor Pump 1 – Paint Chips Gray	3.2	32000
17294- 04	Lower Floor Pump 3 – Paint Chips Gray	16	160000
17294- 05	Lower Floor East Wall Column – Paint Chips White	29	290000
17294- 06	Lower Floor Pump 3 Component – Paint Chips Green	0.28	2800
17294- 07	Upper Mid Level Catwalk Railing – Paint Chips Light Green	0.13	1300
17294- 08	Upper Mid Level Catwalk Railing – Paint Chips Dark Green	0.30	3000
17294- 09	Lower Mid Level Catwalk "I" Beam – Paint Chips White	17	170000
17294- 10	Upper Mid Level Catwalk "I" Beam – Paint Chips White	17	170000
17294- 11	Upper Mid Level Catwalk Railing – Paint Chips Light Green	0.027	270
17294- 12	Upper Mid Level Catwalk Stairs – Paint Chips Black	0.10	1000
17294- 13	Main Stairs South Side Stairs – Paint Chips Black	8.3	83000
17294- 14	Upper Catwalk Overhead Steel Sheeting – Paint Chips White	19	190000

### Paint

Analysis of paint samples indicated that lead is present in concentrations ranging from a high of 29% to a low of 0.019%. Samples were found to have lead concentrations in excess of the threshold specified in the federal *Surface Coatings Material Regulation SCMR* of 90 mg/kg for new paint acceptable for use in residential applications.

Overall, paint coatings were found to be in poor to good condition. Where damaged and deteriorating, paint should be removed, debris cleaned following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination.

---

## TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	I
FINDINGS .....	I
LIST OF ACRONYMS .....	III
1.0 INTRODUCTION.....	1
2.0 REGULATORY FRAMEWORK, GUIDELINES AND CODES .....	1
2.1 FEDERAL OCCUPATIONAL HEALTH AND SAFETY .....	1
2.2 BC OCCUPATIONAL HEALTH AND SAFETY REGULATION .....	1
2.3 ENVIRONMENTAL MANAGEMENT ACT .....	2
2.4 BC OCCUPATIONAL HEALTH AND SAFETY REGULATION .....	2
2.5 HAZARDOUS PRODUCTS ACT, SURFACE COATING MATERIALS REGULATION .....	2
3.0 METHODOLOGY .....	3
4.0 FINDINGS .....	3
4.1 LEAD PAINT .....	3
5.0 SAMPLE LOCATIONS .....	5
6.0 LIMITATION OF SURVEY.....	10
APPENDICES.....	11



## LIST OF ACRONYMS

ALARA .....	As Low As Reasonably Achievable
EC .....	Environment Canada
EGD.....	Esquimalt Graving Dock
EMA .....	Environmental Management Act
HPA.....	Hazardous Products Act
HWR.....	Hazardous Waste Regulation
LCM.....	Lead Containing Material
NWEG.....	North West Environmental Group
NVLP.....	National Voluntary Laboratory Accreditation Program
PWGSC.....	Public Works and Government Services Canada
SCMR.....	Surface Coating Materials Regulation



## 1.0 INTRODUCTION

North West Environmental Group Ltd. (NWE) was retained by Public Works and Government Services Canada (PWGSC) Environmental Services to conduct a Lead Paint Risk Assessment in the Pump House located at the Esquimalt Graving Dock, Esquimalt BC. The facility is referred to as the "subject site" or "site" throughout this document.

The following locations were sampled at the request of PWGSC:

- Beams/Columns (existing grey and white paint)
- Interior Walls (white paint)
- Under decking of Pump House Floor (white paint)
- Handrails (light green/dark green paint)
- Stairs/Walkways (expanded metal)

Samples were collected on April 24<sup>th</sup>, 2012 by Trevor Olsen and Devin Fenwick, Hygiene Technicians from North West Environmental Group.

Samples were sent to a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## 2.0 REGULATORY FRAMEWORK, GUIDELINES AND CODES

### 2.1 Federal Occupational Health and Safety

In Federal jurisdictions, lead-containing materials (LCM) are regulated under the *Canada Labour Code, Part II*. Specifically, *Part X, Hazardous Substances*, provides the direction for the control of exposure to potentially toxic substances in the workplace. Under this regulation, employers are required to:

- Maintain a record of all lead containing materials;
- Undertake a hazard investigation by competent persons;
- Ensure materials are properly stored and handled;
- Post warning signs;
- Inform and educate employees regarding hazards; and
- Control exposure through substitution, engineering or protective equipment.

### 2.2 BC Occupational Health and Safety Regulation

Most of the employees working in the PWGSC buildings are Federal employees and are subject to the federal OHSA. However for the majority of contractors and some site tenants, workplace health and safety is regulated in British Columbia by WorkSafeBC under the *Workers' Compensation Act* (effective April 15, 1998), as amended by *Workers' Compensation (Occupational Health and Safety) Amendment Act* (effective October 1, 1999). The Act defines the general duties and obligations of the employer, employees and others at the work site.

Under this regulation, employers are required to:

- Maintain a record of all lead containing materials;



- Undertake a hazard investigation by competent persons;
- Ensure materials are properly stored and handled;
- Post warning signs;
- Inform and educate employees regarding hazards; and
- Control exposure through substitution, engineering or protective equipment

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. Permissible exposure limits to these designated substances, which include, lead, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

### 2.3 Environmental Management Act

The *Environmental Management Act* (EMA), brought into force in July 2004, is the principle environmental statute in British Columbia. The EMA prohibits the introduction of waste into the environment in such a manner or quantity as to cause pollution, except in accordance with a regulation, permit, approval or code of practice issued under the Act. The Hazardous Waste Regulation (HWR) addresses the proper handling, transport and disposal of hazardous wastes, under provisions of the EMA. While the Provincial Regulations do not apply directly to the sites operated by the Federal Government, they do apply when the materials are removed from the site for disposal.

### 2.4 BC Occupational Health and Safety Regulation

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. These designated substances, which include lead, mercury and arsenic, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

Where worker exposure to a designated substance may exceed 50% of the threshold limit value for a substance, WorkSafeBC requires that the employer establish an exposure control plan. All routes of entry must be considered when establishing the extent of worker exposure. Exposure limits are summarized in Table 4.4.1.

**Table 2.4.1: ACGIH / WorkSafeBC Exposure Limits**

Substance [CAS No.]	Time Weighted Average (TWA)
Lead - elemental and inorganic compounds, as Pb [7439-92-1]	0.05 mg/m <sup>3</sup>

### 2.5 Hazardous Products Act, Surface Coating Materials Regulation

The *Hazardous Products Act* (HPA), *Surface Coating Materials Regulation* (SOR/2005-109) (SCMR) permits the advertising, sale and labeling of surface coatings (including paint) that meet the following criteria set out below. Quantities of lead and mercury are specifically limited. Other heavy metals are not addressed in this regulation.

There has been confusion in the past regarding the limits for lead and mercury in paint and how that relates to worker safety and disposal. An explanation of the SCMR limits for paint and mercury are included in this report to help alleviate this confusion. Although a given paint sample may have concentrations of lead and mercury lower than the limits specified within the SCMR, worker exposure may still occur if sufficient quantities of lead and/or mercury are inhaled, ingested or absorbed through the skin. The risk to workers posed by heavy metal



containing coatings is proportional to the work undertaken. Heavy metal laden coatings that are not disturbed pose little risk to non-pre-school aged building occupants.

### Lead Paint

In 2005 the federal *Surface Coating Materials Regulation* was amended to reduce the amount of lead in paint required to be considered 'lead based' from 5,000 mg/kg to 600 mg/kg and then to 90 mg/kg in 2010. As paints under this concentration of lead are acceptable for use in residential settings today, such coatings do not pose a significant hazardous material issue unless rendered airborne within a worker's breathing zone by fine dust generating processes.

If a worker is, or may be, exposed to potentially harmful levels of lead, the employer must ensure that a risk assessment is conducted by a qualified person. Where a worker may be exposed to airborne lead concentrations in excess of 50% of the exposure limit of 0.05 mg/cu.m or where exposure through any route of entry could cause elevated blood levels, the employer must develop and implement an exposure control plan (ECP) which meets the requirements of section 5.54 of the BC Occupational Health and Safety Regulation. As an ALARA substance, worker exposure must be kept as low as reasonably achievable.

Appropriate precautions for protecting workers from lead exposure should be implemented during any work involving lead or lead paint including the use of personal protective equipment, localized ventilation and/or dust suppression methods.

Paint chips can be hazardous wastes if they contain leachable components that when subjected to the *Toxicity Characteristic Leaching Procedure (TCLP, US EPA Method 1311)* leach out levels of contaminant in excess of those published in Table 1 of *Schedule 4* of the *BC Hazardous Waste Regulation*. Wastes deemed to be hazardous wastes must be disposed through a waste disposal contractor licensed by the Province.

## 3.0 METHODOLOGY

### Paint

Painted surfaces were scraped down to the base substrate to ensure that all layers of paint were included. Paint samples were tested using the following analytical method:

- Lead: EMSL (SW 846 3050B\*/7000B) Lead in Paint Chips by Flame Atomic Absorption Spectrophotometer

A total of fourteen (14) paint chips were submitted to EMSL Analytical for analysis.

## 4.0 FINDINGS

of sample locations are provided in Section 7.0. The lead paint risk assessment are provided in this section. The analytical reports are provided in Appendix A.

### 4.1 Lead Paint

Lead was found in all samples of paint. The results vary from a high of 29% to a low of 0.019%.

All samples were confirmed to exceed the concentration of lead permissible in new paint (0.009% - SCMR) threshold to be sold without notifying the consumer of its lead content.

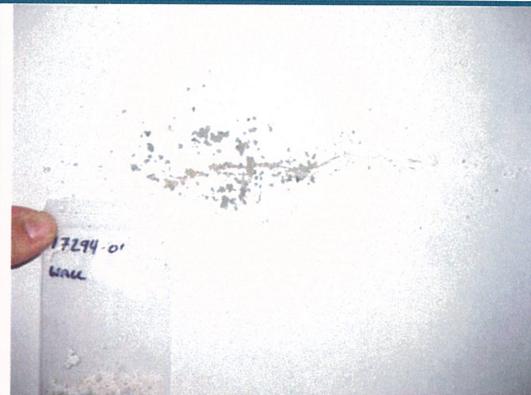


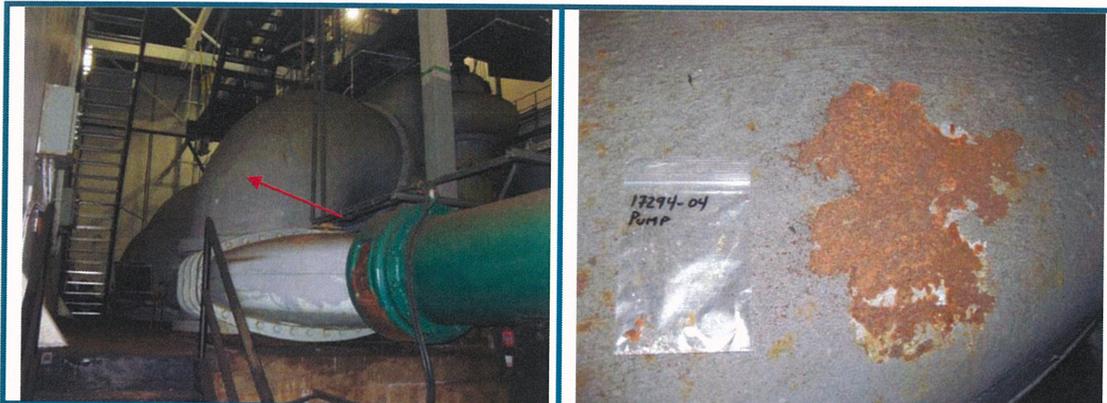
**Table 2: Paint Chip Sampling Results**

Sample	Description	Lead (% wt)	Lead (mg/kg)
17294- 01	Lower Floor West Wall – Paint Chips White	0.019	190
17294- 02	Lower Floor East Wall – Paint Chips White	0.44	4400
17294- 03	Lower Floor Pump 1 – Paint Chips Gray	3.2	32000
17294- 04	Lower Floor Pump 3 – Paint Chips Gray	16	160000
17294- 05	Lower Floor East Wall Column – Paint Chips White	29	290000
17294- 06	Lower Floor Pump 3 Component – Paint Chips Green	0.28	2800
17294- 07	Upper Mid Level Catwalk Railing – Paint Chips Light Green	0.13	1300
17294- 08	Upper Mid Level Catwalk Railing – Paint Chips Dark Green	0.30	3000
17294- 09	Lower Mid Level Catwalk “I” Beam – Paint Chips White	17	170000
17294- 10	Upper Mid Level Catwalk “I” Beam – Paint Chips White	17	170000
17294- 11	Upper Mid Level Catwalk Railing – Paint Chips Light Green	0.027	270
17294- 12	Upper Mid Level Catwalk Stairs – Paint Chips Black	0.10	1000
17294- 13	Main Stairs South Side Stairs – Paint Chips Black	8.3	83000
17294- 14	Upper Catwalk Overhead Steel Sheeting – Paint Chips White	19	190000

Overall, paint coatings were found to range from poor to good condition. Where damaged and deteriorating, paint should be removed, debris cleaned following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination. Lead content of painted materials should not increase their disposal costs however; concentrated paint chips would need to be disposed as hazardous waste. Routine removal of lead paint is not recommended; rather it should be managed in place and removed on an “as needed” basis.

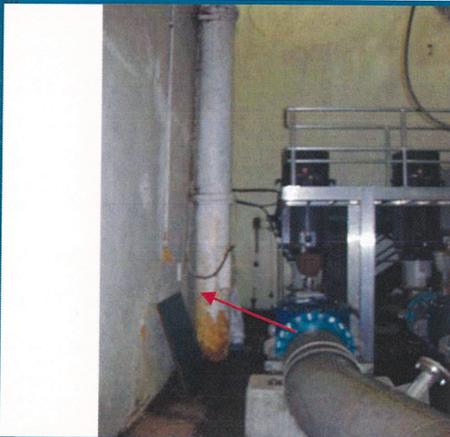
## 5.0 Sample Locations

	
<p>Sample: 17294-01 Location: Lower Floor West Wall Description: Wall Paint Chips - White</p>	<p>Sample: 17294-01 Description: Wall Paint Chips - White Lead: 190 mg/kg</p>
	
<p>Sample: 17294-02 Location: Lower Floor East Wall Description: Wall Paint Chips - White</p>	<p>Sample: 17294-02 Description: Paint Chips - White Lead: 4400 mg/kg</p>
	
<p>Sample: 17294-03 Location: Lower Floor Pump # 1 Description: Pump #1 Paint Chips - Grey</p>	<p>Sample: 17294-03 Description: Pump # 1 Paint Chips - Grey Lead: 32000 mg/kg</p>



Sample: 17294-04  
Location: Lower Floor Pump # 3  
Description: Pump # 3 Paint Chips - Grey

Sample: 17294-04  
Description: Pump # 3 Paint Chips - Grey  
Lead: 160000 mg/kg



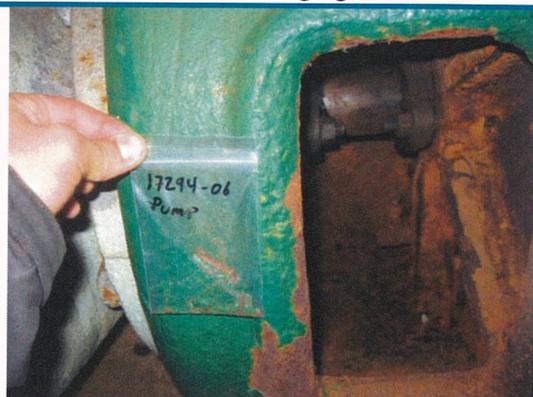
Sample: 17294-05  
Location: Lower Floor East Wall Column  
Description: Column Paint Chips - White



Sample: 17294-05  
Description: Column Paint Chips - White  
Lead: 290000 mg/kg

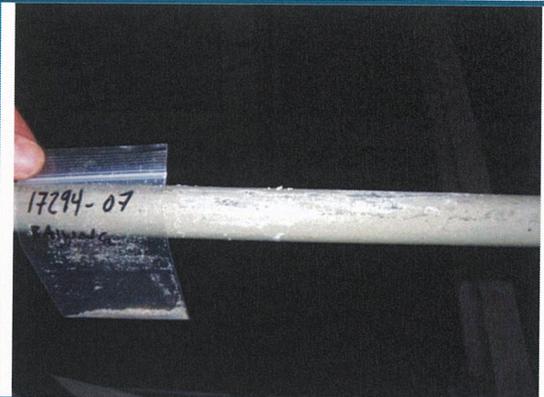


Sample: 17294-06  
Location: Lower Floor Pump # 3  
Component  
Description: Pump #3 Component Paint  
Chips - Dark Green



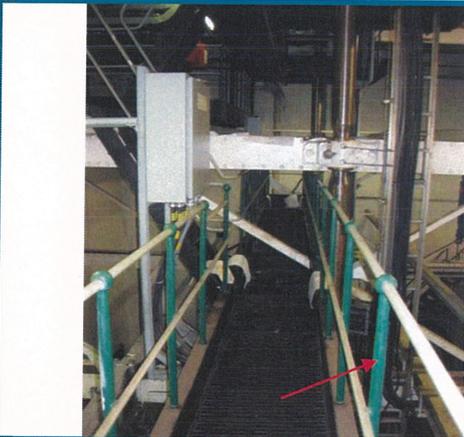
Sample: 17294-06  
Description: Pump # 3 Component Paint  
Chips - Dark Green  
Lead: 2800 mg/kg





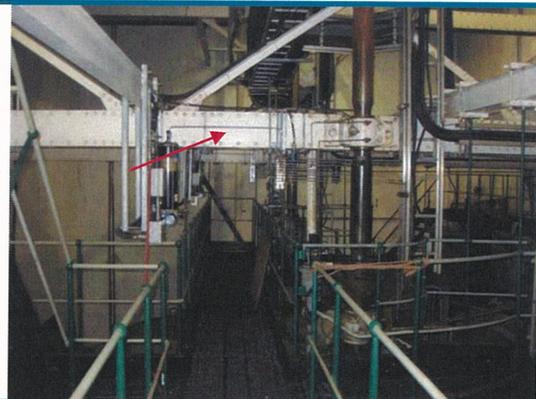
Sample: 17294-07  
Location: Upper Mid-Level Catwalk  
Description: Railing Paint Chips – Light Green

Sample: 17294-07  
Description: Railing Paint Chips – Light Green  
Lead: 1300 mg/kg



Sample: 17294-08  
Location: Upper Mid-Level Catwalk  
Description: Railing Paint Chips – Dark Green

Sample: 17294-08  
Description: Railing Paint Chips – Dark Green  
Lead: 3000 mg/kg



Sample: 17294-09  
Location: Lower Mid-Level Catwalk  
Description: I-Beam Paint Chips - White

Sample: 17294-09  
Description: I-Beam Paint Chips – White  
Lead: 170000 mg/kg



Sample: 17294-10  
Location: Upper Mid-Level Catwalk  
Description: I-Beam Paint Chips - White

Sample: 17294-10  
Description: I-Beam Paint Chips - White  
Lead: 170000 mg/kg



Sample: 17294-11  
Location: Upper Mid-Level Catwalk  
Description: Railing Paint Chips – Light Green

Sample: 17294-11  
Description: Railing Paint Chips – Light Green  
Lead: 270 mg/kg



Sample: 17294-12  
Location: Upper Mid-Level Catwalk  
Description: Stair Paint Chips – Black

Sample: 17294-12  
Description: Stair Paint Chips – Black  
Lead: 1000 mg/kg

	
<p>Sample: 17294-13 Location: South Wall Main Stairs (Mid Level) Description: Stair Paint Chips – Black</p>	<p>Sample: 17294-13 Description: Stair Paint Chips – Black Lead: 83000 mg/kg</p>
	
<p>Sample: 17294-14 Location: Upper Catwalk Overhead Steel Decking Description: Steel Decking Paint Chips - White</p>	<p>Sample: 17294-14 Description: Steel Decking Paint Chips – White Lead: 190000 mg/kg</p>

## 6.0 Limitation of Survey

This document details the methodology, findings and conclusions of this survey and assessment conducted on the subject site on April 24<sup>th</sup>, 2012.

Analytical results included in the report reflect the sampled materials at the specific sample locations. Visually similar materials were referenced to specific analyzed samples.

Yours very truly,

**North West Environmental Group Ltd.**



Julie Scott-Moncrieff, B.Sc.,  
Senior Occupational Hygienist



## APPENDICES



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (856) 858-4800 Fax: (856) 858-9551 Email: [cinnaminsonleadlab@emsl.com](mailto:cinnaminsonleadlab@emsl.com)

Attn: **Janet Peto**  
**North West Environmental Group**  
**2950 Douglas Street**  
**Unit 210**  
**Victoria, BC V8T 4N4**

Customer ID: PAEC50  
Customer PO:  
Received: 04/26/12 10:17 AM  
EMSL Order: 201203938

Fax: (250) 384-9865 Phone: (250) 384-9695  
Project: **17294 Public Works & Government Services Canada**

EMSL Proj:

**Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B\*/7000B)**

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
17294-01 Site: Lower Floor West; Wall Desc: Paint Chips- White	0001		4/26/2012	0.019 % wt
17294-02 Site: Lower Floor East; Wall Desc: Paint Chips- White	0002		4/26/2012	0.44 % wt
17294-03 Site: Lower Floor; Pump 1 Desc: Paint Chips- Grey	0003		4/26/2012	3.2 % wt
17294-04 Site: Lower Floor; Pump 3 Desc: Paint Chips- Grey	0004		4/26/2012	16 % wt
17294-05 Site: Lower Floor East Wall; Column Desc: Paint Chips- White	0005		4/26/2012	29 % wt
17294-06 Site: Lower Floor; Pump #3 Component Desc: Paint Chips- Dark Green	0006		4/26/2012	0.28 % wt
17294-07 Site: Upper Mid-Level Catwalk; Railing Desc: Paint Chips-Light Green	0007		4/26/2012	0.13 % wt
17294-08 Site: Upper Mid-Level Catwalk; Railing Desc: Paint Chips-Dark Green	0008		4/26/2012	0.30 % wt
17294-09 Site: Lower Mid-Level Catwalk; I-Beam Desc: Paint Chips-White	0009		4/26/2012	17 % wt

Initial report from 04/26/2012 17:20:04

Julie Smith - Laboratory Director  
NJ-NELAP Accredited:04653  
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. \* slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NELAP Certifications: NJ 03036, NY 10896, PA 68-00367, AIHA-LAP, LLC ELLAP 100194, A2LA 2845.01



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (856) 858-4800 Fax: (856) 858-9551 Email: [cinnaminsonleadlab@emsl.com](mailto:cinnaminsonleadlab@emsl.com)

Attn: **Janet Peto**  
**North West Environmental Group**  
**2950 Douglas Street**  
**Unit 210**  
**Victoria, BC V8T 4N4**

Customer ID: PAEC50  
Customer PO:  
Received: 04/26/12 10:17 AM  
EMSL Order: 201203938

Fax: (250) 384-9865 Phone: (250) 384-9695  
Project: **17294 Public Works & Government Services Canada**

EMSL Proj:

**Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B\*/7000B)**

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
17294-10 Site: Upper Mid-Level Catwalk; I-Beam Desc: Paint Chips-White	0010		4/26/2012	17 % wt
17294-11 Site: Upper Mid-Level Catwalk; Railing Desc: Paint Chips- Light Green	0011		4/26/2012	0.027 % wt
17294-12 Site: Upper Mid-Level Catwalk; Stairs Desc: Paint Chips- Black	0012		4/26/2012	0.10 % wt
17294-13 Site: Main Stairs (South Side); Stairs Desc: Paint Chips- Black	0013		4/26/2012	8.3 % wt
17294-14 Site: Upper Catwalk; Overhead Steel Sheeting Desc: Paint Chips- White	0014		4/26/2012	19 % wt

Initial report from 04/26/2012 17:20:04

Julie Smith - Laboratory Director  
NJ-NELAP Accredited:04653  
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. \* slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NELAP Certifications: NJ 03036, NY 10896, PA 68-00367, AIHA-LAP, LLC ELLAP 100194, A2LA 2845.01