Fisheries and Oceans Canada | Pêches et Océans Canada | Canada

FISHERIES AND OCEANS CANADA
REAL PROPERTY, SAFETY, AND SECURITY
PACIFIC REGION

INSTITUTE OF OCEAN SCIENCES
PATRICIA BAY

CONCRETE WHARF REPAIRS

Смтллпмрлфплк !

Fisheries and Oceans Canada, Pacific Region
#2100– 8401 Burrard Street, Vancouver, B.C. V6C 3S4

SPECIFICATIONS

APPENDICES

DRAWINGS	**Bound Separately**
Materials	
0227- 000	Cover Sheet, Location Plan, and Drawing Index
0227- 001	Key Plan and Site Plan
0227- 002	Existing Wharf – General Arrangement
0227- 003	Existing Wharf – Pile Layouts for Bents
0227- 004	Existing Wharf – Layout for D. Tees
0227- 005	Existing Sections
0227- 006	Existing Standard Crib, Kiosk Pad, and Cleat Details
0227- 007	Approach Trestle Repairs
0227- 008	Cross Pier Repairs
0227- 009	Pier 1 Repairs
0227- 010	Pier 2 Repairs
0227- 011	Proposed Concrete & Joint Repair Details

END OF INDEX

DISCIPLINE	SEAL
PRIME CONSULTANT CIVIL ENGINEER	
MATERIALS ENGINEER	
STRUCTURAL ENGINEER	

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.
.2 Section 01 35 33 – Health and Safety Requirements.
.3 Section 01 35 43 – Environmental Procedures.
.4 Section 01 45 00 – Quality Control.
.5 Section 01 61 10 – Product requirements.

1.2 References

1 National Research Council of Canada (NRC):
.1 National Building Code of Canada (NBC) 2005.

1.3 Codes and Standards

.1 Perform work in accordance with the National Building Code, the Workers' Compensation Board of B.C., and any other code of provincial or local application provided that, in any case of conflict or discrepancy, the most stringent requirements shall apply.

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

.3 Prior to commencing work, all Contractor's personnel will be required to complete the Fisheries and Oceans Canada site access orientation session.

.4 Ensure that all employees have received appropriate WHMIS training and that all necessary MSDS information is available on site.

1.4 Location of Site

.1 The work is located at the Institute of Ocean Sciences located at 9860 West Saanich Road, Sydney, BC. This site is owned and operated by the Department of Fisheries and Oceans.

.2 The work site includes the approach, wharf, floats and water lot areas that form the facility.

1.5 Site Conditions

.1 Make inquiries or investigations necessary to become thoroughly acquainted with site, soil, climatic and tidal conditions along with the nature and extent of the work.

.2 Submission of a tender will be deemed confirmation that the Contractor if familiar the site and is conversant with all relevant conditions.

.3 All known discrepancies are to be brought to the attention of the Departmental Representative and are to

be accounted for in the Contractor's Bid Price.

.4 Water is available for construction use at no cost. Department Representative will determine delivery points. Connect to existing power supply in accordance with Canadian Electrical Code. Provide all equipment and temporary hoses to bring water to work, at no additional cost to the Contract. Exercise conservation whenever using water supply. Do not leave water running unattended.

.5 Electrical power is available for construction purposes at no cost. Department Representative will determine delivery points. Provide all equipment and temporary lines to bring power to work, at no additional cost to the Contract. Exercise conservation whenever using temporary electrical power supply.

1.6 Work Covered by Contract Documents

.1 Work under this contract covers repair and refurbishment of degraded elements on the IOS Concrete Wharf.

.2 The principal works to be executed and for which all materials, plant and labour are to be supplied by the Contractor as shown on in the plans and in the specifications:

.1 Top Surface Concrete Repairs - at locations identified on the drawings to include:

.1 Excavation of loose and de-bonded concrete.
.2 Cutting of clean edges.
.3 Installation of embedded zinc anodes.
.4 Placing of bonded concrete repair material.

.2 Longitudinal Joint Repairs (Type 1 & 2) – longitudinal joints between precast elements to be:

.1 Cleaned of existing concrete or grout.
.2 Installation of foam backing rod.
.3 Refilled with a new concrete material.

.4 Expansion Joint Repairs – traverse expansion joints to be:

.1 Cleaned of existing concrete or grout.
.2 Installation of foam backing rod.

.3 Refilled with a new concrete material.
.4 Payment per: lineal meter.

.5 Steel Plate Joint Repairs – joints covered with steel plates at removable channel covers to be:

.1 Cleaned of existing concrete or grout.
.2 Installation of a neoprene gasket.
.3 Re-placement of steel plates.
.4 Fastening of plates to shear key.
.5 Payment per: lineal meter.

.6 Cleat Refurbishment (Liverpool & 110LB):

.1 Removal from site – coordinated with vessel moorage schedule.
.2 Cleaned of existing paint and corrosion products and repainted/refinished.
.3 Re-installed.
.4 Painting of supporting pile caps.
.5 Payment per: cleat.

.7 Bull Rail Painting - Yellow (top and front), Red (outer, bumper side), to be repainted to DFO colours:

.1 Cleaning, surface preparations, and painting.
.2 Bull rail, concrete and wood, three sides.
.3 Coordinated with vessel moorage schedule.

.8 Steel Member Bulk Anode Installation

.1 Placement of anodes & test station(s).
.2 Attachment of components.
.3 Wiring to test station.

1.7 Documents Required .1 Maintain at job site one copy of the following:

.1 Contract drawings and approved shop drawings

.2 Specifications

.3 Addenda

.4 Change orders

.5 Other modifications to contract

.6 Copy of approved work schedule

.7 Manufacturer's installation and application instructions

.8 Health and Safety Plan and Fire Safety plan

.9 Environmental Emergency Response Plan (including Spill Response Plan)

.2 Departmental Representative may furnish additional drawings to assist proper execution of work. These documents will be issued for clarification only. Such documents will have the same meaning and intent as if they were included in the plans referred to in the Contract documents.

1.8 Record Drawings

.1 As work proceeds, maintain accurate records to show all deviations from the contract drawings. Note on as-built drawings as changes occur, and at completion supply one set of all drawings at full scale and specifications clearly marked.

1.9 Ground Condition Data

.1 The Departmental Representative has no detailed ground condition data for this site.

1.10 Datum

.1 All elevations or soundings used in the drawings and specifications refer to local low water datum.

1.11 Layout of Work

.1 Construction layout is the responsibility of Contractor.

.2 Notify Departmental Representative immediately if the work cannot be completed as shown in the plans and specifications.

1.12 Requirements of Regulatory Agencies

.1 Ensure work meets all applicable environmental regulations and standards.

.2 The Contractor shall comply with municipal, provincial, and national regulatory agency regulations relating to the project.

.3 No claims for extra costs resulting from regulatory agency requirements, including those referenced in Clause 1.12.2, will be authorized by the Departmental Representative.

.4 The Contractor shall mark floating equipment with lights in accordance with Notice to Mariners CCG regulations.

.5 The Contractor will ensure that a fuel/oil spill emergency

action plan is in place at all times.

1.13 Assistance by the Contractor

.1 Provide access to the work areas as required for the Departmental Representative to perform their duties.

.2 Place small work vessels at the Departmental Representative's disposal as required for the Departmental Representative to perform his duties.

1.14 Time of Completion

.1 Complete all work, including all required submittals, under the contract within ten (10) weeks of award.

1.15 Work Schedule

.1 Within 5 days of Contract award, Contractor to submit to the Departmental Representative for approval a plan clearly indicating proposed sequencing of Work.

.1 Include documents submittals warning Departmental Representative of forthcoming activities.

.2 Whenever a variation from the schedule in excess of 10 working days occurs or is expected to occur, request approval from Departmental Representative for the change in writing.

.3 Notify the local Fisheries Officer and the Regional Director, Environmental Services Branch, no less than 5 days before start and completion of operations.

.4 Keep Vancouver Vessel Traffic Services, Canadian Coast Guard informed of operations in order that necessary notices to shipping will be issued. For notices to shipping, contact:

Comox MCTS Centre (Coast Guard Radio)
Tel: 800-889-8852
Email: offshore@rmic.gc.ca

.5 Other Contracts:

.1 Other contracts may be in progress or be awarded while this contract is in progress.

.2 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Department Representatives.

.3 Co-ordinate with that of other Contractors. If any part of work under this contract depends for its

proper execution or result upon work of another Contractor, report promptly to Department Representative, in writing, any defects or conflicts which may interfere with the proper execution of this work.

1.16 Use of Site

.1 Use of site is limited to work areas required for the work, including the storage of materials and equipment and to the access routes assigned by the Departmental Representative required for the completion of work as specified. Access keys will be provided to the contractor as required.

.2 As there will be NO ACCESS to any of the buildings, Contractor will provide sanitary facilities for the work force in accordance with governing regulations and ordinances.

.3 Vehicles entering and left in the designated work area must have Contractor's logo/name clearly marked on the vehicle.

.4 Arrange parking in areas directed by Department Representative. Maintain construction parking area clean and free of construction related debris. Make good damage resulting from Contractor use of parking areas, at no cost to the Contract.

.5 Hours of work to comply with local bylaws.

.1 Hours of work will be restricted to 8:00 AM to 4:00 PM, Mondays to Fridays only.

.2 Work may be performed after working hours, on weekends and holidays as approved by Departmental Representative.

.6 Contact companies using the facility and make arrangements to ensure their operations are not affected by work.

.7 Project Work is to be planned around scheduled vessel moorages. A schedule can be found in the Appendices.

1.17 Measurement For Payment

.1 General:

.1 Payment for work will be made at the Prices Per Unit as tendered for the various classifications of

the work appearing in the 'Unit Price Table" of the Form of Tender.

.2 Any work called for in the specifications or shown on the plans, or which is necessary for the completion of the work called for in the specifications and is not specifically listed as a separate item in the "Unit Price Table", shall be deemed incidental to the general purpose of the Contract and no separate payment will be made on account of any such work, but the cost of any such incidental work shall be included in the Price Per Unit values as tendered for the various items appearing in the "Unit Price Table".

.2 Mobilization and Demobilization – Pay Item No 1:

.1 The unit of measure will be a single fixed item. “Mobilization and Demobilization” will include all work required to supply the material, plant, and labour (including temporary sanitary facilities) to the site of the work at the start of the project and to remove all materials, plant and labour from the site at the end of the project. The supply and maintenance of the temporary sanitary facilities for the work force will be included in this pay item. This item will also include all costs associated the General Conditions requirements, and instructions of the Contract.

.3 Top Surface Repair – Pay Item No 2:

.1 The unit of measure will be per square meter of bonded concrete repair material, measured at the surface level. Payment item will include concrete cutting, area preparation and supply and installation bonded concrete.

.4 Sacrificial Zinc Anodes – Pay Item No 3:

.1 The unit of measure will be per unit supplied and installed – as required for Pay Item No 2.

.5 Longitudinal Joint Repair (Type 1) – Pay Item No 4:

.1 The unit of measure will be per lineal meter, measured at the surface level. Payment item will include cleaning and supply and installation of foam rod and grout.

.6 Longitudinal Joint Repair (Type 2) – Pay Item No 5:

.1 The unit of measure will be per lineal meter, measured at the surface level. Payment item will include cleaning and supply and installation of foam rod and grout.

.7 Expansion Joint Repairs – Pay Item No 6:

.1 The unit of measure will be per lineal meter, measured at the surface level. Payment item will include cleaning and supply and installation of foam rod and grout.

.8 Steel Plate Joint Repairs – Pay Item No 7:

.1 The unit of measure will be per lineal meter of steel plate. Payment item will include cleaning and supply and installation of anchors and gaskets.

.9 Liverpool Cleat Refurbishment – Pay Item No 8:

.1 The unit of measure will be per unit. Payment item will include removal, cleaning, refinishing, and re-installation.

.10 110LB Cleat Refurbishment – Pay Item No 9:

.1 The unit of measure will be per unit. Payment item will include removal, cleaning, refinishing, re-installation, and re-painting of the pile cap.

.11 Bull Rail Painting (yellow) – Pay Item No 10:

.1 The unit of measure will be per lineal meter of bull rail painted. Payment item will include surface preparation, and all re-painting as indicated on Contract Drawings.

.12 Bull Rail Painting (red) – Pay Item No 11:

.1 The unit of measure will be per lineal meter of bull

rail painted. Payment item will include surface preparation, and all re-painting as indicated on Contract Drawings.

.13 Bulk Anode Installation (Anodes) – Pay Item No 12:

.1 The unit of measure will be per anode supplied and installed. Payment item will include surface preparation, placement of anode, attachment to components, and wiring to test station.

.14 Bulk Anode Installation (Test Station) – Pay Item No 13:

.1 The unit of measure will be per test station supplied and installed. Payment item will include placement of test station, attachment of components, wiring to anodes associated with this work.

.15 Construction Delays:

.1 Delays, other than those caused by changes requested by the Departmental Representative, which occur will not affect the Tender Prices Per Unit. Claims for such delays will not be authorized by the Department.

1.18 Project Meetings

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

1.19 Location of Equipment and Fixtures

.1 Location of existing equipment and fixtures indicated or specified is to be considered as approximate.

1.20 Shop Drawings, Product Data and Samples

.1 Submit in accordance with Section 01 33 00 - Submittals.

1.21 Testing and Inspection Services

.1 Inspections will be carried out by Departmental Representative.

.2 Particular requirements for inspection and testing to be carried out by testing service or in laboratory approved by Departmental Representative are specified under

various sections.

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

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

.5 Provide Departmental Representative with two (2) copies of testing laboratory reports as soon as they are available.

1.22 Site Security

.1 The Contractor will assume responsibility for construction personnel, vessels and vehicles requiring access to the site.

.2 The Contractor will assume responsibility in public safety and protection with regard to setting up warning signs and barricades during the construction period.

1.23 Relics and Antiquities

.1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.

.2 Give immediate notice to Departmental Representative and await Departmental Representative's written instructions before proceeding with work in this area.

.3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

1.24 Interpretation

.1 In interpreting the Contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.

.2 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between:

.1 the Plans and Specifications, the Specifications govern;

.2 the Plans, the Plans drawn with the largest scale govern; and

.3 figured dimensions and scaled dimensions, the figured dimensions govern.

PART 2 – PRODUCTS

Not applicable

PART 3 - EXECUTION

Not applicable

END OF SECTION

PART 1 - GENERAL

1.1 Administrative

.1 Submit to Departmental Representative submittals listed under each Section for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock ups in SI Metric units.

.4 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

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

.6 Verify field measurements and affected adjacent Work are co-ordinated.

.7 The review of the Environmental Emergency Response Plan by Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental

Representative's review of submittals.

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

.10 Keep one reviewed copy of each submission on site.

1.2 Submittals

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

.2 Adjustments made to submitted plans by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.3 Make changes to submitted plan as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.4 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.

.5 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.

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

.6 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, Work may proceed. If submitted plan is rejected, noted copy will be returned and resubmission of corrected plan, through same procedure indicated above, must be performed before Work may proceed.

.7 All submissions to be made electronically in Adobe Acrobat ".PDF" format.

1.3 Certificates and Transcripts

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

1.4 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 and/or as requested by the Department Representative.

.1 Format, as directed by the Department Representative

.1 Electronically in Adobe Acrobat ".PDF" format.

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

1.5 Shop Drawings Review

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

.2 This review shall not mean that the Department 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 the fabrication processes or to techniques of construction and installation.

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

1.6 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 electronic PDF copies of product data.

1.7 Samples

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

.2 Deliver samples prepaid to Departmental Representative's business address.

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

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

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Engineer prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

PART 2 – PRODUCTS

Not applicable

PART 3 - EXECUTION

Not applicable

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 Government of Canada.

.1 Canada Labour Code - Part II

.2 Canada Occupational Health and Safety Regulations.

.2 National Building Code of Canada (NBC):

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

.3 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 Fire Protection Engineering Services, HRSDC:

.1 FCC No. 301, Standards for Construction Operations.

.2 FCC No. 302, Standard for Welding and Cutting.

.5 Province of British Columbia:

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

.2 Occupational Health and Safety Regulation

1.2 Related Sections

.1 Section 01 11 05 – Marine General Instructions.

.2 Section 35 05 51 – Marine General Site Work.

.1.3 Workers' Compensation Board Coverage

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

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

1.4 Compliance with Regulations

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

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

1.5 Submittals

.1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 33 00 – Submittal Procedures.

.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 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to

commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

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

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

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

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

1.6 Responsibility

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

.2 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 The Contractor is to assume the role of the “prime contractor” for the duration of the job.

.4 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have site-related working experience specific to activities associated with the work outlined in the Contract.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that

personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of work.

1.7 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 as deemed necessary to protect site against entry.

1.8 Project/Site Conditions

.1 Work at Site will involve:

.1 Construction on piers during high and low tides.

.2 Slippery and unstable surfaces.

1.9 Regulatory Requirements

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

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

1.10 Filing of Notice

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

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

1.11 Health and Safety Plan

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

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

.1 Primary requirements:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

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

.4 General safety rules for project.

.5 Job-specific safe work, procedures.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee/ Representative procedures.

.9 Occupational Health and Safety meetings.

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

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

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

.4 Indicate Engineering and administrative control measures to be implemented at the site for

managing identified risks and hazards.

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

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

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

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

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

.5 Departmental Representative's review: the review of Health and Safety Plan by Department of Fisheries and Oceans (DFO) 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.

1.12 Emergency Procedures

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

.1 Designated personnel from own company.

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

.3 Local emergency resources.

.4 Departmental Representative 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.

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

.1 Work at high angles.

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

.3 Work with hazardous substances.

.4 Underground work.

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

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

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

.5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

1.13 Hazardous Products

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

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

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

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

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

1.14 Electrical Safety Requirements

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

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

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

1.15 Electrical Lockout

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

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

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

1.16 Overloading

.1 Ensure no part of work is subjected to a load which will

endanger its safety or will cause permanent deformation.

1.17 Falsework

.1 Design and construct falsework in accordance with CSA S269.1.

1.18 Scaffolding

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CAN/CSA-S269.2.

1.19 Powder-Actuated Devices

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

1.20 Fire Safety and Hot work

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

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

1.21 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.

1.22 Unforeseen Hazards

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

1.23 Posted Documents

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

.1 Health and Safety Plan.

.2 Emergency Procedures.

.3 Notice of Project.

.4 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.

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

.6 Material Safety Data Sheets (MSDS).

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

1.24 Meetings

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

1.25 Correction of Non Compliance

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

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

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

PART 2 – PRODUCTS

Not applicable

PART 3 - EXECUTION

Not applicable

END OF SECTION

PART 1 - GENERAL

1.1 Products/Material and Equipment

.1 Comply with Federal, Provincial and Municipal laws, orders, and regulations concerning the protection of the environment and the control and abatement of soil, water, and air pollution.

.2 Do not dispose of waste or volatile materials such as oil, paint thinners, or mineral spirits into waterways, storm or sanitary sewers.

.3 The standard mitigation by project measures contained the Appendices will form part of the specification. The Contractor will keep a copy of the report on site.

1.2 Vessels

.1 Vessels and floating equipment must not come to rest on the intertidal or subtidal zones unless specified otherwise.

1.3 Fires

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

1.4 Disposal of Wastes

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.5 Drainage

.1 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 Work Adjacent to Waterways

.1 Do not operate land based construction equipment within waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

1.7 Pollution Control

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.5 Spill kits and containment are to be maintained on site and ready for deployment in case of spills.

.1 Spill kits are to contain sufficient quantities of absorbent material on site in close proximity to working machinery.

.2 During the work there are to be trained and qualified personnel on site that are ready to deploy spill kits when necessary.

1.8 Protection of Wildlife

.1 Make every effort to minimize disturbance to the benthic and upland wildlife communities.

.2 Any large invertebrates adhering to the portion of the wharf or jetty under construction must be removed and replaced in the nearby marine environment.

.3 Do not disturb eel grass or kelp beds.

1.9 Submittals

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

.2 Submit an Environmental Emergency Response Plan, including spill response plan, to Department Representative for approval.

PART 2 – PRODUCTS

Not applicable

PART 3 - EXECUTION

3.1 Work Procedures

.1 Clearly mark work areas and construction materials storage areas. The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.

.2 Work on site will be conducted in accordance with the plans and specifications, the Environmental Response Plan and all other applicable regulations.

.3 All stockpiles of grubbed material within the specified clearing limits will be located so as not to obstruct the access or work of others or natural drainage patterns

END OF SECTION

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 78 00 – Closeout Submittals

1.2 Inspection

.1 Allow the Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by the Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.3 Independent Inspection Agencies

.1 Independent Inspection/ Testing Agencies will be engaged by the Departmental Representative for purpose of inspecting and/ or testing portions of Work. Cost of such services will be borne by Departmental Representative.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/ testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection

and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative. Pay costs for retesting and re-inspection.

1.4 Access to Work

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 Procedure

.1 Notify appropriate agency and the Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 Rejected Work

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of the Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be

determined by the Departmental Representative.

1.7 Reports

.1 Submit inspection and test reports to the Departmental Representative in accordance with Section 01 33 00.

END OF SECTION

PART 1 - GENERAL

1.1 Products/Material and Equipment

.1 Use NEW products/material and equipment unless otherwise specified. The term “products” is referred to throughout the specifications.

.2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.

.3 Unless otherwise specified, comply with manufacturer’s latest printed instructions for materials and installation methods.

.4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer’s instructions. Departmental Representative will designate which document is to be followed.

.5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.

.1 Prevent electrolytic action between dissimilar metals.

.2 Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.6 Fastenings which cause spalling or cracking are not acceptable.

.7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.8 Use heavy hexagon heads, semi-finished unless otherwise specified.

.9 Bolts may not project more than 1 diameter beyond nuts.

.10 Types of washers as follows:

.1 Plain type washers: use on equipment and sheet metal.

.2 Soft gasket lock type washers: use where vibrations occur.

.3 Resilient washers: use with stainless steel.

.11 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.

.12 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.

.13 Store products in accordance with suppliers' instructions.

.14 Touch up damaged factory finished surfaces to Departmental Representative's satisfaction.

.1 Use primer or enamel to match original.

.2 Do not paint over nameplates.

1.2 Quality of Products

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

.2 Defective products will be rejected regardless of previous inspections.

.1 Inspection does not relieve responsibility, but is precaution against oversight or error.

.2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.

.4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the Contract documents.

.5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item

throughout the building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 Availability of Products

.1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.

.2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.

.3 In event of failure to notify Departmental Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

1.4 Manufacturer's Instructions

.1 Unless otherwise indicated in the specifications, install or erect products in accordance with the manufacturer's instructions.

.1 Do not rely on labels or enclosures provided with products

.2 Obtain written instructions directly from the manufacturer

.2 Notify Departmental Representative in writing of conflicts between the specifications and the manufacturer's instructions so that the Departmental Representative may establish the course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in either the Contract price of

the Contract time.

1.5 Contractor's Options For Selection of Products for Tendering

.1 Products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.

.2 Products specified under "Acceptable Products" (used for complex Mechanical or Electrical Systems): select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.

.3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

.4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".

.5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer and independent laboratory report showing that the product meets or exceeds the specified requirements.

1.6 Substitution After Contact Award

.1 No substitutions are permitted without prior written approval of the Departmental Representative.

.2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.

.3 Proposals will be considered by the Departmental Representative if:

.1 products selected by tenderer from those specified are not available;

.2 delivery date of products selected from those specified would unduly delay completion of

Contract, or

.3 alternative product to that specified, which is brought to the attention of considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.

.4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.

.5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

PART 2 – PRODUCTS

Not applicable

PART 3 - EXECUTION

Not applicable

END OF SECTION

PART 1 - GENERAL

1.1 Waste Management Goals

.1 Prior to start of Work, submit for approval a written Waste Management plan to the Department Representative. Approval must be obtained prior to beginning onsite work.

.2 Accomplish maximum control of solid construction waste.

.3 Preserve environment and prevent pollution and environment damage.

1.2 Related Sections

.1 Section 01 11 05 – Marine General Instructions.

.2 Section 01 35 33 – Health and Safety Requirements.

.3 Section 01 35 43 – Environmental Procedures.

.4 Section 03 01 31 – Concrete Repairs.

.5 Section 03 62 00 – Non-Shrink Grouting.

.6 Section 09 96 00 – High Performance Coatings.

.7 Section 26 42 20 – Cathodic Protection Passive.

1.3 Definitions

.1 Inert Fill: inert waste – exclusively asphalt and concrete.

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

.3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

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

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

thermally destroying waste.

.6 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

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

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

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

.8 Separate Condition: refers to waste sorted into individual types.

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

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

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

1.4 Documents

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

.1 Waste Audit

.2 Waste Reduction Workplan

.3 Material Source Separation Plan.

.4 Schedules A & B completed for project

1.5 Submittals

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

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

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

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

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

1.6 Waste Audit (WA)

.1 Conduct WA prior to project start-up.

.2 Prepare WA: Schedule A.

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

1.7 Waste Reduction Workplan (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:

.1 Destination of materials listed.

.2 Deconstruction/disassembly techniques and sequencing.

.3 Schedule for deconstruction/disassembly.

.4 Location.

.5 Security.

.6 Protection.

.7 Clear labelling of storage areas.

.8 Details on materials handling and removal procedures.

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

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

.4 Describe management of waste.

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

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

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

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

1.8 Materials Source Separation Program (MSSP)

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

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

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

.4 Provide containers to deposit reusable and recyclable materials.

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

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

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

.1 Transport to approved and authorized recycling facility.

1.9 Storage, Handling And Protection

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

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

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

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

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

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

.1 On-site source separation is recommended.

.2 Provide waybills for separated materials.

1.10 Disposal Of Wastes

.1 Do not bury rubbish or waste materials.

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

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Tonnage reused or recycled.

.5 Reused or recycled waste destination.

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

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

1.11 Use Of Site And Facilities

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

.2 Maintain security measures established by existing facility.

1.12 Scheduling

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

1.13 Application

.1 Do Work in compliance with WRW.

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

1.14 Cleaning

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

.2 Clean-up work area as work progresses.

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

1.15 Diversion of Materials

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

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of materials IS NOT permitted.

.3 Demolition Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Metals	100	
Rubble	100	
Wood (uncontaminated)	100	
Other		

.4 Construction Waste:

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

1.16 Waste Audit .1 Schedule A – Waste Audit (WA):

Material Category	Material Quantity Unit	Estimated Waste %	Total Quantity of Waste (unit)	Generation Point	% Recycled	% Reused

1.17 Waste Reduction Workplan .1 Schedule B.

(1) Material Category	(2) Person(s) Responsible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected Actual	(5) Recycled Amount (unit) Project Actual	(6) Material Destination
Wood and Plastics Material Description					
Chutes					
Warped Pallet Forms					
Plastic Packaging					
Cardboard Packaging					
Wood					
Metal					
Other					

END OF SECTION

1.1 Related Sections

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 78 00 – Closeout Submittals.

1.2 References

Not Applicable

1.3 Substantial Completion Inspection and Declaration Procedures

.1 Acceptance of Work Procedures:

.1 Notify the Departmental Representative in writing of satisfactory completion claim and request the Departmental Representative's inspection. A minimum of 7 days notice is required.

.2 Department Representative will complete an inspection and prepare a list of deficiencies and/or outstanding work.

.2 Completion Tasks: submit written certificates in English that deficiency tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Operation of systems: demonstrated to required personnel.

.4 Work: complete and ready for Final Inspection.

.3 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by the Departmental Representative, and Contractor.

.2 When Work incomplete according to Departmental Representative.

.1 Complete outstanding items and request re-inspection.

.2 Incur all costs for re-inspection, including travel time for Department Representative.

.3 Declaration of Substantial Performance: when the Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed,

make application for Certificate of Substantial Performance.

1.4 Final Cleaning

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Work site landscaping to be reinstated to pre-existing conditions or better.

.3 Waste Management: separate waste materials for reuse and recycling.

1.5 Total Performance Inspection and Declaration Procedures

.1 Acceptance of Work Procedures:

.1 Notify the Departmental Representative in writing of satisfactory completion claim and request the Departmental Representative's inspection.

.2 Department Representative will complete an inspection and prepare a list of deficiencies and/or outstanding work.

.2 Completion Tasks: submit written certificates in English that deficiency tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by the Departmental Representative, and Contractor.

.2 When Work incomplete according to Departmental Representative.

.1 Complete outstanding items and request re-inspection.

.2 Incur all costs for re-inspection, including travel time for Department Representative.

.3 Declaration of Total Performance: when the Departmental Representative considers deficiencies and defects corrected and requirements of Contract totally performed.

END OF SECTION

PART 1 - GENERAL

1.1 References

Not Used.

1.2 Action and Informational Submittals

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

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

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

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

1.3 Format

.1 Organize data as instructional manual.

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

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

.1 Identify contents of each binder on spine.

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

.5 Arrange content by systems (i.e. utilities, controls) under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

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

text pages.

.9 Provide Record Drawings and Final Survey data.

1.4 Contents – Project Record Documents

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

.1 Date of submission; names.

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

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

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.5 As Built Documents And Samples

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

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

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

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

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

.1 Provide files, racks, and secure storage.

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

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

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

.1 Do not use record documents for construction purposes.

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

1.6 Recording Information On Project Record Documents

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

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

.3 Record information concurrently with construction progress.

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

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

.1 Measured depths of elements of foundation in relation to geodetic datum.

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

.3 Field changes of dimension and detail.

.4 Changes made by change orders.

.5 Details not on original Contract Drawings.

.6 References to related shop drawings and modifications.

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

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

.2 Changes made by Addenda and change orders.

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

.7 Provide digital photos for site records.

1.7 Final Survey

.1 Submit final site survey certificate certifying that elevations and locations of completed Work are in conformance, or non conformance with Contract Documents.

1.8 Equipment And Systems

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

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

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Maintenance Requirements: include routine procedures and guide for trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.3 Include manufacturer's printed operation and maintenance instructions.

.4 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

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

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

1.9 Maintenance Materials

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

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

.2 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to site; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

1.10 Delivery, Storage

.1 Store spare parts, maintenance materials, and special

And Handling

tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.11 Warranties And Bonds

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

.2 Submit warranty management plan, 15 days before planned Substantial Completion, to Departmental Representative.

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

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

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

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

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

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

.4 Verify that documents are in proper form, contain

full information, and are notarized.

.5 Co-execute submittals when required.

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

.6 Conduct joint 12 month warranty inspection, measured from time of acceptance, by Departmental Representative.

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

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

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

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

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

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

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

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

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

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

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

.3 Contractor's plans for attendance at 12 month post-construction warranty inspections.

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

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

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

1.12 Warranty Tags

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

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

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

.4 Indicate following information on tag:

.1 Type of product/material.

.2 Model number.

.3 Serial number.

.4 Contract number.

.5 Warranty period.

.6 Inspector's signature.

.7 Construction Contractor.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

Not Used.

1.2 References

.1 Canadian Environmental Protection Act,1999 (CEPA 1999).

.1 Export and Import of Hazardous Waste Regulations (SOR/2002-300).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 National Fire Code of Canada [2005].

.4 Transportation of Dangerous Goods Act (TDG Act) [1999], (c. 34).

.4 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).

1.3 Definitions

.1 Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.4 Workplace Hazardous Materials Information System (WHMIS): Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

1.4 Submittals

.1 In accordance with Section 01 33 00

1.5 Delivery Storage, and Handling

.1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.

.4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

.2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Do not transfer of flammable and combustible liquids in vicinity of open flames or heat-producing devices.

.7 Do not use flammable liquids having flash point below 38 degrees C, such as naptha or gasoline as solvents or cleaning agents.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.10 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.11 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are not mixed.

.6 Ensure that different hazardous materials or hazardous wastes are not mixed.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 Transportation

.1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

PART 2 – PRODUCTS

2.1 Materials

.1 Only bring on site quantity of hazardous materials required to perform work.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 - EXECUTION

3.1 Materials

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes	.1	Preparation of concrete and application of repair materials.
	.2	Rehabilitation of concrete surfaces.
	.3	Repair of concrete internal reinforcement.
1.2 Related Sections	.1	Section 03 62 00 – Non-Shrink Grout
	.2	Section 26 42 20 – Cathodic Protection Passive
1.3 Price and Payment Procedures	.1	Unit Prices: Section 01 11 05 - Measurement of quantities and payment procedures affecting this section.
	.2	Repair Surface: By the square metre. Includes surface preparation, repair, finishing.
1.4 References	.1	CSA-A23.1-14/A23.2-14 - Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
	.2	CAN/CSA-A3000-03 (2004) - Cementitious Materials Compendium.
	.3	CAN/CSA-G30.18-M92 (R2007) - Billet-Steel Bars for Concrete Reinforcement (Metric).
	.4	CSA-W59-03 - Welded Steel Construction (Metal Arc Welding).
	.5	ASTM A82/A82M-07 - Steel Wire, Plain, for Concrete Reinforcement.
	.6	ASTM C881/C881M-02 - Epoxy-Resin-Base Bonding Systems for Concrete.
	.7	ASTM C1059-99(2008) - Latex Agents for Bonding Fresh To Hardened Concrete.
	.8	ICRI Guideline No. 310R – 2013 Selecting and specifying concrete surface preparation for sealers, coating, polymer overlays, and concrete repair.
1.5 Submittals	.1	Section 01 33 00: Submissions procedures.
	.2	Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations.

regarding each material.

1.6 Submittals for Information

.1 Section 01 33 00: Submissions procedures.

.2 Manufacturer's Certificate: Certify that specified products meet or exceed specified requirements.

1.7 Closeout Submittals

.1 Section 01 77 00: Submissions procedures.

.2 Accurately record actual locations of concrete and reinforcement repairs, type of repair.

1.8 Quality Assurance

.1 Perform welding work in accordance with CSA W59.

.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.3 Applicator Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience, approved by the manufacturer.

1.9 Delivery, Storage, and Protection

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Comply with Manufacturer's instructions for storage, shelf life limitations, and handling.

PART 2 – PRODUCTS

2.1 Patching Materials

.1 Concrete or Shotcrete materials: to CSA A23.1 meeting the following minimum characteristics.

- .1 Characteristic Test Results:
  - .1 Bond Strength to existing Concrete at 28 days: 1.0 MPa
  - .2 Compressive Strength at 28 days: 50 MPa.
  - .3 Concrete Air Content: 7 to 9 %
  - .4 Shotcrete Air Content: 3 to 7 %.
  - .5 Nominal Aggregate size: 10 mm.
  - .6 Class of exposure: CXL
- .2 Bonding Agents:
  - .1 Cement/ Sand grout with compressive strength 50 MPa.
  - .2 Epoxy Resin: ASTM C881/C881M Type II, two part

epoxy resin.

.3 Portland Cement: CSA-A3000, Type GU, grey colour.

.4 Silica Fume: CSA-A3000, Type SF

.5 Fly Ash: CSA-A3000, Type F

.6 Sand: CSA-A3000, Type F.

.7 Water: Clean and Potable

2.2 Reinforcing Materials

.1 Reinforcing Steel: CSA G30.18, Type R - regular.

2.3 Anodes

.1 Vector Galvashield XP or approved equivalent.

2.4 Mixing Epoxy Materials

.1 Mix epoxy mortars in accordance with manufacturer's written instructions for purpose intended.

.2 Mix components in clean equipment or containers. Conform to pot life and workability limits.

2.5 Mixing Cementitious Materials

.1 Mix cementitious mortar grout to CSA-A23.1/A23.2 and manufacturer's instructions for purpose intended.

PART 3 - EXECUTION

3.1 Examination

.1 Section 01 11 05: Verify existing conditions before starting work.

.2 Verify that surfaces are ready to receive work.

.3 Beginning of installation means acceptance of existing surfaces.

3.2 Preparation

.1 Chip areas identified by the engineer to remove delaminated and deteriorated concrete.

.2 Square cut edges of the repair areas to a depth of 20 mm. No feather-edging of patching materials is permitted. Do not cut existing reinforcement.

.3 Prepare concrete surfaces to ICRI CSP 7.

.4 Clean concrete surfaces of dirt, laitance, corrosion, or other contamination; wire brush using water; rinse surface and allow to dry. Concrete surfaces shall be in Saturated Surface Dry (SSD) conditions when patching materials are applied.

.5 Flush out cracks and voids with water to remove laitance and dirt. Rinse with water.

.6 Sandblast clean the exposed reinforcement steel surfaces. Mechanically cut away damaged portions of bar and replace with the same size as required. Provide splice lengths in accordance with the Engineer's requirements.

3.3 Repair Work

.1 Repair exposed structural, shrinkage, and settlement cracks of concrete as indicated on Drawings by the epoxy injection or bonding agent and cementitious paste method.

.2 Install anodes as per manufacturer's recommendations and test for electrical continuity.

.3 Repair spalling. Fill voids flush with surface using the concrete or shotcrete patching material. Apply surface finish.

.4 Repair reinforcement by welding new bar reinforcement to existing reinforcement with sleeve splices. Strength of welded splices and reinforcement to exceed original stress values.

.5 Wet cure the repaired areas for 7 days under burlap and polyethylene sheeting.

3.4 Application – Bonding Agents

.1 Cement/Sand Grout:

.1 Broom coating of bonding agent to SSD concrete surfaces. Provide full surface coverage

.2 Epoxy Resin: Prepare base surface to manufacturer's instructions; spread, screed, and compact to specified grade.

3.5 Field Quality Control

.1 Section 01 45 00: Quality Control.

.2 Test concrete and grout for compressive strength, air content and slump during the execution of the Work in accordance with CSA A23.1.

3.6 Schedule

.1 Provide work schedule to Department Representative.

.2 The work is not interfere with ship berthing unless approved by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Non-shrink grout for structural purposes.
- .1 Grout for the Anode Jackets.
- .2 Grout for the shear keys between precast units.

1.2 Related Sections

.1 Section 03 01 31 – Concrete Repair.

.2 Section 26 42 20 – Cathodic Protection Passive

1.3 References

.1 ASTM C109/C109M-13 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50-mm Cube Specimens).

.2 ASTM C1107/C1107-13 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non shrink).

.3 CSA-A23.1-14A23.2-14 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.4 CSA-A3000-13 - Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 Submittals for Review

.1 Section 01 33 00: Submissions procedures.

.2 Product Data: Provide data on grout including all structural properties, characteristics, and product limitations.

1.5 Submittals for Information

.1 Section 01 33 00: Submission procedures.

.2 Test Reports: Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.

.3 Installation Data: Special installation requirements or limitations.

1.6 Closeout Submittals

.1 Section 01 78 10: Submissions procedures.

1.7 Quality Assurance

.1 Include grout design mix; indicate whether Proportion or Property specification is to be used, required environmental conditions, and admixture limitations.

.2 Design structural components including grout mix design under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located.

1.8 Mock-Up

.1 Section 01 43 00: Requirements for mock-up.

.2 Provide a grouted anode jacket and a 3 m grouted joint mock-up.

.3 Locate where directed by Consultant.

.4 Approved mock-up may remain as part of the Work.

1.9 Environmental Requirements

.1 Section 01 35 26: Environmental conditions affecting products on-site.

.2 Do not install grout when ambient temperature is less than 5 degrees C.

PART 2 – PRODUCTS

2.1 Materials

.1 Cementitious Grout: CSA-A23.1/A23.2.

.1 Portland Cement: CSA-A3000, Type GU.

.2 Grout Aggregate: CSA-A3000, standard type.

.3 Grout Coarse Aggregate: 10mm nominal to CSA-A23.1

.4 Non-Shrink Admixture: ASTM C494.

.5 Substrate bonding agent: Sand/Cement Grout with compressive strength 50 MPa.

.6 Water: Clean and Potable.

2.2 Grout Mix

.1 Anode jacket Grout: sanded with 40 MPa strength at 28 days.

.2 Shear Key Grout: 50 MPa strength at 28 days, nominal

10 mm aggregate, 7 to 9 % air exposure class CXL and polymer fibre.

2.3 Grout Mixing

.1 Thoroughly mix grout ingredients in quantities needed for immediate use.

.2 Add admixtures to manufacturer's written instructions; mix uniformly.

.3 Do not use anti-freeze compounds to lower the freezing point of grout.

2.4 Mix Tests

.1 Section 01 45 00: Test grout.

.2 Testing of Grout Mix: CSA-A23.1 /23.2

.1 Compressive strength at 7, 28 and 56 days

.2 Air content for shear key grout only.

.3 Slump for shear key grout only.

PART 3 - EXECUTION

3.1 Examination

.1 Section 01 70 00: Verify existing conditions before starting work.

.2 Request inspection of spaces to be grouted.

3.2 Preparation

.1 Apply bonding agent to existing concrete surfaces if required.

.2 Plug clean-out holes. Brace components for wet grout pressure.

.1 Install temporary strapping on anode jackets at 300 mm spacing.

.2 Fasten the crib anode jackets with 6 mm stainless steel concrete screws at 300 each way. Embed 50 mm in concrete.

3.3 Installation

.1 Anode Jackets:

.1 Install grout to manufacturer's written instructions.

.1 Start grout injection from lowest grout port on

each jacket. Proceed to the next port when grout appears there.

.2 Proceed vertically up each jacket to the top.

.3 Cap each port before moving on using a guillotine valve.

.2 Shear Keys:

.1 Install grout to requirements of the specific component section.

.2 Work grout into substrate and cavities to eliminate air voids.

.3 Cover grouted shear keys and wet cure for 7 days.

3.4 Field Quality Control

.1 Section 01 45 00: Field inspection and testing.

.2 Test and evaluate grout to CSA-A23.1/A23.2.

3.5 Protection of Finished Work

.1 Section 01 78 40: Protecting installed work.

.2 Protect finished Work from damage.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 Master Painters and Decorators Association of B.C. (MPDA)/Canadian Painting Contractors Association (CPCA), "Architectural Painting Specifications Manual".

.2 Canadian General Standards Board (CGSB), CAN/CGSB-85.100-93 "Painting".

.3 International Concrete Repair Institute (ICRI) "Selection and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays" Guideline No. 03732.

.4 ASTM D4259 - 88(2006) Standard Practice for Abrading Concrete.

.5 ASTM D4258 - 05 Standard Practice for Surface Cleaning Concrete for Coating.

.6 ASTM D4263 – 83 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

.7 ASTM F1869 – 11 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.8 ACI 548.8 – Specification for Type EM (Epoxy Multi-Layer) Polymer Overlay for Bridge and Parking Decks.

1.2 Scope

.1 The coating areas are outlined on the attached drawings and include the following.

.1 Coating of Concrete Wharf surface.

.2 Traffic Line Painting.

PART 2 – PRODUCTS

2.1 Materials

.1 Traffic Paint to meet the requirements of CAN/CGSB-1.74; Alkyd Traffic Paint.

PART 3 - EXECUTION

3.1 Surface Preparation

.1 Remove all hardware and fixtures from the surfaces to be coated. If these cannot be removed from the area protect them from damage by surface preparation and coating overspray.

.2 Reinstall all hardware when coating is complete.

.3 Scrape and vacuum efflorescence from concrete.

.4 Prepare and inspect all surfaces to be coated in accordance with the requirements of NACE No. 6/SSPC-SP13 Surface Preparation of Concrete. Chemical surface preparation techniques shall not be used.

.5 The specified surface profile as per ICRI No. 03732. Shall be CSP 3 for all surfaces to be coated. This shall be achieved by shotblasting using steel shot.

.6 The concrete surfaces prior to coating shall be clean and free of dust. The surfaces shall be vacuumed prior to coating to remove dust if required by the manufacturer

.7 pH of concrete to be in range of manufacturers requirements prior to coating application.

.8 Patch existing scaled areas and remove debris and other contaminants which might interfere with the bond of the new coating system.

.9 Patch surface holes with patching material approved by manufacturer.

3.2 Inspection by Contractor

.1 Examine all surfaces to be coated before commencing work. The commencement of work indicates acceptance of the surface and job conditions.

3.3 Application

.1 Apply coatings in strict accordance with the Manufacturer's requirements.

.2 Ensure that repair concrete is satisfactorily cured and dry before applying membrane. The minimum curing period is 28 days. Evaluate the concrete moisture level using the polyethylene film test in accordance with ASTM D4263, and keep the film in place for at least 7 days. Coating will not be permitted if any moisture appears on the film.

.3 The Engineer shall measure the moisture transmission levels in accordance with ASTM E 1869. Coating may only proceed if the moisture transmission levels are less than 3.0 lbs/1000 ft^2 / 24 hrs.

.4 Do not apply coatings if the ambient temperature is outside of manufacturer approved application temperature range.

Maintain coating above 5°C for at least 24 hr. following application or as required by manufacturer.

.5 Pre-treat cracks prior to applying the membrane in accordance with the manufacturer's requirements. Cracks larger than 1.0 mm wide shall be routed to a profile of 6 mm x 6 mm and sealed with a flexible sealant which is compatible with the membrane material.

.6 All coating systems shall be applied in minimum three coats – a primer, a base coat and a finish coat. The film thickness will be measured during the project using a wet film gauge.

.7 The top coat shall include a grit to produce a non-slip finish in the identified areas. The contractor shall prepare a trial application on a concrete paving stone 600mm x 600mm in area. This shall be approved by the Engineer and Owner and shall be used as the standard for the membrane installation.

3.4 Traffic Markings

.1 Repaint all traffic markings to match the existing present colours and configuration.

.2 Line locations and dimensions on the drawings to be confirmed by the Contractor.

3.5 Inspection

.1 Notify the Engineer when all surface preparation work is complete and permit the Engineer sufficient time to inspect the surfaces before proceeding with coating application.

.2 Wet film thickness measurements will be made during the work. Additional coats will be required in areas not meeting the specified thickness.

3.6 Guarantee

.1 The Coating work will be guaranteed for five (5) years from the date of completion with a joint labour and materials guarantee. This guarantee stipulates that the coating work is done according to the applicable standards specified and that any defects in the work due to faulty workmanship or materials supplied in accordance with the specifications only which appear within 5 years of the date of completion will be corrected at the contractors expense.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Anodes and attachments on steel structures in the intertidal zone including:

.1 Tension anchors

.2 Fender bracing and fixtures

.3 Camels

.4 Camel Piles

Steel Elements requiring cathodic protection using bulk anodes

Element	Qty.	Size	Length (water)	Length (mud)	Length (rock)
Tension Anchors	38	0.22 dia.	10	5	9
Fender Bracing					
HSS	28	.203 x .152 x 10	10	-	-
WWF	28	W .410 x .60 x 6	6	-	-
Built-up Section	14	.864 x 0.94 x 2.75	2.75		
Camels					
(A)	16	.710 dia. x 22.76	22.76	-	-
(B)	11	.710 dia. x 7.62	7.62	-	-
(C)	4	.305 dia. x 7.62	7.62		
Camel Piles	20	0.762 dia.	10	5	-

*Refer to appendices for addition reference drawing information.

.2 Five (5) test stations to be installed at existing kiosk locations - as directed by the Departmental Representative.

1.2 Related Sections

.1 Section 01 33 00 – Submittals

.2 Section 01 35 33 – Health and Safety Requirements

1.3 Price and Payment Procedures

.1 Anodes: By the unit. Includes placement of anode, attachment to components, wiring to test station.

.3 Test Stations: By the unit. Includes placement of test station, attachment of components, wiring to anodes associated with this work.

1.4 References

.1 ASTM B418-12 - Standard Specification for Cast and Wrought Galvanic Zinc Anodes.

.2 NEMA 250-2008 - Enclosures for Electrical Equipment (1000 Volt Maximum).

.3 NACE SP0177-2007 - Standard Recommended Practice - Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control Systems.

1.5 Performance Requirements

.1 Conform to NACE SP0177 standard.

.2 Iron and Steel Components:

.1 Negative 0.85 volts measured between component and saturated reference electrode contacting the earth near component.

.2 Negative voltage shift of 300 millivolts measured between component and saturated reference electrode contacting the earth near component.

.3 Polarization voltage shift of 100 millivolts measured between component and saturated reference electrode contacting the earth near component.

.3 Design Cathodic Protection System for a service life extension of 20 years.

1.6 Submittals For Review

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide data for anodes and test stations.

.3 Shop Drawings: Show cathodic protection system installation details for each type of structure including:

.1 anode type and location.

.2 anode fastener and stand-off details.

.3 connection to steel structure.

.4 wiring details.

.5 test station details.

1.7 Submittals For Information

.1 Section 01 33 00: Submission procedures.

.2 Installation Data: Include procedures applicable to protecting differing metals.

1.8 Closeout

.1 Section 01 78 10: Submission procedures.

Submittals

.2 Record Documentation: Accurately record actual locations of anodes and test stations.

.3 Operation and Maintenance Data: Include periodic test procedures.

1.9 Quality Assurance

.1 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

.2 Design system under direct supervision of a corrosion Engineer experienced in design of this Work and certified by National Association of Corrosion Engineers and licensed at the place of work. Submit proof of designer certification.

PART 2 – PRODUCTS

2.1 Manufacturers

.1 Manufacturers who may have products suitable for this work include:

.1 Corrosion Service Co. Ltd.

.2 Canada Metals Ltd.

2.2 Materials

.1 Magnesium Anode: coating alloy content conforming to the following:

.1 Aluminum: 0.05% maximum.

.2 Manganese: 0.5 to 1.3% maximum.

.3 Zinc: 0% maximum.

.4 Silicon: 0% maximum.

.5 Copper: 0.02% maximum.

.6 Nickel: 0.001% maximum.

.7 Iron: 0.03% maximum.

.8 Other Impurities: 0.3% maximum

.2 Zinc Anode: ASTM B418, Type I, cast or wrought galvanix zinc, rod

.3 Aluminum Anode: allow content conforming to the following:

.1 Indium: 0.02% maximum.

.2 Zinc: 4.5% maximum.

.4 Anode Lead Wire: Solid Copper Conductor, 10 AWG, Type RWU XLPE insulation.

.5 Field Wiring: Stranded copper conductor, 10 AWG Type RWU XLPE insulation.

.6 Conduit: Rigid Poly Vinyl Chloride conforming to CSA 22.2 No 211.1

2.4 Accessories

.1 Enclosure: NEMA 250, Type 4X.

.2 Terminal Board: One-piece with screw terminals rated 15 amperes.

PART 3 - EXECUTION

3.1 Examination

.1 Section 01 70 00: Verify existing conditions before starting work.

.2 Verify concrete surfaces are cleaned and prepared to Section 03 01 31.

3.2 Installation

.1 Install anodes in accordance with manufacturer's requirements.

.2 Provide bonding to ensure protected components are electrically continuous.

.3 Locate test stations as follows:

.1 At existing Service kiosk located on the wharf deck (5 stations) – as directed by Departmental Representative.

.4 Restore corrosion protective coatings and wraps damaged during installation.

3.3 Field Quality Control

.1 Section 01 45 00: Field inspection and testing.

.2 Conform to NACE SP0177.

END OF SECTION

APPENDIX

Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
GENERAL (to be incorporated into all activities below)	1. Ensure all personnel involved with activities are adequately trained and utilize appropriate personal protective equipment. 2. Storage of fuels and petroleum products will comply with safe operating procedures, including containment facilities in case of a spill. 3. Waste or any miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the marine or terrestrial environment. 4. Onsite crews will have emergency spill equipment available. 5. All activities should be completed in such a way as to minimize stress and disturbance to resident flora and fauna. 6. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project. 7. Aesthetic effects created by activities will be short-term and localized. Sites should be kept in a tidy manner during activities and left in a good condition at the end of the project. 8. Archaeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit.
MACHINERY OPERATION	1. All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 2. Vehicles should not be operated below the line of Highest High Water in the intertidal zone. 3. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimise the footprint of the project. 4. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.
POWER-WASHING	1. Activities should be completed in such a way as to minimise the amount of fines and organic debris that may enter nearby aquatic environments.
EXCAVATION/ROCK DRILLING	1. Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock remain small and localized. 2. Dust and fines entering the water must be avoided. 3. Archeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if

Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
EXCAVATION/ROCK DRILLING continued	evidence shows a potential archaeological artifact or deposit. 4. Loose material at excavation sites should be managed to avoid excessive migration of silt and debris to nearby waters, especially during heavy rainfall events. 5. All excavation below Highest High Water should be completed by hand, as no vehicles should be operated in the intertidal zone. 6. Any blasting will follow the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
PILE INSTALLATION	1. All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. 2. Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). 3. Proper notice should be given to transportation authorities to warn of potential disruptions to navigability during works. 4. Whenever Contractors are working in areas where spawning is present, appropriate monitoring by a qualified person will be undertaken and activities ceased if spawn disruption is apparent. 5. Where possible, new timber piles will comply with the BMP for the use of treated wood in aquatic environments as developed by the Canadian Institute of Treated Wood and the Western Wood Preservers Institute. 6. Where the BMP pilings are not available, creosote piling will stand for a minimum of 45 days prior to installation. These requirements are for new pilings only and will not restrict the use of re-used timber pilings. Reused pilings will not be subject to any additional treatments. 7. If pile installation activities are causing fish kill, work must cease immediately and contractors will be responsible for introducing effective means of reducing the level of shock waves or introduce measures that will protect fish from entering the potentially harmful shock wave area. For example, appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile that would defuse the shock waves to an acceptable level. 8. If, after preventive measures are introduced, visual monitoring reveals unacceptable conditions (fish kill), then work will stop immediately and the system reviewed and corrected. 9. Any instances of fish kill must be reported to the appropriate agencies (DFO). 10. When cleaning out pipe piles (i.e. air lifting), if the material that is to be removed inside the pipe is non-toxic, then it shall be redistributed in a manner that will minimize damage to the surrounding aquatic fish habitat.

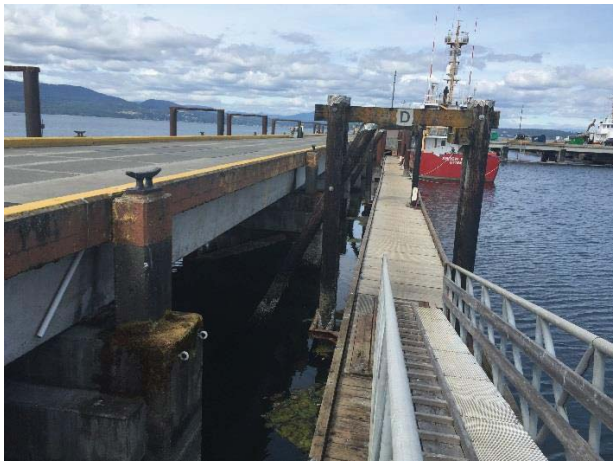
Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
CONCRETE WORKS	1. When pouring concrete all spills of fresh concrete must be prevented. If concrete is discharged from the transit mixer directly to the form work or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews will ensure that concrete forms are not filled to overflowing. 2. All concrete forms will be constructed and sealed in a manner which will prevent fresh concrete or cement laden water from leaking into the surrounding water. 3. All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash off water from entering the marine environment. The wash water will be contained and disposed of upland in an environmentally acceptable manner.
SITE ACCESS	1. Site access practices must be undertaken with regard to resident flora and fauna, especially during times of the year when they are most sensitive.
AID MAINTENANCE	1. Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. 2. Power washing activities must follow mitigation provided under “POWER-WASHING” 3. An approach of “contain and recover” should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of properly. 4. Painting activities should be completed in such a way as to minimise the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered.
PILE REMOVAL	1. Contractors will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). 2. When demolition is required on timber pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. All demolition operations should be monitored in order to control and contain the construction debris.
CONCRETE BASE REMOVAL	1. Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). 2. All debris deposited throughout the life of the aid should be removed from the site.
CONCRETE BASE ABANDONMENT	1. Care should be taken to remove all components of the Fixed Aid that are not incorporated into the concrete base.

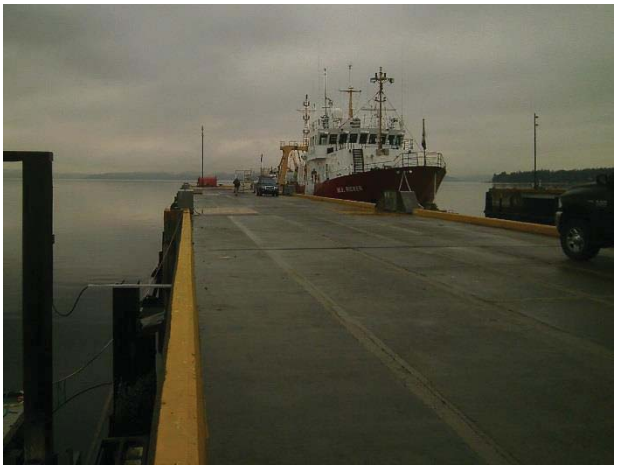
Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
CONCRETE BASE ABANDONMENT continued	2. All debris deposited throughout the life of the aid should be removed from the site. 3. Areas near the base should be protected from excessive disturbance. 4. Concrete base abandonment will be conducted only in remote sites, where aesthetic effects are not a concern.

IOS CONCRETE WHARF – SITE PHOTOGRAPHS - 2015



IOS CONCRETE WHARF – SITE PHOTOGRAPHS - 2015



IOS WHARF VESSEL MOORAGE SCHEDULE
JANUARY 2016 - JUNE 2016

VESSEL MOORED

Self Maintenance

Refit

Month	Day	GORDON REID	TANU	JOHN P TULLY	W E RICKER
JANUARY	2	DRYDOCK 28 DAYS DEC 31 - JAN 28		JAN. 05 CC - WHITE ON. PATROL 15-11 CC-PH	JANUARY 05 CC - WHITE ON. PATROL 15-11 CC:IOS
	4		JANUARY 06 CC - WHITE ON. PATROL 15-11 CC:IOS		
	6				
	8		REFIT 14 DAYS JAN 06 - 20	SAR	
	10				
	12				LAY-UP
	14				
	16				
	18				
	20		SELF MAINTENANCE 14 DAYS JAN 20 - FEB 03		
	22				
	24				
	26	JANUARY 28 CC - RED ON. PATROL 15-12 CC:TBD			
	28				
	30				
FEBRUARY	2		FEBRUARY 03 CC - RED ON. PATROL 15-12 CC:IOS	FEBRUARY 02 CC - RED ON. PATROL 15-12 CC-PH	FEBRUARY 02 CC - RED ON. PATROL 15-12 CC:IOS
	4		MOB - FEB 03-05 (2 DAYS)		
	6		Transit to SAR Area - FEB 05-06 (1 DAY)	SAR	
	8			Transit from SAR Area - FEB 07-08 (1 DAY)	
	10	REFIT 28 DAYS JAN 28 - FEB 25		Robert 14 Days. Feb 08 - 22.	
	12				REFIT 28 DAYS FEB 02 - MAR 01
	14		SAR		
	16				
	18				
	20				
	22			Transit to SAR Area - FEB 22-23 (1 DAY)	
	24	FEB.25 CC - WHITE ON. PATROL 15-13 CC:IOS			
	26			SAR	
	28				
	30				
MARCH	2		MARCH 02 CC - WHITE ON. PATROL 15-13 CC:PH	MARCH 01 CC - WHITE ON. PATROL 15-13 CC-PH	MARCH 01 CC - WHITE ON. PATROL 15-13 CC:IOS
	4	REFIT 14 DAYS FEB 25 - MAR 10		SAR/Science - FORD 14 Days - March 01 - 15	MOB + TRANSIT to PBS - 2 DAYS Mar 01 - 03
	6				Coblani - 11 Days. Mar 03 - 14
	8				20' container on deck for Coblani trip
	10				
	12	SELF MAINTENANCE 14 DAYS MAR 10 - 24			
	14				Gauthier - 13 Days. Mar 14 - 27
	16			SAR - 14 Days. March 15 - 29	
	18				
	20		SAR		
	22				
	24	MARCH 24 CC - RED ON. PATROL 16-01 CC:IOS			
	26	MOB - MAR 24-27 (2 DAYS)			TRANSIT + DEMOB - 2 DAYS Mar 27 - 29
	28	Transit to SAR Area -MAR 27-28 (1 DAY)		Transit from SAR Area - MAR 28-29 (1 DAYS)	MARCH 29 CC - RED ON. PATROL 16-01 CC:IOS
	30	SAR	MARCH 30 CC - RED ON. PATROL 16-01 CC:PH	REFIT 14 DAYS	REFIT 14 DAYS

IOS WHARF VESSEL MOORAGE SCHEDULE
JANUARY 2016 - JUNE 2016

VESSEL MOORED

Self Maintenance

Refit

Month	Day	VECTOR	NEOCALIGUS	MARTIN CHARLES	OTTER BAY
JANUARY	2			REFIT - 14 DAYS	LAY-UP
	4				
	6	JANUARY 06 CC - WHITE ON. PATROL 15-11	SELF MAINTENANCE 14 DAYS		
	8		JAN 4 - 18		
	10				
	12	DRYDOCK 28 DAYS			
	14	JAN 06 - FEB 03		SELF MAINTENANCE - 14 DAYS	
	16				
	18				
	20		LAY-UP - 21 DAYS. JAN 18 - FEB 07		
	22				
	24				
	26			JANUARY 27 CC - RED ON. PATROL 15-12 CC:IOS	
	28			MOB - 2 DAYS JAN 27 - 29	
	30				
FEBRUARY	2	FEBRUARY 03 CC - RED ON. PATROL 15-12 CC:TBD			
	4				
	6	MOB - 5 DAYS & Transit to IOS	Maintenance Day Feb 08		
	8		FONG - 10 DAYS. FEB 09 - 18	EFM	
	10				
	12				LAY-UP
	14	SELF MAINTENANCE 23 DAYS			
	16	FEB 8 - MAR 02			
	18				
	20		DE-MOB - 1 DAY. FEB 19		
	22		LAY-UP - 6 DAYS. FEB 20 - 26		
	24			FEBRUARY 24 CC - WHITE ON. PATROL 15-13	
	26				
	28				
	30				
MARCH	2	MARCH 02 CC - WHITE ON. PATROL 15-13 CC:IOS			MARCH 01 CC - WHITE ON. PATROL 15-13 CC:IOS
	4	MOB - 2 DAYS - Mar 02 - 04		EFM	
	6	Crowe - UBC - 2 Days Mar 04 - 06			
	8		Resource Management - Herring		
	10		24 Days - Feb 26 - March 20		
	12				SELF MAINTENANCE
	14	C&P - 23 Days - Mar 06 - 29			
	16				
	18				
	20				
	22		DE-MOB - 1 DAY. March 21	MARCH 23 CC - RED ON. PATROL 16-01	
	24				
	26		LAY-UP - 9 days March 22-31		
	28	Maint. Day - 1 Day - MAR 29 - 30		EFM	MARCH 29 CC - RED ON. PATROL 16-01 CC:IOS
	30	MARCH 30 CC - RED ON. PATROL 16-01 CC:IOS			

IOS WHARF VESSEL MOORAGE SCHEDULE
JANUARY 2016 - JUNE 2016

VESSEL MOORED

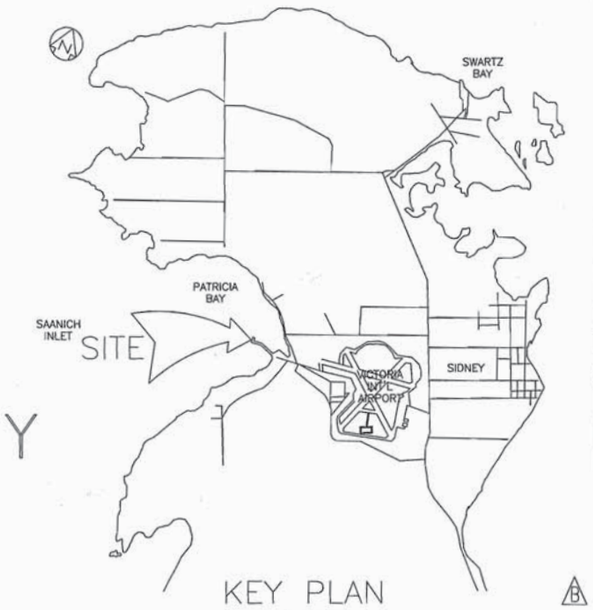
Self Maintenance

Refit

Month	Day	JOHN P TULLY	W E RICKER	NEOCALIGUS	DUMIT
APRIL	2	MARCH 29 CC - RED ON. PATROL 16-01 CC-IOS	MARCH 29 CC - RED ON. PATROL 16-01 CC-IOS	Self-maintenance 14 Days Apr 01 - 14	LAY-UP
	4				
	6				
	8	Refit 14 Days Mar 29 - Apr 12	Refit 14 Days Mar 29 - Apr 12		
	10				
	12				
	14				
	16				
	18	Self-maintenance 14 Days Apr 12 - Apr 26	Self-maintenance 14 Days Apr 12 - Apr 26	Neocaligus crew changes at PBS Nanaimo all year long. (99% of the time.)	
	20				
	22				
	24				
	26	APRIL 26 CC - WHITE ON. PATROL 16-02	APRIL 26 CC - WHITE ON. PATROL 16-02		
	28	MOB 2 DAYS APR 26-28	MOB 2 DAYS APR 26-28		
	30		CC:IOS		
MAY	2				
	4				
	6				
	8				
	10				
	12				
	14				
	16				
	18				
	20				SELF MAINTENANCE - 4 weeks ending Jun 6 May 09 - Jun 05
	22		Maint. Day - 1 day May 23-24		
	24	MAY 24 CC - RED ON. PATROL 16-03	MAY 24 CC - RED ON. PATROL 16-03 CC:PBS		
	26	CC:IOS			
	28				
	30				
JUNE	2				
	4				
	6				
	8				MOB 5 DAYS JUN 06-10
	10				
	12				
	14				
	16				
	18		Maint. Day - 1 day Jun 20-21		
	20	JUNE 21 CC - WHITE ON. PATROL 16-04	JUNE 21 CC - WHITE ON. PATROL 16-04 CC:PBS		
	22	CC:IOS			
	24				
	26				
	28				
	30				

Public Works and Government Services Canada

PATRICIA BAY, B.C. MARINE FACILITY
WHARF SEISMIC RETROFIT



KEY PLAN
N.T.S.

DRAWING No:	TITLE:
142232-8200	COVER SHEET
142232-8201	GENERAL NOTES
142232-8202	GENERAL ARRANGEMENT
142232-8203	EXISTING SECTIONS
142232-8204	BENT RETROFITS
142232-8205	BENT AND CRIB RETROFITS - SHEET 1 OF 2
142232-8206	BENT AND CRIB RETROFITS - SHEET 2 OF 2
142232-8207	TYPICAL DETAILS

REFERENCE DRAWINGS

89323-S1	EXISTING STRUCTURE SITE PLAN
89323-S2	GENERAL ARRANGEMENT
89323-S3	DREDGING PLAN

△B (SEE EDRM DRAWING NUMBER NOTE THIS DRAWING)

Public Works and Government Services Canada / Travaux publics et Services gouvernmentaux Canada

Pacific Region / Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8200

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, #82381 and #82455 SHEETS 1-4.

number	revision / revision	date
B	AS BUILT	03.30.01
	ISSUED FOR TENDER	02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet: PATRICIA BAY, B.C. MARINE FACILITY

drawing / dessin: WHARF SEISMIC RETROFIT COVER SHEET

designed / concu
date / date
drawn / dessine
date / date
approved / approuve
date / date
Tender / Soumission
PWGSC Project Manager / Administrateur de projets TPSGC
project number / numéro du projet: 850497

drawing number / numéro du dessin: 142232-8200
rev.: B

EDRM #81911 (Version 2)
PLOT 1:1

142232-8200

STRUCTURAL DESIGN CRITERIA

1. DESIGN CODES ARE: AASHTO, CSA A23.3, CSA S16.1
2. ELEVATION RELATIVE TO LOWER LOW WATER (LLW) 0.0m.
3. HIGH WATER MARK (HWM) 3.87m.
4. EARTHQUAKE (1/475)
   PEAK HORIZONTAL GROUND ACCELERATION 0.337g
   PEAK HORIZONTAL GROUND VELOCITY, 0.286m/s
   ACCELERATION RELATED SEISMIC ZONE, Za 6
   VELOCITY RELATED SEIMIC ZONE, Zv 5
   RESPONSE MODIFICATION FACTOR (R) ≤ 2
5. NO LOAD ALLOWANCE FOR FUTURE TOPPING IS MADE IN THIS DESIGN.

GENERAL NOTES

1. REFER TO TECHNICAL SPECIFICATIONS WHICH ARE TO BE READ IN CONJUCTION WITH THESE DRAWINGS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. BERTH FACE IS ESTABLISHED AS THE FACE OF THE FENDER CAMEL.

CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO CSA STANDARD A23.1–00.
2. ALL EXPOSED CONCRETE EDGES TO BE CHAMFERED 20mm UNLESS NOTED OTHERWISE.
3. CLEAR COVER TO ALL REINFORCEMENT TO BE 50mm UNLESS NOTED OTHERWISE.
4. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 35 MPa (fc') AT 28 DAYS

fc'	CLASS	TYPE	NOMINAL SIZE OF COARSE AGGREGATE	SLUMP	AIR CONTENT	DENSITY OF AIR DRY CONCRETE	MAXIMUM W/C RATIO
35 MPA	C1	20	20mm	80 ± 30mm	5 TO 8%	2300±150kg/m³	0,40

5. CONCRETE TESTING TO BE DETERMINED IN ACCORDANCE WITH CSA STANDARD A23.2–94.
6. SET EMBEDDED STEEL TRUE TO POSITION SHOWN WITHIN ±3mm.

REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO CAN/CSA–G30.18–M92 GRADE 400R.
2. FABRICATION DETAILS TO CONFORM TO CSA A23.1.
3. NO WELDING OF REINFORCEMENT IS PERMITTED, UNLESS NOTED OTHERWISE.
4. THREADED COUPLERS SHALL DEVELOP A MINIMUM OF 125% OF THE SPECIFIED STRENGTH OF THE BAR.
5. NO SPLICES IN THE MAIN REINFORCING BARS IS PERMITTED UNLESS NOTED OTHERWISE.
6. WHERE NOT SHOWN ON THE DRAWINGS, SPLICES IN THE SECONDARY REINFORCEMENT SHALL CONFORM TO THE FOLLOWING:
   –NO MORE THAN ONE HALF OF TENSION REINFORCEMENT SHALL BE SPLICED AT ANY LOCATION.
   –LAP SPLICES IN TENSION REINFORCEMENT SHALL BE STAGGERED BY A MINIMUM OF ONE SPLICE LENGTH.
7. REINFORCING DEVELOPMENT AND SPLICE LENGTH SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:

BAR SIZE	CLASS B TENSION SPLICE (mm)	STRAIGHT BAR DEVELOPMENT (mm)	HOOKED DEVELOPMENT (mm)
10M	340	260	190
15M	480	370	270
20M	590	450	330
25M	830	640	430
30M	1170	900	510
35M	1680	1290	610

DEVELOPMENT OF TOP BARS WITH MORE THAN 300mm OF CONCRETE CAST BELOW THE BAR TO BE 1.4 TIMES THAT SHOWN IN TABLE.

GROUT

1. UNDER BASE PLATES USE PRE–MIXED CEMENTITIOUS, FLOWABLE NON SHRINK GROUT CONFORMING TO ASTM C1107. MINIMUM COMPRESSIVE CUBE STRENGTH OF 21MPa AT 3 DAYS AND 45MPa AT 28 DAYS.
2. FOR TENSION ANCHORS USE CEMENT, SAND AND WATER NON–SHRINK SULPHATE RESISTANT GROUT. MINIMUM COMPRESSIVE CUBE STRENGTH OF 30MPa AT 28 DAYS.

STRUCTURAL AND MISCELLANEOUS STEEL

1. ALL ROLLED OR WELDED SECTIONS AND PLATES SHALL CONFORM TO CAN/CSA G40.20/G40.21, GRADE 300W.
2. PIPE FOR TENSION ANCHORS SHALL CONFORM TO ASTM A53 GRADE B.
3. ALL EMBEDDED ANCHOR BOLTS TO BE GALVANIZED AND CONFORM TO ASTM A307 GRADE A.
4. TENSION ANCHORS TO BE DOUBLE CORROSION PROTECTED THREADBAR AS MANUFACTURED BY DYWIDAG SYSTEMS INTERNATIONAL OR APPROVED EQUAL, IN ACCORDANCE WITH CSA G30.18–M92 GRADE 413/620 MPa.
5. HOT DIP GALVANIZE STEEL WHERE INDICATED TO CAN/CSA G164, MINIMUM ZINC COATING OF 600 g/m².
6. STRUCTURAL STEEL ERECTION BOLTS SHALL CONFORM TO ASTM A325 TYPE 1 ZINC COATED UNLESS NOTED OTHERWISE.
7. ALL BOLTED CONNECTIONS TO BE BEARING TYPE WITH THREADS EXCLUDED FROM SHEAR PLANES UNLESS NOTED OTHERWISE.
8. PAINTING TO BE IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.
9. MINIMUM THICKNESS OF CONNECTION PLATES IS 6mm.
10. 32mmø THREADED RODS TO BE WILLIAMS ALL–THREADED (GRADE 150 KSI) OR EQUIVALENT.

WELDING

1. WELDING, MATERIAL AND WELDERS SHALL COMPLY WITH CSA–W59 AND CSA–W47.1.
2. MINIMUM WELD SIZE TO BE 6mm UNLESS NOTED OTHERWISE.
3. ALL WELDS TO BE CONTINUOUS UNLESS NOTED OTHERWISE.
4. ELECTRODES SHALL BE IN ACCORDANCE WITH CSA STANDARD W48.1–M.
5. ELECTRODES TO BE E480XX CLASSIFICATION.
6. SEAL WELD ALL WELDED JOINTS.

ELASTOMERIC BEARINGS

1. THE ELASTOMER USED SHALL BE NATURAL RUBBER, GRADE 3, 1.0MPa SHEAR MODULUS.
2. BEARING PLATES TO BE MACHINED TO PROVIDE 90% BEARING.
3. SHEAR STUDS TO CONFORM TO ASTM A108 GRADE 1015, 1018 OR 1020 ø 22x120 UNLESS NOTED OTHERWISE.
4. ALL EXPOSED PLATE TO BE GALVANIZED PER CAN/CSA G164 (REMOVE GALVANIZING IN AREA OF BONDED PAD BEFORE VULCANIZATION.)
5. ALL STEEL PLATE SHALL CONFORM TO CAN/CSA G40.20/G40.21, GRADE 300W.
6. ELASTOMER TO BE SHIELDED FROM WELDING ARC.
7. ALTERNATE WELD PASSES BETWEEN OPPOSITE SIDES TO AVOID OVERHEATING CONCRETE OR RUBBER.

TENSION ANCHORS							
	BAYLINE	ROCK EMBEDMENT (m)	APPROXIMATE (N) LENGTH (m)	(S)	No. OF BARS	BATTER 1:5	P/T (kN)
APPROACH	2	9.0	21.8	21.5	2	1:5	400
	3	9.0	23.0	23.3	2	1:5	400
	4	9.0	22.7	22.4	2	1:5	400
	5	9.0	22.0	22.1	2	1:5	400
	6	9.0	22.0	22.7	2	1:10	400
	7	9.0	23.0	24.2	2	1:5	400
	8	9.0	24.2	23.6	2	1:10	400
	9	9.0	23.6	24.2	2	1:5	400
	10	9.0	24.2	23.0	2	1:5	400
PIER 1	14	9.0	23.0	23.0	2	1:5	450
	17	9.0	22.7	23.6	2	1:5	450
	20	9.0	24.2	24.0	2	1:5	450
	23	9.0	24.2	24.0	2	1:5	450
PIER 2	14	9.0	24.0	24.0	2	1:5	450
	17	9.0	24.0	24.0	2	1:5	450
	20	9.0	24.0	24.0	2	1:5	450
CROSS PIER	C	9.0	23.9	23.9	2	1:5.5	620
	D	9.0	24.0	24.2	2	1:5.5	620
	E	9.0	24.5	24.0	2	1:5.5	620
			(WEST) PILE	(EAST) PILE			

NOTES:
1. P/T FORCES ARE NET AFTER LOSSES.

(CROSS PIER ONLY)

B

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

Pacific Region / Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232–8201

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS–BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, and #82381.

number	revision	revision	date
B	AS BUILT		03.30.01
	ISSUED FOR TENDER		02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

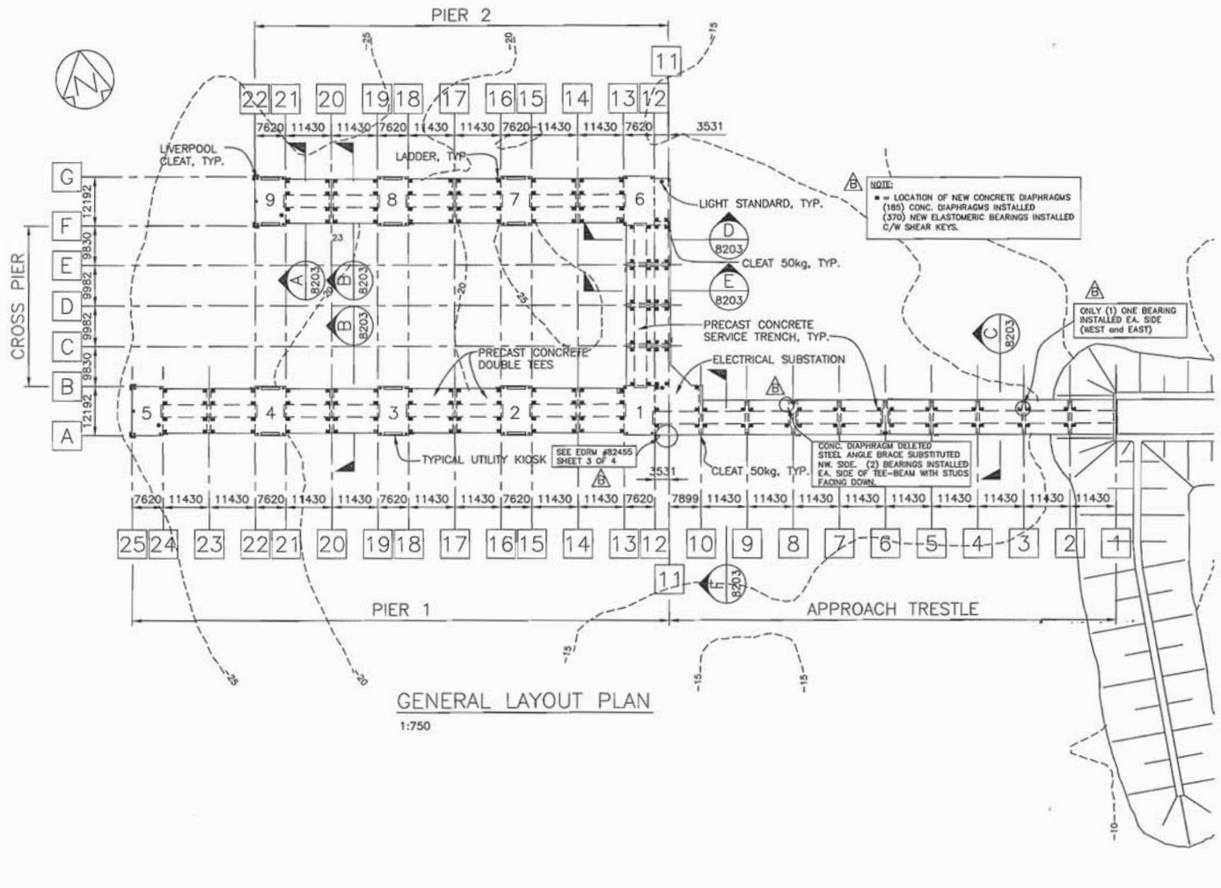
project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

drawing / dessin
WHARF SEISMIC RETROFIT
GENERAL NOTES

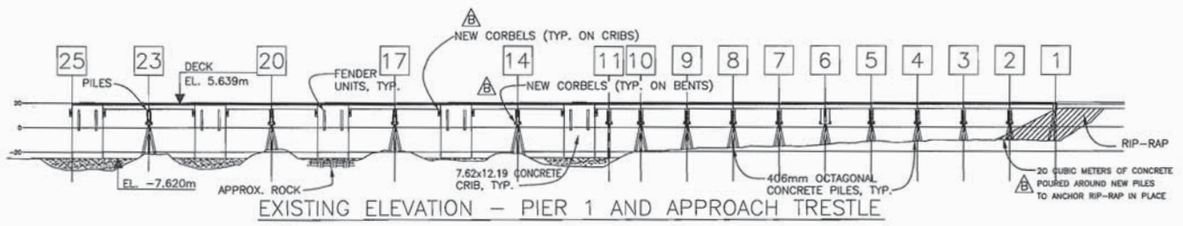
designed	GN	concu
date	01.12.15	date
drawn	DH	dessine
date	01.11.20	date
approved		approuve
date		date
Tender		Soumission
PWGSC Project Manager		Administrateur de projets TPSGC
project number		numéro du projet
850497		
drawing number / numéro du dessin	142232–8201	rev. B

EDRM #81912 (Version 2)
PLOT 1:1

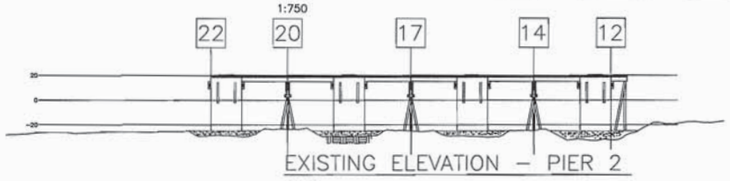
142232–8201



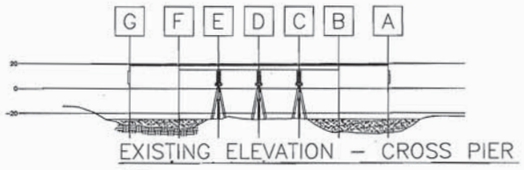
GENERAL LAYOUT PLAN
1:750



EXISTING ELEVATION – PIER 1 AND APPROACH TRESTLE
1:750



EXISTING ELEVATION – PIER 2
1:750



EXISTING ELEVATION – CROSS PIER
1:750

EXTENT OF SEISMIC RETROFITTING WORKS		
DESCRIPTION	DRAWINGS	BENTS
SEISMIC ANCHORS (2/BENT)	8204 8205 8207	2–10 14, 17, 20 (NORTH AND SOUTH) 23, C, D, E
PILE CAP STRENGTHENING (STEEL PLATES)	8204 8205	2–5, 7, 9, 10 14, 17, 20 (NORTH AND SOUTH) 23, C, D, E
PILE CAP STRENGTHENING AND SEATING RETROFIT	8204 8207	2–5, 7, 9, 10
CONCRETE CORBEL ON BENT CAPS	8205 8207	6, 8
CONCRETE CORBEL ON CAISSONS	8206 8207	3 SIDES – CAISSON 1 2 SIDES – CAISSONS 2, 3, 4, 6, 7, 8 1 SIDE – CAISSONS 5, 9
CONCRETE DIAPHRAGMS, BEARINGS & SHEAR KEYS	8204 8205 8207	2–10 14, 17, 20 (NORTH AND SOUTH) 23, C, D, E
CAISSON RETROFIT	TO COME	

B

NOTE:
BEARINGS REMOVED AT THE FOLLOWING LOCATIONS:
APPROACH TRESTLE
BENTS 2 THRU 9
BENT 10 – (4) BEARINGS NOT REMOVED ON NW. SIDE and (2) BEARINGS NOT REMOVED ON NE. SIDE
PIER 1
BENTS 14, 17, 20, and 23
CRIB #2 EAST WALL (4) BEARINGS REMOVED.
PIER 2
BENTS 14, 17, and 20
CRIBS #7, #8, and #9.
CROSS PIER
BENTS C, D, and E
CRIB #6 SOUTH WALL (4) BEARINGS REMOVED
SE. CORNER.

NOTES

1. DIMENSIONS AND ELEVATIONS OF EXISTING CRIBS AND PILED BENTS ARE FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY ACTUAL DIMENSIONS IN THE FIELD.

EDRM #81913 (Version 2)
PLOT 1:1

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

Pacific Region / Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8202

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, #82381 AND #82455 SHEETS 1 –4.

number	revision	date
B	AS BUILT	03.01.30
	ISSUED FOR TENDER	02.01.07

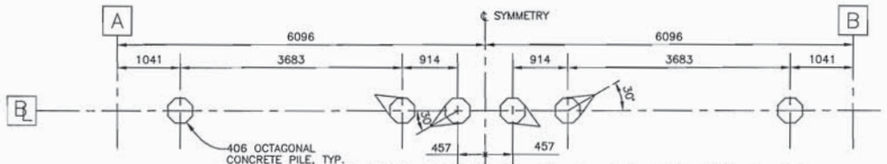
A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

drawing / dessin
WHARF SEISMIC RETROFIT
GENERAL ARRANGEMENT

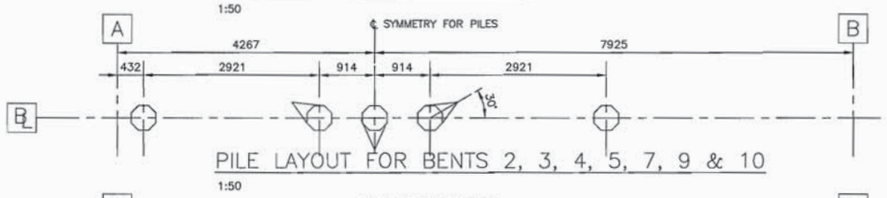
designed	GN	concu
date	01.12.15	date
drawn	DH	dessine
date	01.11.20	date
approved		approuve
date		date
Tender		Soumission
PWGSC Project Manager		Administrateur de projets TPSGC
project number		numéro du projet
850497		
drawing number	numéro du dessin	rev.
142232-8202		B

142232-8202



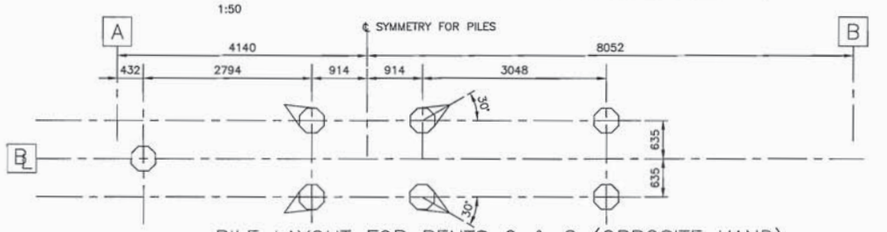
PILE LAYOUT FOR BENTS C, D, E, 14, 17, 20 & 23

1:50



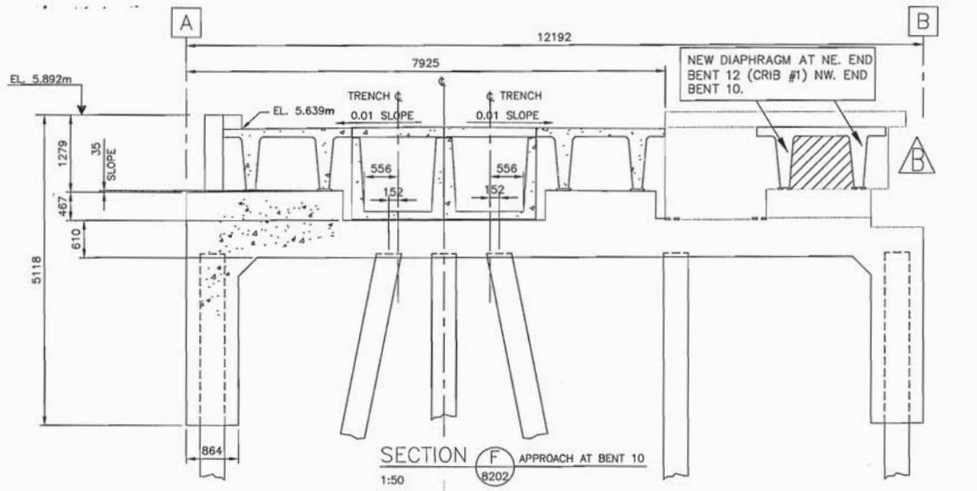
PILE LAYOUT FOR BENTS 2, 3, 4, 5, 7, 9 & 10

1:50



PILE LAYOUT FOR BENTS 6 & 8 (OPPOSITE HAND)

1:50

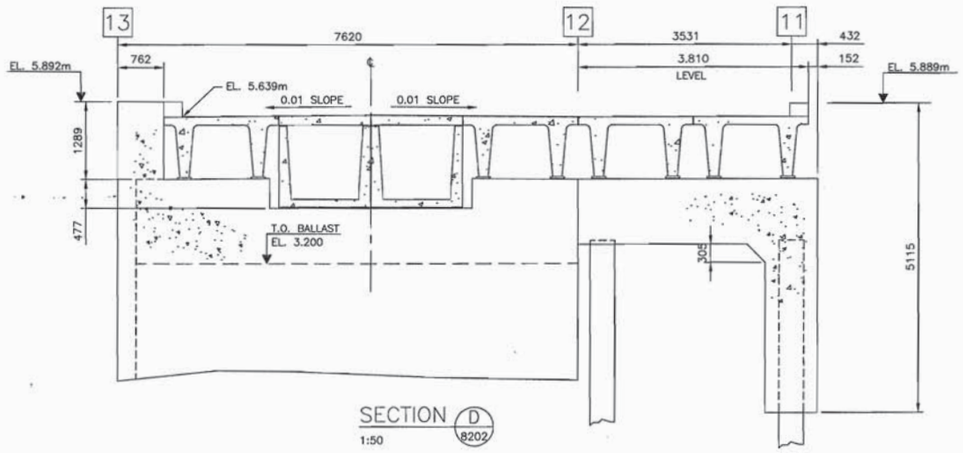


SECTION F APPROACH AT BENT 10 (8202)

1:50

SECTION C APPROACH, TYP. SYM. ABOUT ℄ (8202)

1:50



SECTION D (8202)

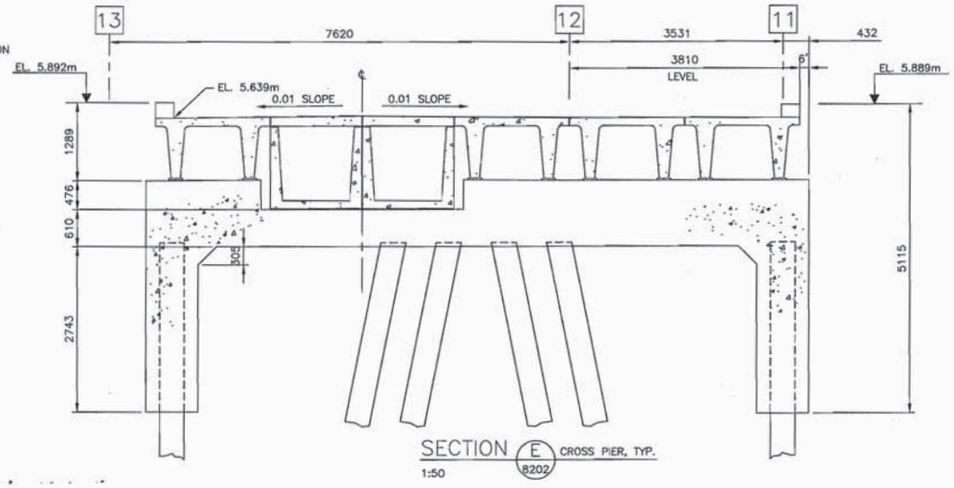
1:50

SECTION A CRIB, TYP. (8202)

1:50

SECTION B MAIN PIER, TYP. (8202)

1:50



SECTION E CROSS PIER, TYP. (8202)

1:50

NOTES

ALL DIMENSIONS ARE FOR REFERENCE ONLY.
CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.

EDRM #82238 (Version 2)
PLOT 1:1

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8203

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, #82381 and #82455 SHEETS 1-4.

number	revision	revision	date
B	AS BUILT		03.02.17
	ISSUED FOR TENDER		02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

drawing / dessin
WHARF SEISMIC RETROFIT
EXISTING SECTIONS

designed	GN	concu
date	01.12.15	date
drawn	DH	dessine
date	01.11.20	date
approved		approuve
date		date
Tender		Soumission

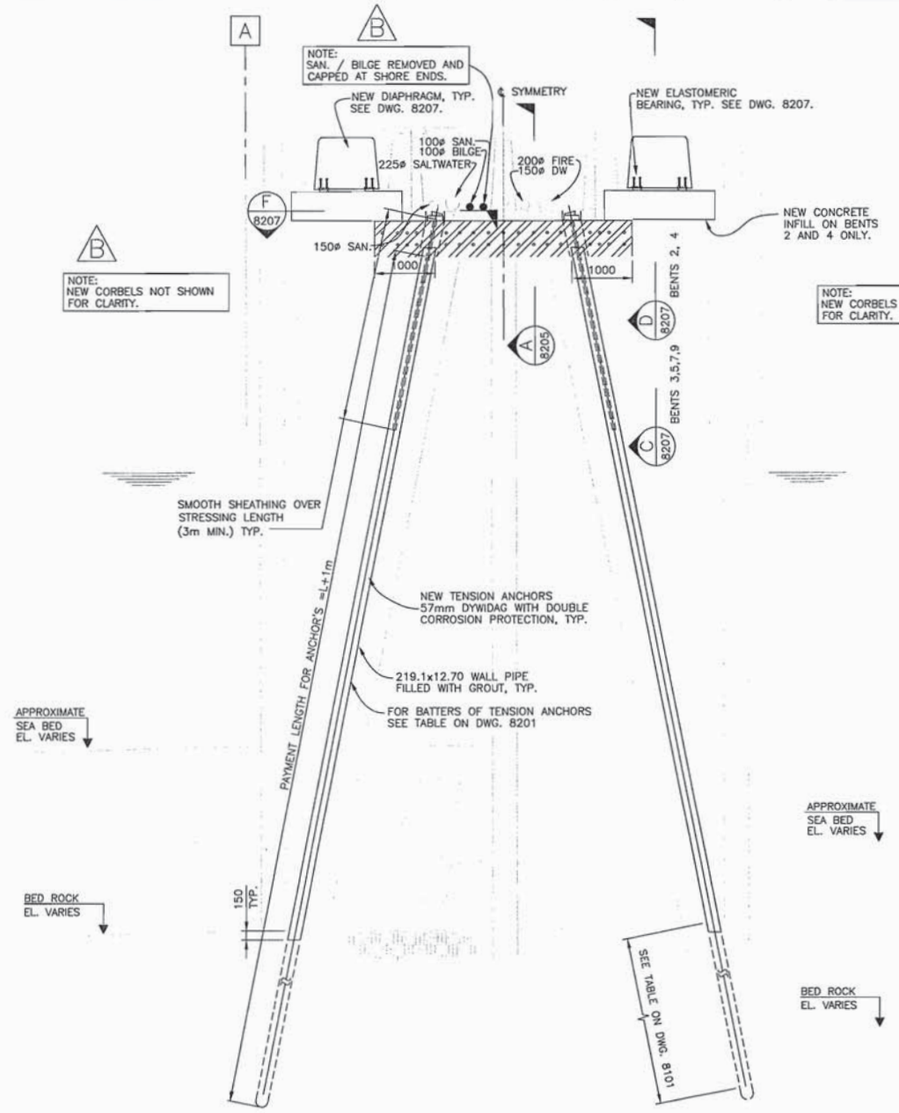
PWGSC Project Manager | Administrateur de projets TPSGC

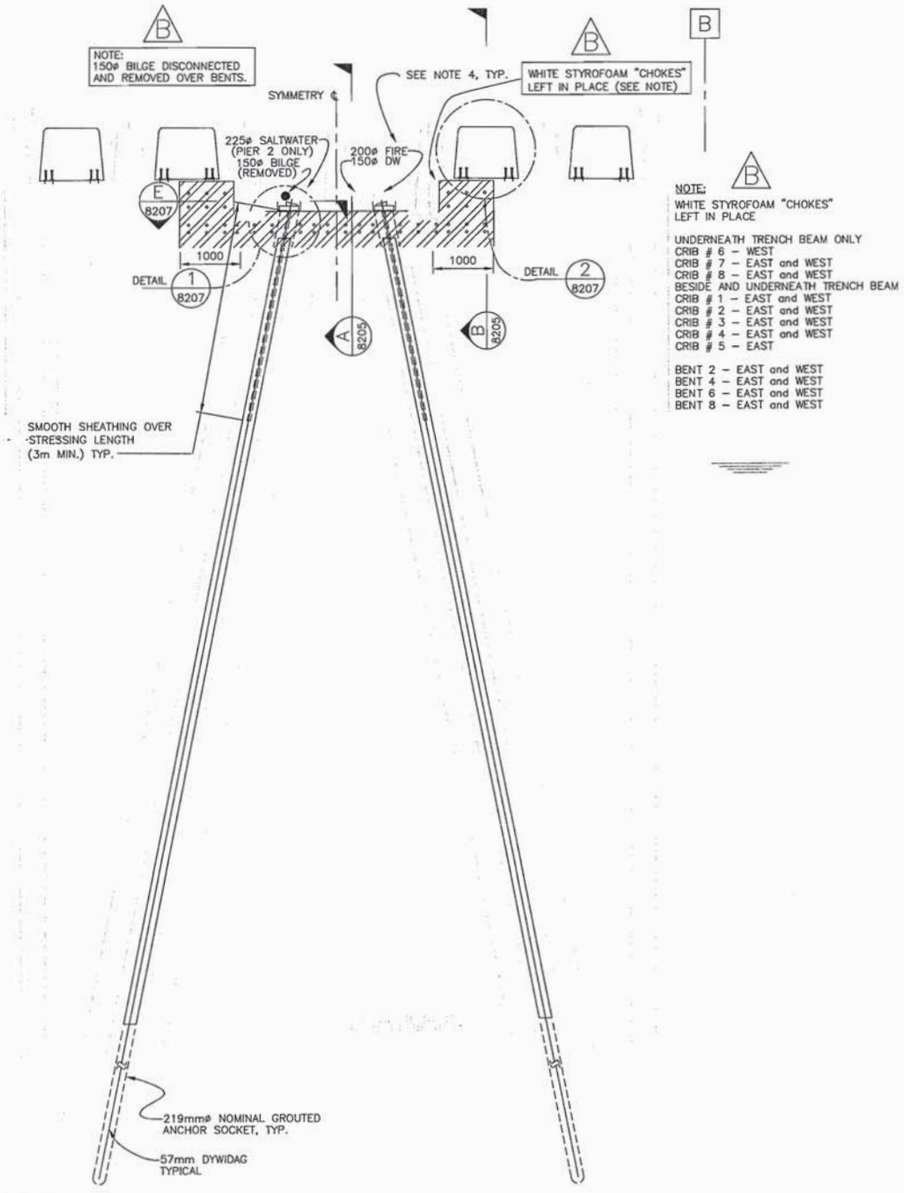
project number / numéro du projet
850497

drawing number / numéro du dessin
142232-8203

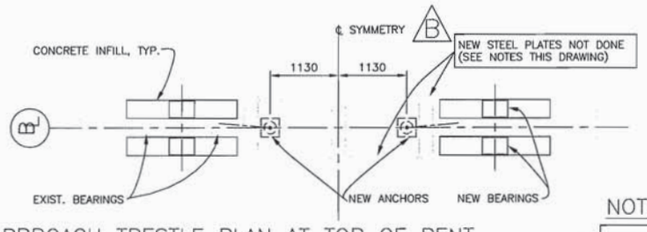
rev.
B

142232-8203





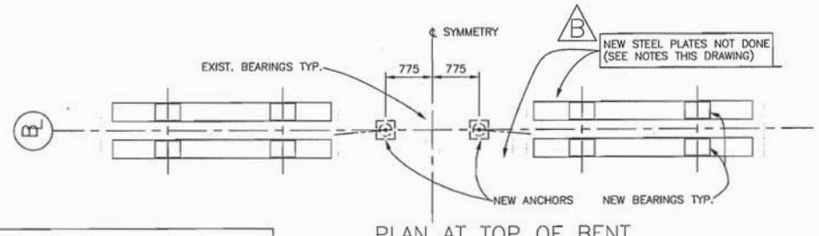
APPROACH TRESTLE
BENTS 2 & 4 (3, 5, 7, 9 AND 10 SIMILAR)
1:50



APPROACH TRESTLE PLAN AT TOP OF BENT
1:50

FINGER PIER 1
BENTS 14 – 20 (17 AND 23 SIMILAR)
1:50

FINGER PIER 2
BENTS 14 – 20 (17 SIMILAR)
1:50



PLAN AT TOP OF BENT
1:50

NOTES:

B NOT USED

2. PILE CAP STRENGTHENING TO BE IN PLACE PRIOR TO TESTING OF ANCHORS.
3. WHERE SURFACE HAS BEEN SHOTCRETED, USE 20–25mm GROUT PAD TO LEVEL SURFACE.
4. TEMPORARILY REMOVE UTILITY PIPES AS REQUIRED TO FACILITATE INSTALLATION OF TENSION ANCHORS. RE INSTALL PIPES TO THEIR ORIGINAL STATE. ADVISE ENGINEER IF DIFFICULTY ARISES WITH REPOSITIONING THE PIPES.

EDRM #82239 (Version 2)
PLOT 1:1

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

Pacific Region / Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8204

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, #82381 and #82455 SHEETS 1–4.

number	revision	revision	date
B	AS BUILT		03.02.17
	ISSUED FOR TENDER		02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

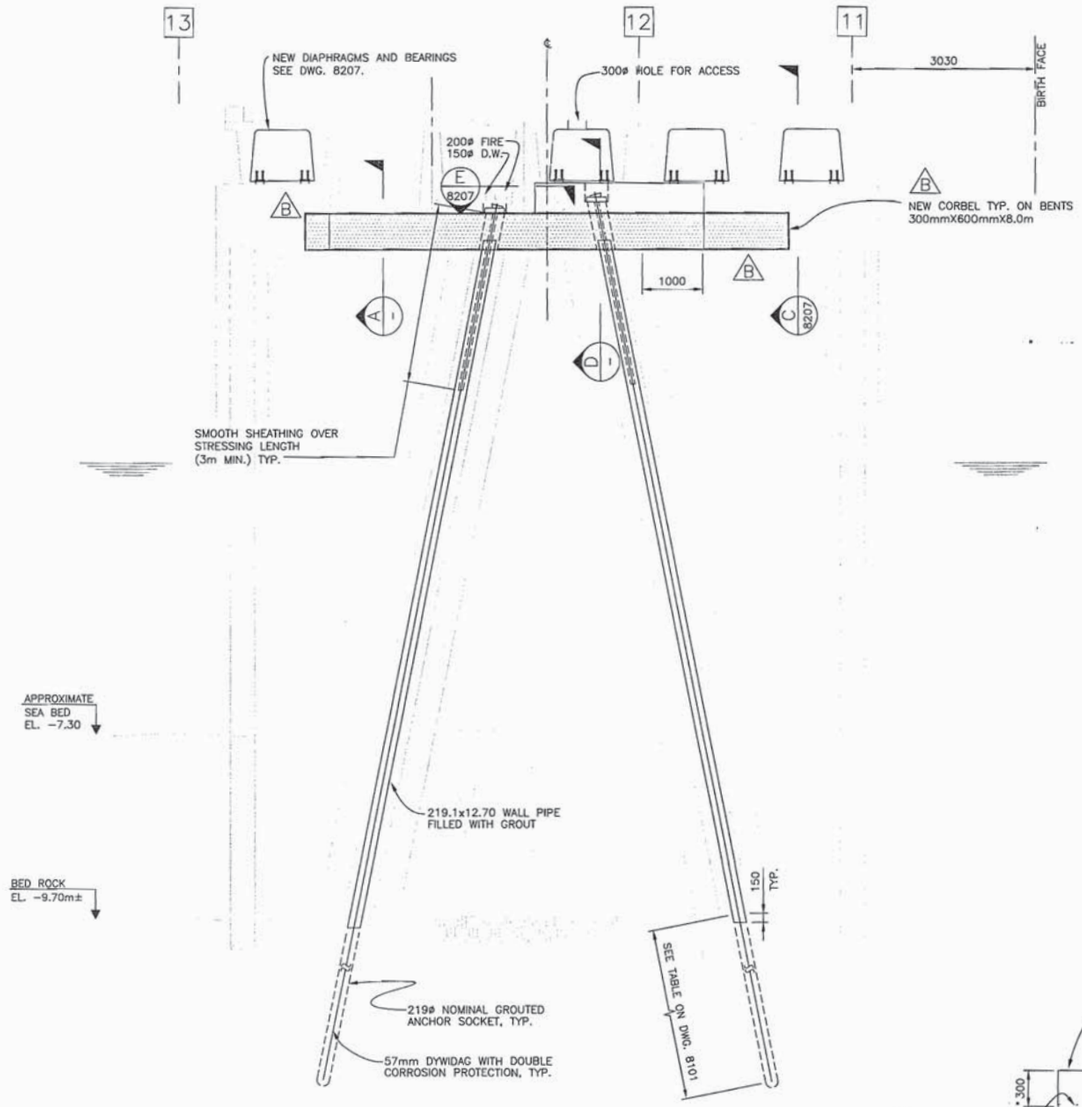
drawing / dessin
WHARF SEISMIC RETROFIT
BENT RETROFITS

designed LL / concu
date 01.12.15 / date
drawn DH / dessine
date 01.11.20 / date
approved / approuve
date / date
Tender / Soumission

PWGSC Project Manager / Administrateur de projets TPSGC
project number / numéro du projet
850497

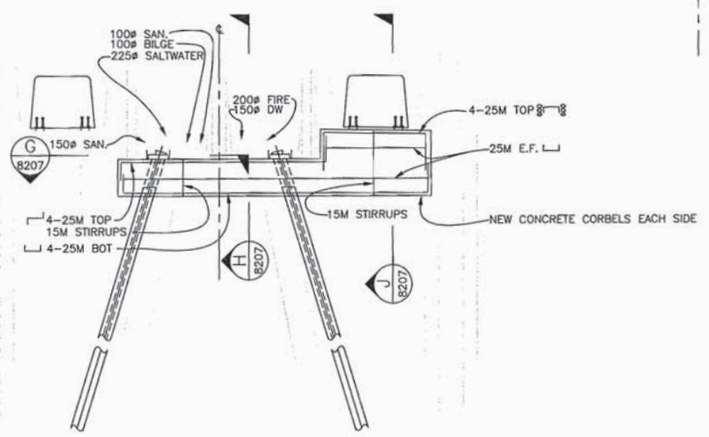
drawing number / numéro du dessin
142232-8204
rev. B

142232-8204



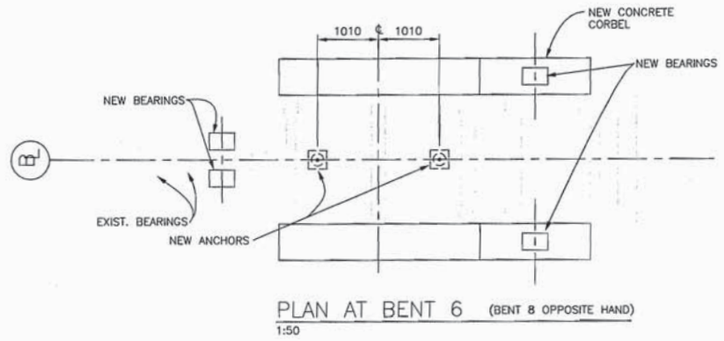
CROSS PIER AT BENT E (BENTS C AND D SIMILAR)

1:50



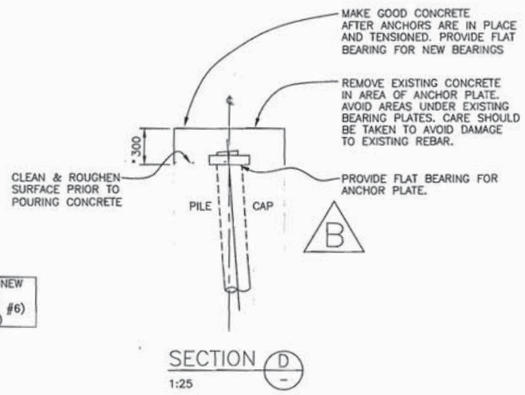
KIOSK PIER AT BENT 6 (BENT 8 OPPOSITE HAND)

1:50



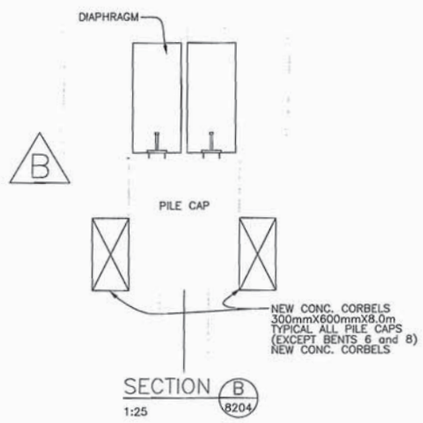
PLAN AT BENT 6 (BENT 8 OPPOSITE HAND)

1:50



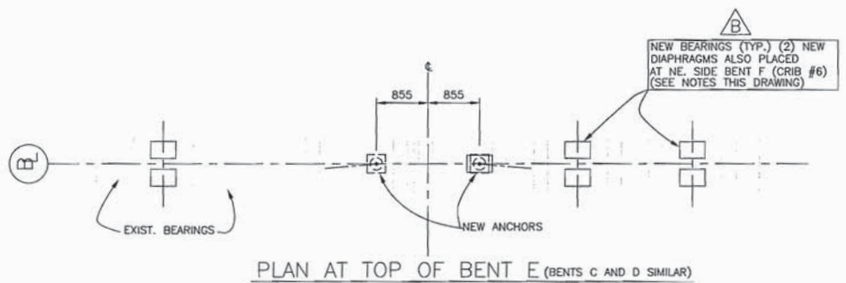
SECTION D

1:25



SECTION B 8204

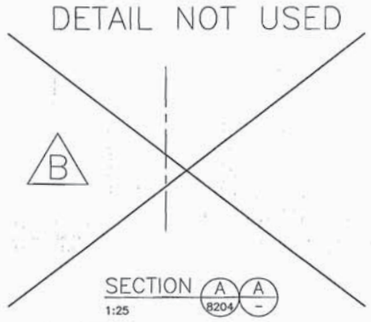
1:25



PLAN AT TOP OF BENT E (BENTS C AND D SIMILAR)

1:50

DETAIL NOT USED



SECTION A A 8204 -

1:25

NOTES

1. FOR RETROFIT NOTES SEE DWG. 8204.

EDRM #82248 (Version 2)
PLOT 1:1

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8205

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, and #82381.

number	revision	revision	date
B	AS BUILT		03.02.17
	ISSUED FOR TENDER		02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

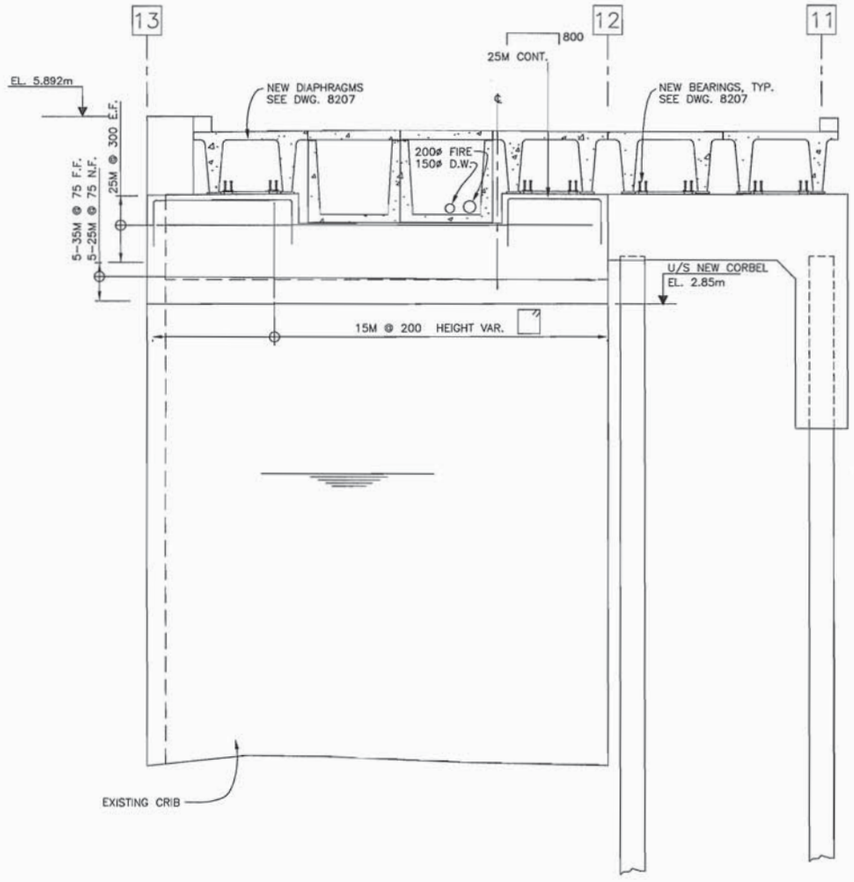
drawing / dessin
WHARF SEISMIC RETROFIT
BENT AND CRIB RETROFITS
SH. 1 OF 2

designed	LL	concu
date	01.12.15	date
drawn	DH	dessine
date	01.11.20	date
approved		approuve
date		date
Tender		Soumission

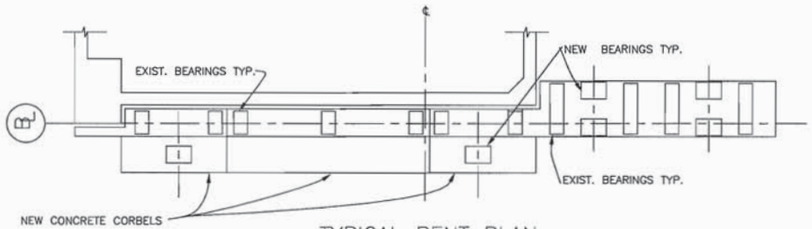
PWGSC Project Manager | Administrateur de projets TPSGC
project number / numéro du projet
850497

drawing number / numéro du dessin: 142232-8205
rev.

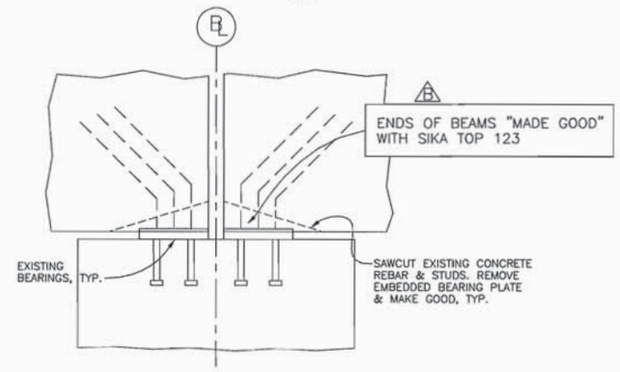
142232-8205



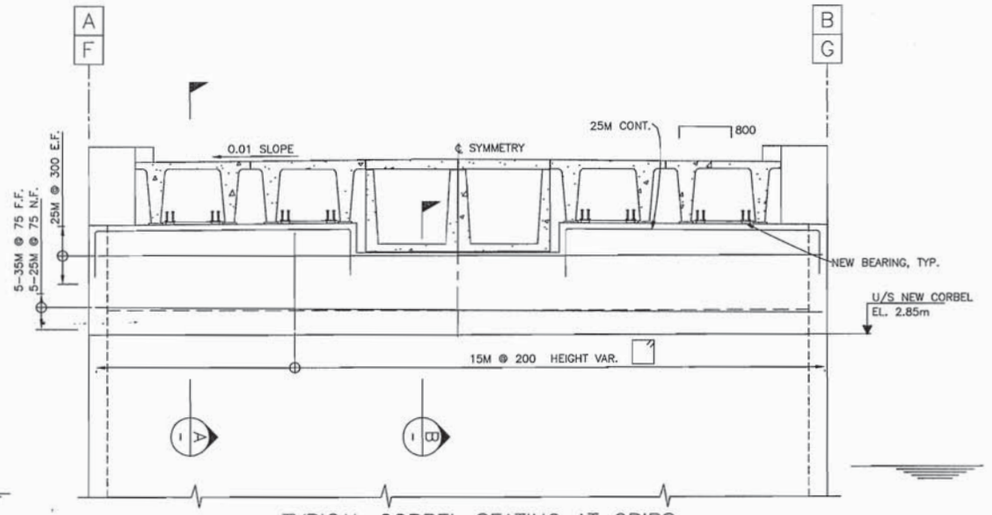
CROSS PIER AT BENT F @ SOUTH SIDE OF CRIB
1:50 NORTH SIDE OF CRIB 1 OPP. HANDED



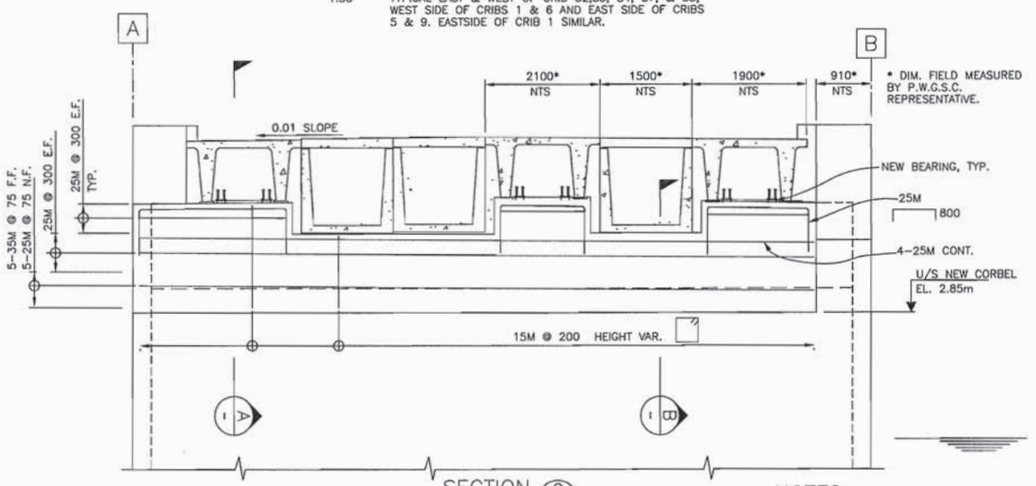
TYPICAL BENT PLAN
1:50



TYPICAL T-BEAM EXISTING BEARING
1:10



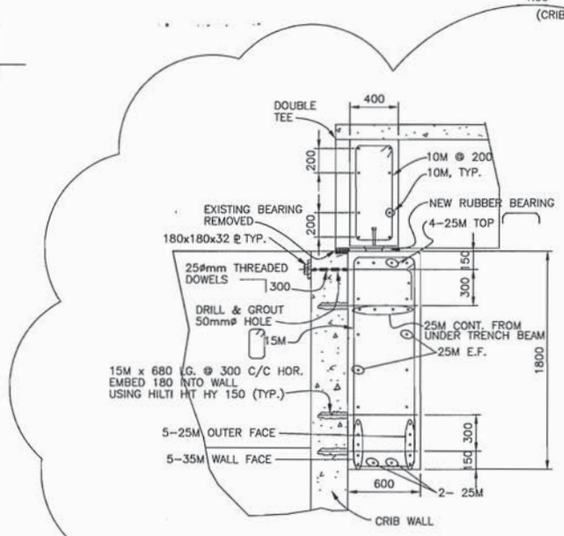
TYPICAL CORBEL SEATING AT CRIBS
1:50 TYPICAL EAST & WEST OF CRIB S2,S3, S4, S7, & S8, WEST SIDE OF CRIBS 1 & 6 AND EAST SIDE OF CRIBS 5 & 9. EASTSIDE OF CRIB 1 SIMILAR.



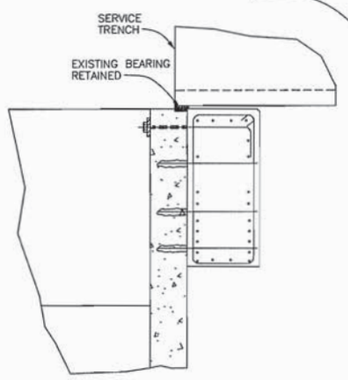
SECTION G 8202
1:50 (CRIB 1 EAST FACE)

NOTES:

1. FOR RETROFIT NOTES SEE DWG. 8204.
2. CONTRACTOR TO VERIFY THE LOCATIONS OF EXISTING CAISSON INTERIOR SLABS AND RIBS PRIOR TO CONSTRUCTION.
3. CONTRACTOR TO IMMEDIATELY NOTIFY ENGINEER IF THERE IS A DISCREPANCY.



SECTION A
1:25



SECTION B
1:25 SECTION @ TRENCH DETAILS SIM. TO SECTION A U.N.O.

EDRM #82249 (Version 2)
PLOT 1:1

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8206

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, and #82381.

number	revision	revision	date
B	AS BUILT		03.02.17
	ISSUED FOR TENDER		02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

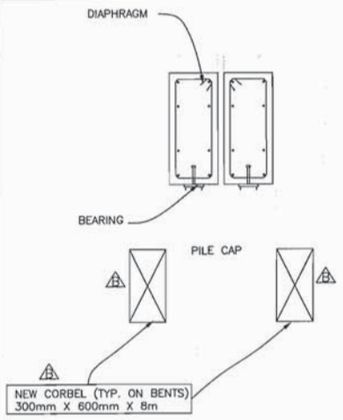
drawing / dessin
WHARF SEISMIC RETROFIT
BENT AND CRIB RETROFITS
SH. 2 OF 2

designed	LL	concu
date	01.12.15	date
drawn	DH	dessine
date	01.11.20	date
approved		approuve
date		date
Tender		Soumission

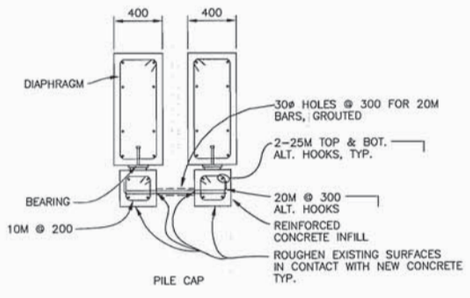
PWGSC Project Manager | Administrateur de projets TPSGC
project number / numéro du projet
850497

drawing number / numéro du dessin: 142232-8206
rev.: B

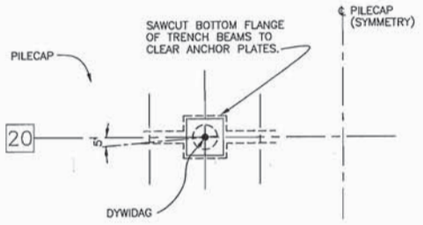
142232-8206



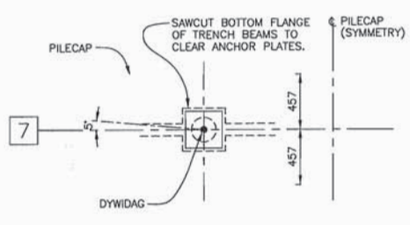
SECTION C/C (8204/8205)
1:25



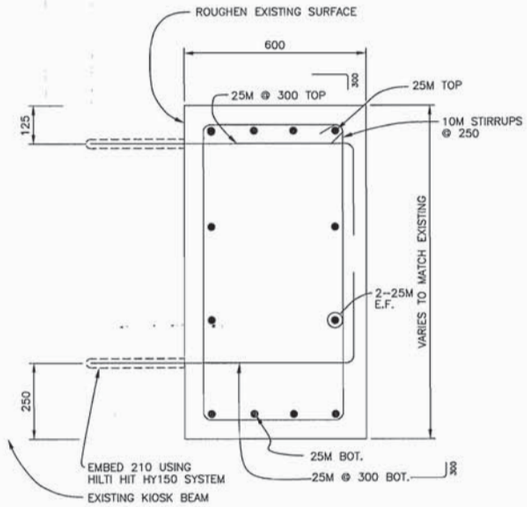
SECTION D (8204)
1:25



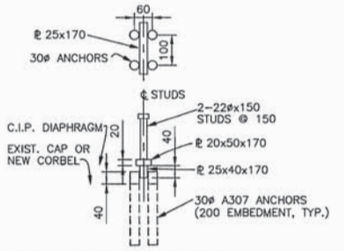
SECTION E/E (8204/8205)
1:25



SECTION F (8204)
1:25

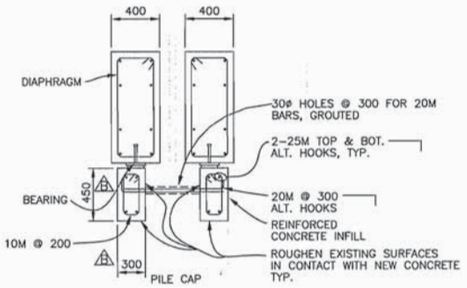


SECTION J (8205) TYP. BOTH SIDES
1:10

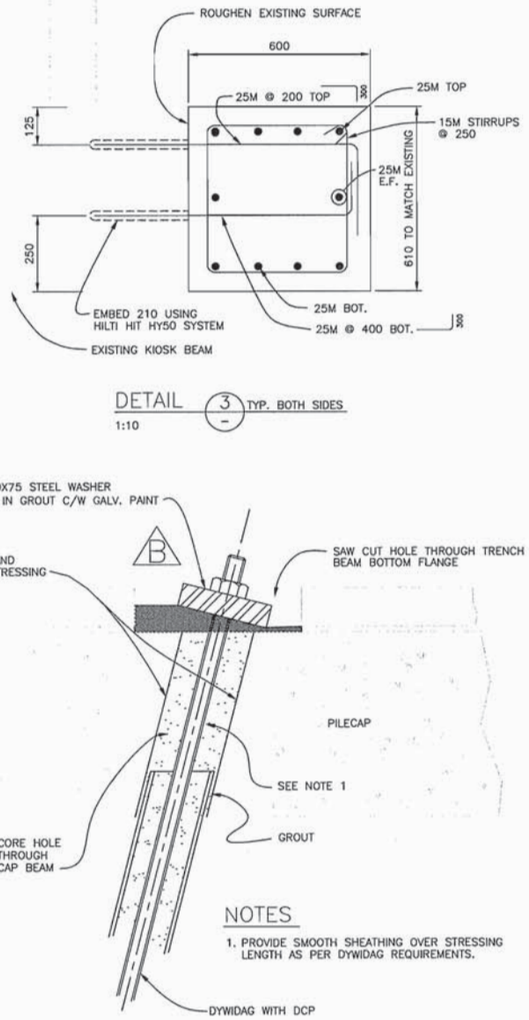


NOTE: ALL STEEL TO BE GALVANIZED

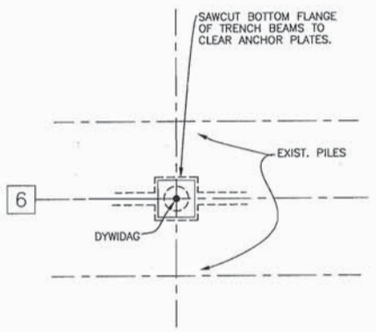
SHEAR KEY DETAIL
1:10

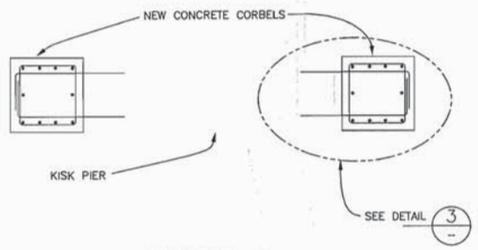


SECTION D (8204) (AT BENTS 2 AND 4 ONLY)
1:25



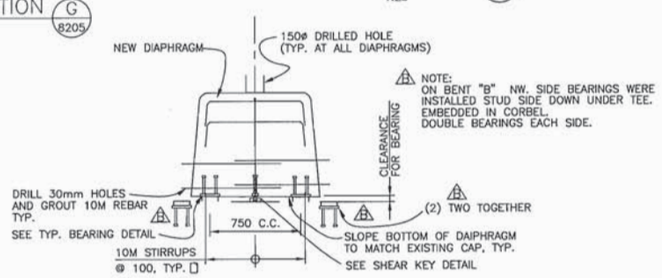
DETAIL 3 (-) TYP. BOTH SIDES
1:10



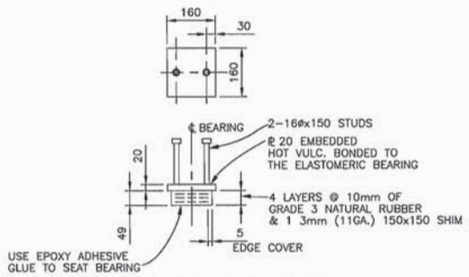


SECTION H (8205)
1:25

SECTION G (8205)
1:25



DETAIL 2 (8204)
1:25
TYPICAL REINFORCING IN NEW DIAPHRAGM



TYPICAL BEARING DETAIL
1:10

NOTES

1. PROVIDE SMOOTH SHEATHING OVER STRESSING LENGTH AS PER DYWIDAG REQUIREMENTS.

DETAIL 1 (8204)
1:10

EDRM #82257 (Version 2)
PLOT 1:1

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada
Small Craft Harbours Branch

Sandwell

CAD FILE No. 142232-8207

PWGSC PROJECT No. 850497

SANDWELL PROJECT No. 142232

NOTE:
REFER TO AS-BUILT DRAWING DETAIL REVISION EDRM DRAWINGS: #82392, #82391, #82390, #82389, #82387, #82385, #82384, #82383, #82382, and #82381.

number	revision	revision	date
B	AS BUILT		03.02.18
	ISSUED FOR TENDER		02.01.07

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet
PATRICIA BAY, B.C.
MARINE FACILITY

drawing / dessin
WHARF SEISMIC RETROFIT
TYPICAL DETAILS

designed	GN/LL	concu
date	01.12.15	date
drawn	DH	dessine
date	01.11.20	date
approved		approuve
date		date
Tender		Soumission

PWGSC Project Manager / Administrateur de projets TPSGC
project number / numéro du projet
850497

drawing number / numéro du dessin: 142232-8207
rev.: B

142232-8207

GENERAL NOTES

1. DETAILS CONTAINED ON THESE DRAWINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE FOLLOWING:
   CAN/CSA–S6–00 – CANADIAN HIGHWAY BRIDGE DESIGN CODE.
   CSA S16.1
2. THE METRIC SYSTEM OF UNITS IS USED UNLESS SPECIFIED OTHERWISE. THE REFERENCE DRAWINGS ARE IN THE IMPERIAL AND METRIC SYSTEM OF UNITS.
3. THE DIMENSIONS AND ELEVATIONS OF THE EXISTING COMPONENTS HAVE BEEN TAKEN FROM THE REFERENCE DRAWINGS PROVIDED BY PWGSC WITHOUT FIELD VERIFICATION. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE ALL FIELD ELEVATIONS AND DIMENSIONS NECESSARY FOR HIS WORK PRIOR TO COMMENCEMENT OF CONSTRUCTION OR ORDERING AND FABRICATING ANY MATERIAL.
4. THE CONTRACTOR IS TO CONFIRM LOCATION OF ALL UTILITIES AND DRAINAGE PIPES THAT MAY BE AFFECTED BY THE WORK TO BE PERFORMED IN THIS CONTRACT PRIOR TO THE COMMENCEMENT OF THE WORK.
5. REMOVE EXISTING ELEMENTS TO GAIN ACCESS TO WORK AS NECESSARY. REINSTATE TO MATCH EXISTING, UNLESS NOTED OTHERWISE.
6. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PROJECT TECHNICAL SPECIFICATIONS.

DESIGN CRITERIA

PROJECT DATUM & TIDAL ELEVATIONS

1 ALL ELEVATIONS ARE REFERENCED TO HYDROGRAPHIC (TIDE & CHART) DATUM.

2 THE METRIC SYSTEM OF UNITS IS USED.

3 TIDAL ELEVATIONS AT THE SITE ARE BASED ON VALUES PUBLISHED BY THE CANADIAN HYDROGRAPHIC SERVICE (C.H.S.) FOR PATRICIA BAY, B.C.:

E.H.W.L.....3.87m
L.L.W.L.....0.00m
E.L.W.L.....–0.40m

STRUCTURAL DESIGN

1. OPERATING VESSELS FOR THE FACILITY.

TABLE 1 – DESIGN VESSELS

VESSEL	LOAD DISPLACEMENT (TONNES)	LENGTH OVERALL (m)	BEAM (m)	MAXIMUM DRAFT (m)
SIR WILFRED LAURIER (A)	4660	83.0	16.20	6.0
BARTLETT (B)	1723	57.8	13.00	4.1
JOHN P. TULLY	2100	69.0	14.50	4.5
JOHN JACOBSON	800	50.0	11.00	4.0
TANU	900	50.1	9.75	4.6
VECTOR	560	39.7	9.50	3.1
GORDON REID	1100	50.0	11.00	5.4
ATLIN POST	70	20.0	5.20	1.5

2. DESIGN VESSEL: PIER 1, PIER 2 & CROSS PIER – 2500 TONNE LOAD DISPLACEMENT VESSEL
   APPROACH PIER – BENTS 3 TO 10 – 1000 TONNE LOAD DISPLACEMENT VESSEL

3. FENDER SYSTEM:

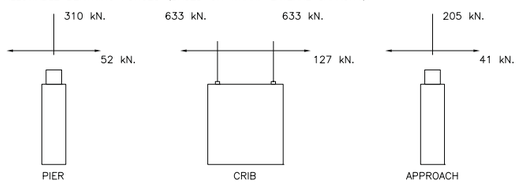
DESIGN BERTHING VELOCITY	– 0.3 m/s PERPENDICULAR TO BERTH FACE
BERTHING TYPE	1/4 POINT
MAXIMUM BERTHING ANGLE	10 DEGREES
BERTHING COEFFICIENT	0.66
DESIGN BERTHING ENERGY	7.0 TONNE m
DESIGN BERTHING ENERGY BENTS 3–10	3.2 TONNE m

4. BERTHING VELOCITIES FOR INCREASED DISPLACEMENT TONNAGE

TABLE 2 – REDUCED VELOCITIES

VESSEL	LOCATION	BERTHING VELOCITY PERP. TO BERTH FACE
STANDARD 2500 TONNE LOAD DISPLACEMENT	APPROACH PIER BENT 3 TO 10	0.2 m/s
STANDARD 5000 TONNE LOAD DISPLACEMENT	PIER 1, PIER 2 & CROSS PIER	0.2 m/s
STANDARD 5000 TONNE LOAD DISPLACEMENT	APPROACH PIER BENT 3 TO 10	0.15 m/s

5. ALLOWABLE BERTHING FORCES (BASED ON WHARF LATERAL CAPACITY):



GROUT

1. FOR FACE PLATES USE PREMIXED CEMENTITIOUS, FLOW ABLE NON SHRINK GROUT, FREE OF METALIC AGGREGATES, CONFORMING TO ASTM C1107. MINIMUM COMPRESSIVE CUBE STRENGTH OF 21MPa AT 3 DAYS AND 45MPa AT 28 DAYS.
2. FOR PILE TIP TENDON USE PREMIXED FLUID CONSISTENCY CEMENTITIOUS EXPANDING NON SHRINK GROUT FREE OF AGGREGATES CONFORMING, TO ASTM C1107. MINIMUM CUBE STRENGTH OF 35 MPa @ 3 DAYS AND 60 MPa @ 28 DAYS, BOTH WITH FLUID CONSISTENCY
3. FOR PILE GROUTING USE PREMIXED FLOWABLE CONSISTENCY CEMENTITIOUS EXPANDING NON SHRINK GROUT FREE OF METALLIC AGGREGATES CONFORMING, TO ASTM C1107. MINIMUM CUBE STRENGTH OF 25 MPa @ 3 DAYS AND 50 MPa @ 28 DAYS, BOTH WITH FLOWABLE CONSISTENCY

STRUCTURAL AND MISCELLANEOUS STEEL

1. STRUCTURAL STEEL CAN/CSA G40.20/G40.21, WITH THE FOLLOWING GRADES.
   W SHAPE BEAMS AND HSS SECTIONS: 350W PLATES AND ANGLES: 300W
   PILE AND CAMEL PIPES: 445 MPa. MINIMUM YIELD
2. PILE TIP TENDONS TO BE DOUBLE CORROSION PROTECTED THREADBAR AS MANUFACTURED BY DYWIDAG SYSTEMS INTERNATIONAL OR APPROVED EQUAL, IN ACCORDANCE WITH CSA G30.18–M92 GRADE 413/620 MPa.
3. HOT DIP GALVANIZE STEEL WHERE INDICATED TO CAN/CSA G164, MINIMUM ZINC COATING OF 600 g/m.
4. STRUCTURAL STEEL ERECTION BOLTS SHALL CONFORM TO ASTM A325 TYPE 1 ZINC COATED UNLESS NOTED OTHERWISE.
5. PAINT ALL METAL NOT REQUIRED TO BE GALVANIZED IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.
6. MINIMUM THICKNESS OF CONNECTION PLATES IS 6mm.

WELDING

1. WELDING IN ACCORDANCE WITH CSA–W59 AND CSA–W47.1.
2. MINIMUM WELD SIZE TO BE 6mm UNLESS NOTED OTHERWISE.
3. ALL WELDS TO BE CONTINUOUS UNLESS NOTED OTHERWISE.
4. ELECTRODES SHALL BE IN ACCORDANCE WITH CSA STANDARD W48.1–M.
5. ELECTRODES TO BE E480XX CLASSIFICATION.
6. SEAL WELD ALL WELDED JOINTS.

EMBEDDED ANCHORS

1. ALL ANCHOR RODS TO BE ~~STAINLESS STEEL GRADE~~ 316 GALVANIZED A307 (A)
2. DRILL ANCHOR HOLES IN CONCRETE AS DETAILS. ADJUST TO AVOID CONFLICT WITH EXISTING REINFORCING. PLUG ALL DRILL HOLES NOT USED WITH CEMENTITIOUS GROUT
3. FIELD MEASURE AND DRILL FABRICATED STEEL ELEMENTS & PLATES TO SUIT DRILLED HOLES (A)
4. EPOXY GROUT ANCHORS WITH "HILTI HIT HY150" OR APPROVED EQUIVALENT (USE 500 EPOXY UNDERWATER) (A)
5. TACK WELD ALL EXPOSED NUTS HOLDING UHMW TO CONCRETE (A)

FENDERS

1. FENDER RUBBERS:
   DESIGN OF THE FENDER RUBBERS HAS BEEN BASED ON PROPRIETARY CATALOGUE INFORMATION. REQUIRED DESIGN PROPERTIES FOR THE FENDERS IS AS FOLLOWS:

FENDER TYPE	CALL UP	THICKNESS [mm]	DESIGN ENERGY ABSORPTION [kNm]	MAX. SUPPORT REACTION [kN]	FACE FINISH
ARCH	AR500H	500	70	450	A
ARCH	AR500HP	500	70	450	A
ARCH	AR600H	600	70	295	A
UNIT ELEMENT	UE550	550	70	295	A
CONE	C400	400	36	180	A
TIRE	305ø	500	–	–	A

   (ARCH AND UNIT ELEMENT DATA BASED ON 1 m WIDTH)

   FACE FINISH:
   TYPE A: STRUCTURAL MOUNTING 1 FACE; IMPACT RUBBER AT OTHER FACE
   TYPE B: STRUCTURAL MOUNTING 1 FACE EMBEDDED STEEL PLATE WITH UHMW PANEL MOUNTING HOLES AT OTHER FACE
   TYPE C: STRUCTURAL MOUNTING EACH FACE

2. PROVIDE, FOR ENGINEER'S APPROVAL, DETAILS AND PERFORMANCE DATA OF FENDER RUBBERS TO BE SUPPLIED TO MEET THE ABOVE REQUIREMENTS.
3. FENDER MOUNTING PLATE SIZES AND ANCHORAGE LOCATIONS ARE TO BE ADJUSTED BY THE CONTRACTOR FOR FENDER RUBBERS APPROVED BY PWGSC.

SUMMARY OF SCOPE OF WORK

1. REMOVE AND DISPOSE TIMBER PILES ALONG THE NORTH AND SOUTH FACES OF THE END CRIBS OF PIER 1 AND PIER 2.
2. REMOVE AND DISPOSE 200mm RUBBER ARCH FENDERS WHERE REQUIRED TO ACCOMMODATE NEW FENDERING SYSTEM.
3. SUPPLY AND INSTALL DIAGONAL HSS BRACING AND FRAMING, TOGETHER WITH ANCHORS, AND STEEL FRAMING EXTENSIONS TO CONCRETE BENT COLUMNS AT THE FOLLOWING LOCATIONS:
   ALONG GRID A – AT GRIDS 3 TO 10;
   ALONG GRID G AT GRIDS 14, 17 & 20;
   ALONG GRID 11 AT EACH COLUMN.
4. SUPPLY & INSTALL 762ø PIPE PILES, WITH PILE TOPS AS DETAILED AND EACH PILE WITH ~~HOLLOW OSLO POINT AND~~ GROUTED 57ø DOUBLE CORROSION PROTECTED TENDON, AT EACH COLUMN OF EACH BENT AND ADJACENT TO THE SIDE FACES OF EACH CRIB ALONG GRID G, EXCEPT AT LOCATIONS CALLED UP IN NOTE 3 ABOVE. (A)
5. SUPPLY AND INSTALL RUBBER ARCH FENDERS, TOGETHER WITH MOUNTING PANELS AND ANCHORS, TO THE WALL FACE AT CRIB AND BENT LOCATIONS AS FOLLOWS:
   EACH CORNER OF EACH CRIB ALONG GRID B, EXCEPT GRID 12;
   EACH CORNER OF EACH CRIB ALONG GRID G;
   EACH BENT FACE ALONG GRID G.
6. SUPPLY AND INSTALL UNIT ELEMENT (UE) RUBBER FENDERS, TOGETHER WITH MOUNTING PANELS, PILE ATTACHMENT FRAMING AND ANCHORS, AT EACH PIPE PILE LOCATION.
7. SUPPLY AND INSTALL WALL ANCHORED BEAM SUPPORT FOR UE RUBBER FENDERS ADJACENT TO THE SIDE FACES OF EACH CRIB ALONG GRID G.
8. SUPPLY AND INSTALL UHMW(PE) PANELS AT LOCATIONS SHOWN.
9. SUPPLY AND INSTALL LOAD DISPERSION PANELS TO PILES AT LOCATIONS OF UE RUBBER FENDERS, EXCEPT THE CROSS PIER PILES ALONG GRID 13.
10. SUPPLY AND INSTALL CONTINUOUS 710ø PIPE CAMELS WITH FOAM FILL, SPLICE JOINTS, RECESSES, TIMBER RUB STRIP, LOCATING HSS & CHAINS, OUTRIGGERS AND UHMW(PE) PANELS. CAMELS TO BE PROVIDED ALONG GRIDS A, B, F, G & 11.
11. SUPPLY AND INSTALL ARCH RUBBER FENDERS AT PIPE CAMEL RECESSES AT THE FOLLOWING LOCATIONS:
    EACH CORNER OF EACH CRIB ALONG GRID A, & F, EXCEPT AT INTERSECTION OF GRIDS F & 12;
    EACH BENT FACE ALONG GRID 11
12. SUPPLY AND INSTALL CONE FENDER RUBBERS AT PIPE CAMEL RECESSES ALONG GRIDS AT GRIDS 3 TO 10.
13. SUPPLY AND INSTALL CAMEL LOCATING CHAINS AND WEIGHTS.
14. SUPPLY AND INSTALL CONTINUOUS 305ø STEEL PIPE WITH 14" USED TIRE WRAP CAMEL AT EACH CRIB FACE ALONG GRID G.
15. SUPPLY AND INSTALL 102ø HSS AND FRAMES FOR CAMEL ALIGNMENT
16. RELOCATE EXISTING LADDER TO ACCOMMODATE FENDER LOCATING HSS AND OUTRIGGERS, WHERE REQUIRED

DRAWING LIST

REFERENCE DATA

REFERENCE DRAWINGS
1. PATRICIA BAY, BC . MARINE FACILITY, PWGSC PROJECT NO. 89323, DRAWINGS S1 TO S17
2. PATRICIA BAY, BC. MARINE FACILITY, PWGSC PROJECT NO. 850497, WHARF SEISMIC RETROFIT – DRAWINGS 142232–8200 TO 8207; DRAWINGS 142232–8–SK1 TO SK14

Public Works and Government Services Canada | Travaux publics et Services gouvernmentaux Canada
Pacific Region | Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 1

KM ENGINEERING PROJECT No. – KM 04–03

number	revision	revision	date
A	AS BUILT		DEC. 2, 2004

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

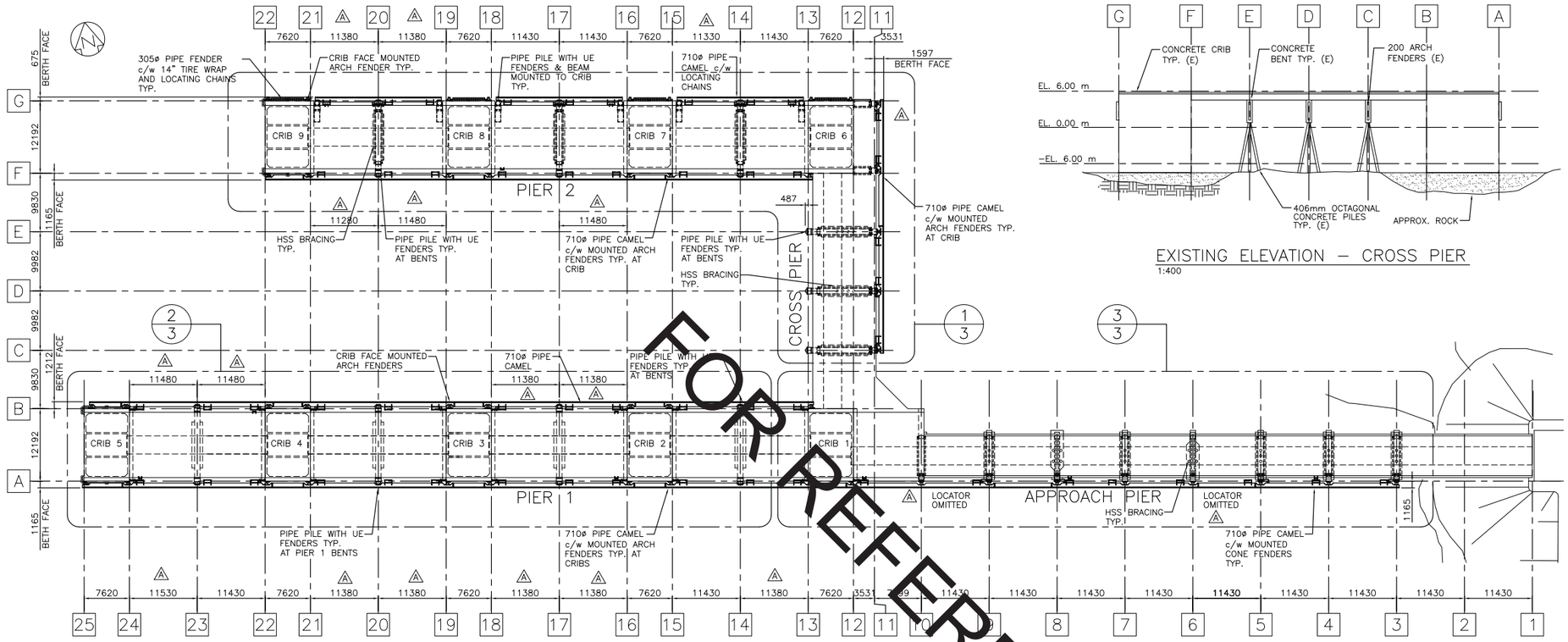
GENERAL NOTES

designed MAHOMED KATHRADA, P. ENG. concu
date 03.03.03 date
drawn ARLEN DONNELLY dessine
date 03.03.10 date
approved approuve
date date
Tender Soumission

PWGSC Project Manager Administrateur de projets TPSGC
project number / numéro du projet
853033

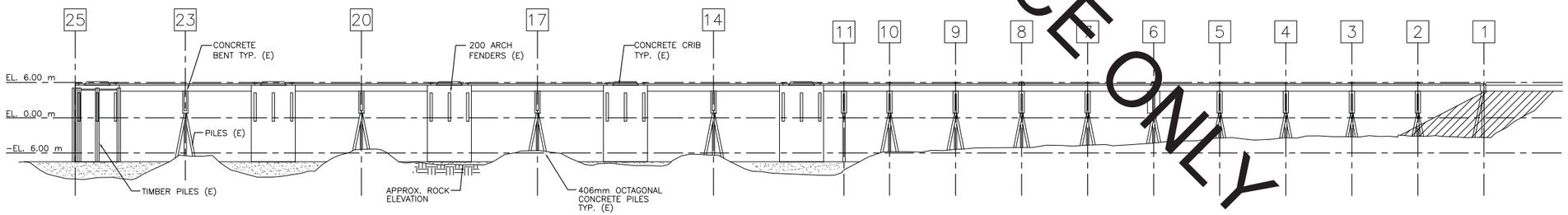
drawing number / numéro du dessin: 001
rev.: A

05–22–03

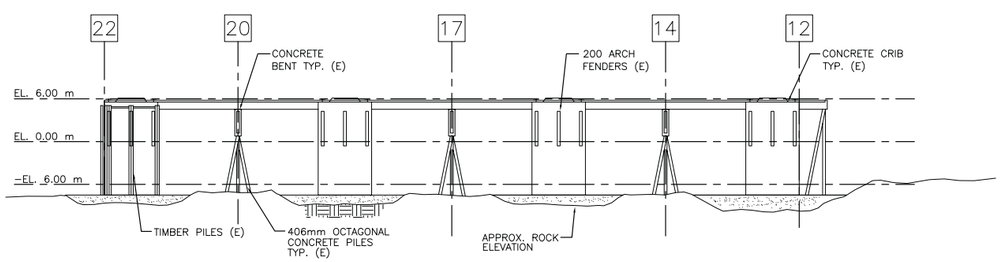


GENERAL ARRANGEMENT
FENDERING SYSTEM UPGRADE
1:400

EXISTING ELEVATION – CROSS PIER
1:400



EXISTING ELEVATION – PIER 1 AND APPROACH PEIR
1:400



EXISTING ELEVATION – PIER 2
1:400

LEGEND
(E) : EXISTING
(L) : RELOCATED EXISTING LADDER
(CL) : EXISTING CLEATS

Public Works and Government Services Canada
Travaux publics et Services gouvernmentaux Canada

Pacific Region
Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04-2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920-7979 FAX: (250) 920-7911

CAD FILE No. – SHEET 1

KM ENGINEERING PROJECT No. – KM 04-03

number	revision	revision	date
A	AS BUILT		DEC. 2, 2004

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

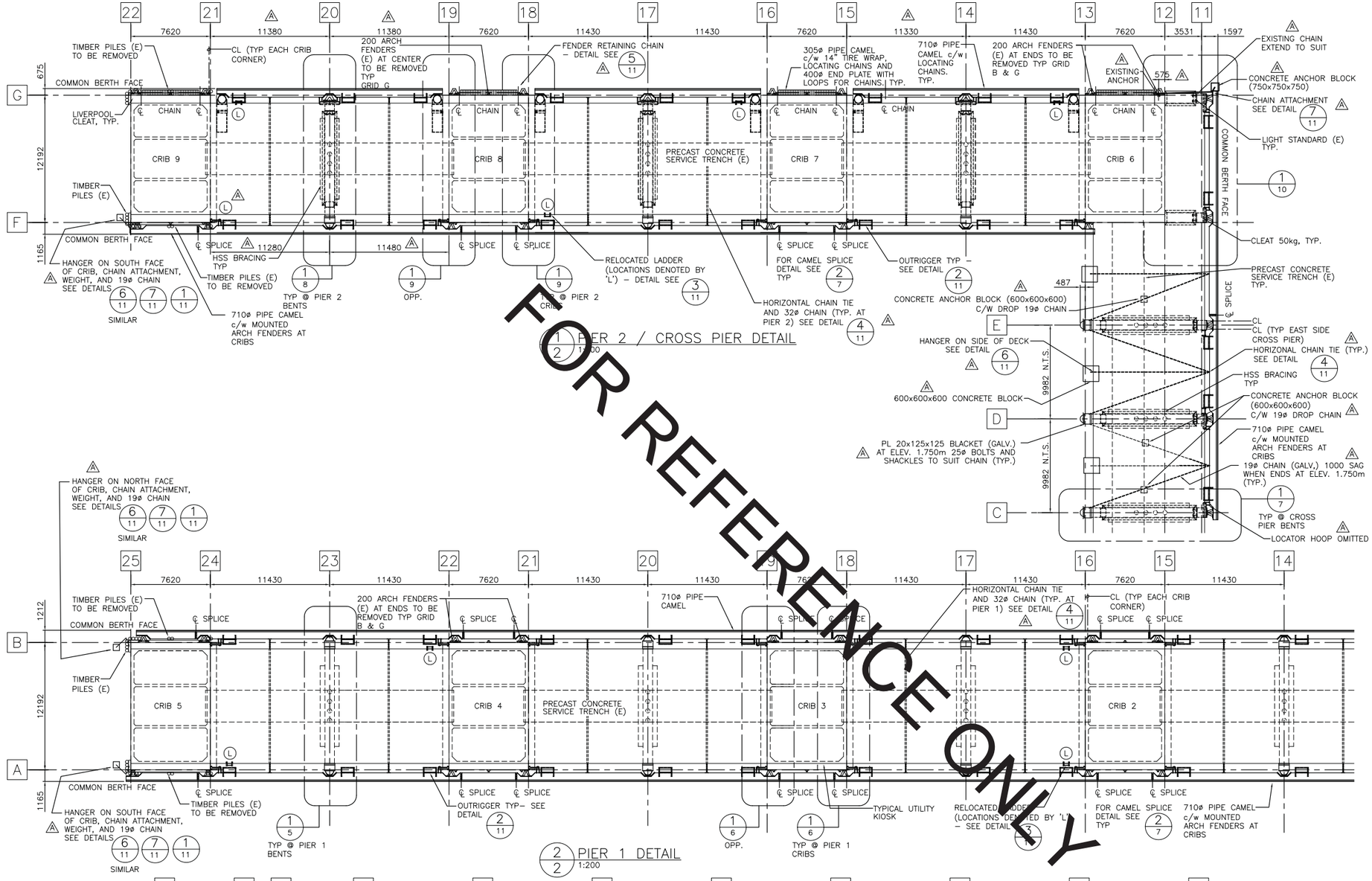
GENERAL ARRANGEMENT AND EXISTING SECTIONS

designed MAHOMED KATHRADA, P. ENG. concu
date 03.03.03 date
drawn ARLEN DONNELLY dessine
date 03.03.10 date
approved approuve
date date
Tender Soumission

PWGSC Project Manager Administrateur de projets TPSGC
project number / numéro du projet
853033

drawing number / numéro du dessin: 002
rev.: A

05-22-03



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KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 3

KM ENGINEERING PROJECT No. – KM 04–03

number	revision	revision	date
A	AS BUILT		DEC. 6, 2004

A/C — A detail number / number du detail; B source drawing no. / de dessin no.; C detail on drawing no. / detail sur dessin no.

A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

GENERAL ARRANGEMENT DETAILS

designed MAHOMED KATHRADA, P. ENG. concu

date 03.03.03 date

drawn ARLEN DONNELLY dessine

date 03.03.10 date

approved approuve

date

Tender Soumission

PWGSC Project Manager Administrateur de projets TPSGC

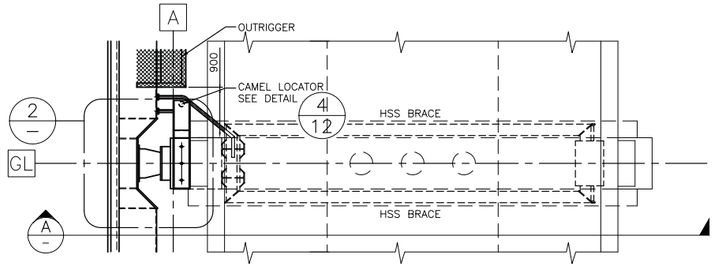
project number / numéro du projet

853033

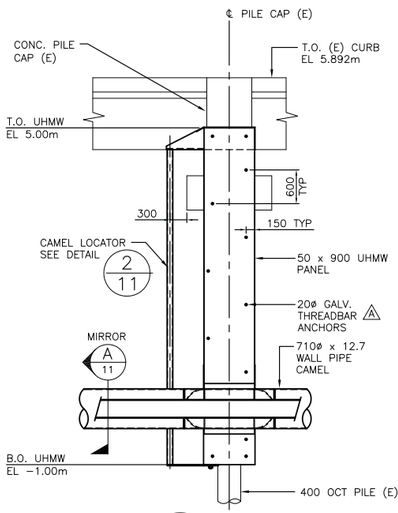
drawing number / numéro du dessin 003

rev. A

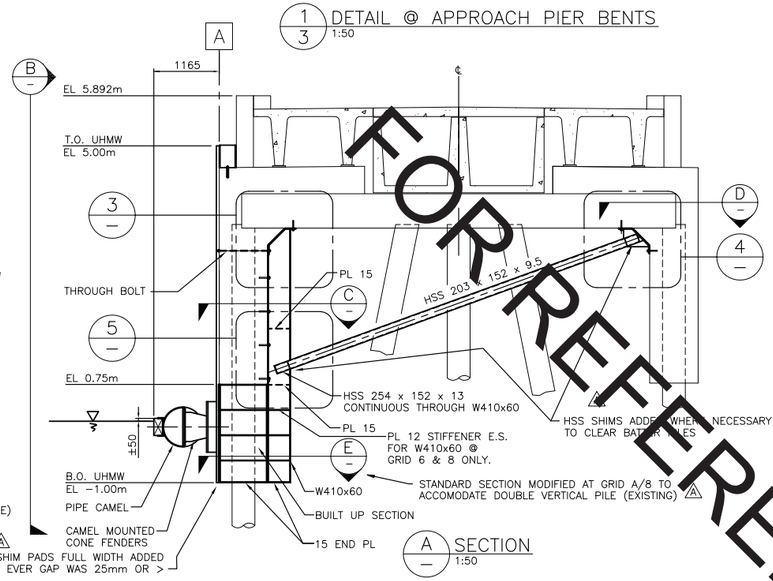
05-22-03



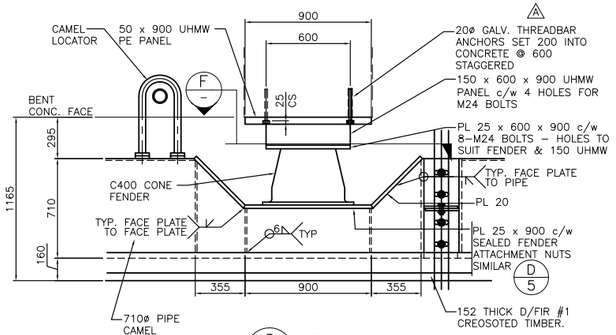
1/3 DETAIL @ APPROACH PIER BENTS 1:50



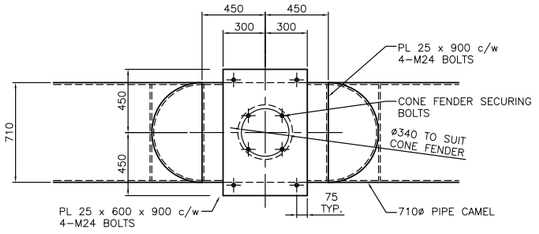
B/– ELEVATION 1:50



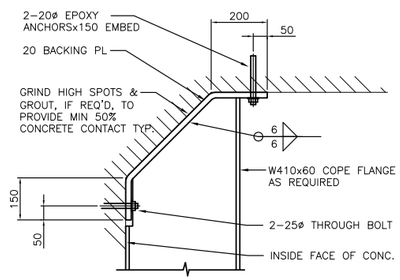
A/– SECTION 1:50



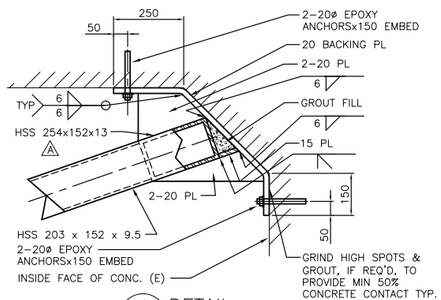
2/– DETAIL 1:20



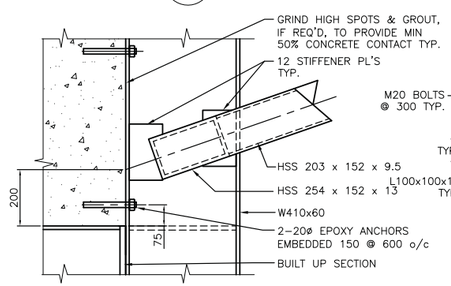
F/– 710ø CAMEL SPLICE AND CONE FENDER NOT SHOWN 1:20



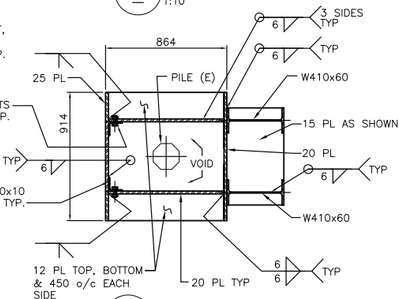
3/– DETAIL 1:10



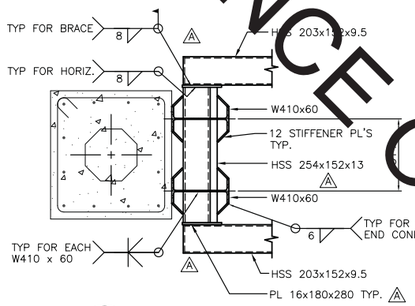
4/– DETAIL 1:10



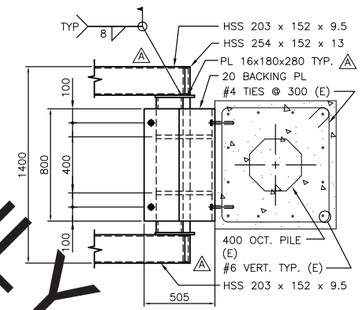
5/– DETAIL 1:10



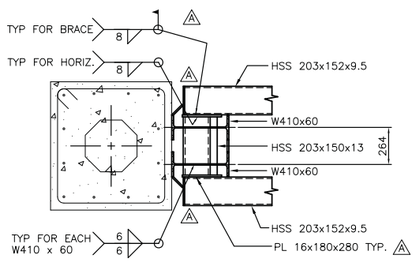
E/– SECTION 1:20



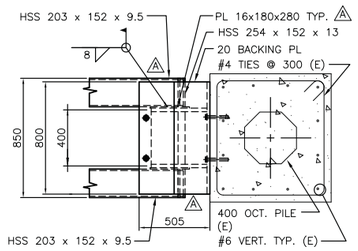
C/– SECTION FENDER NOT SHOWN 1:20



D/– SECTION FENDER NOT SHOWN 1:20



C/– AT GRID 6 & 8 FENDERS NOT SHOWN 1:20



D/– AT GRID 6 & 8 FENDER NOT SHOWN 1:20

Public Works and Government Services Canada
Travaux publics et Services gouvernmentaux Canada
Pacific Region
Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 4

KM ENGINEERING PROJECT No. – KM 04–03

number	revision	revision	date
A	AS BUILT		DEC 4, 2004

A/C: A detail number / number du detail; B source drawing no. / de dessin no.; C detail on drawing no. / detail sur dessin no. — A/B|C

project / projet

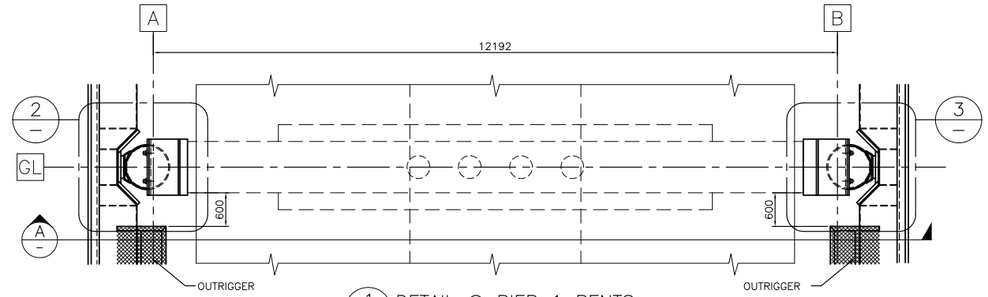
PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

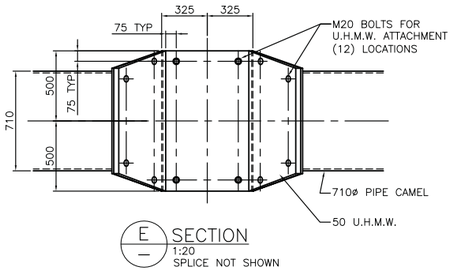
DETAILS AT APPROACH BENTS

designed	MAHOMED KATHRADA, P. ENG.	concu
date	03.03.03	date
drawn	ARLEN DONNELLY	dessine
date	03.03.10	date
approved		approuve
date		date
Tender		Soumission
PWGSC Project Manager		Administrateur de projets TPSGC
project number	853033	numéro du projet
drawing number	004	numéro du dessin / rev. A

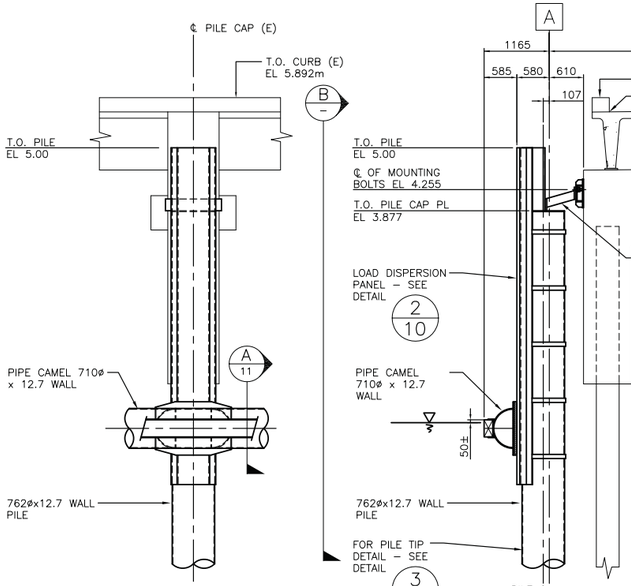
05-22-03



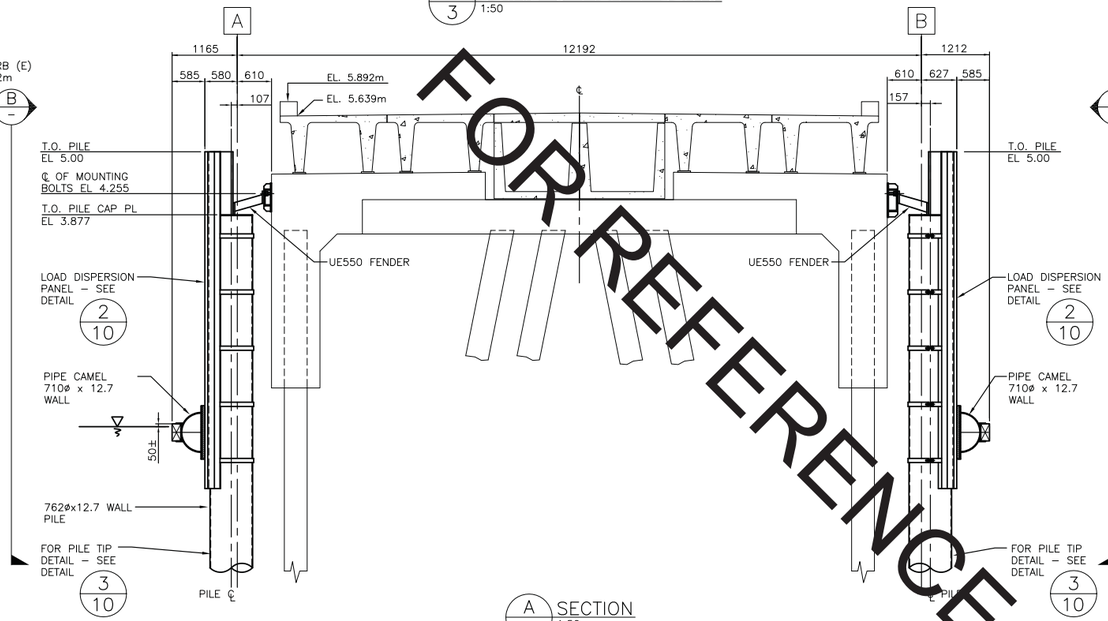
1/3 DETAIL @ PIER 1 BENTS
1:50



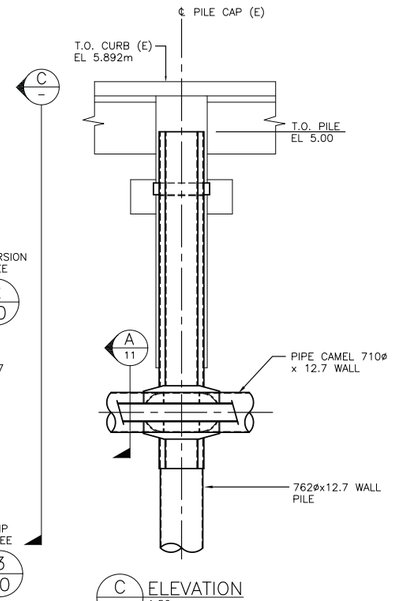
E — SECTION
1:20
SPLICE NOT SHOWN



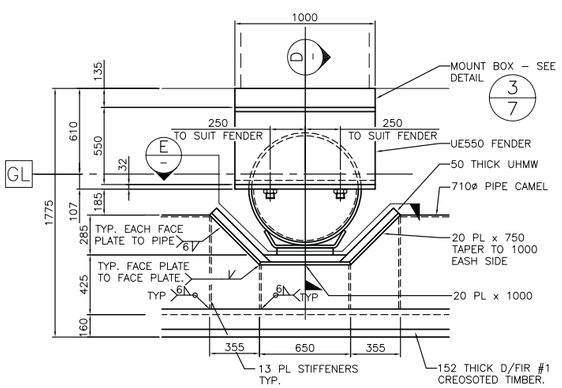
B — ELEVATION
1:50



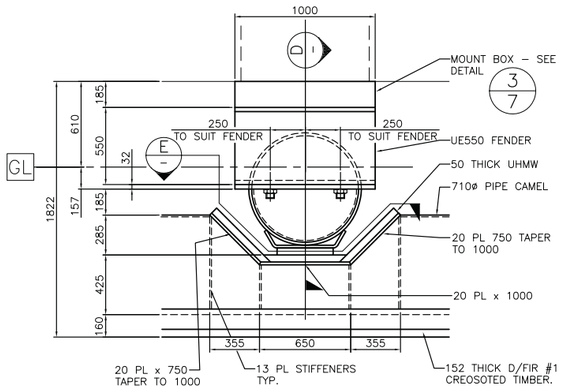
A — SECTION
1:50



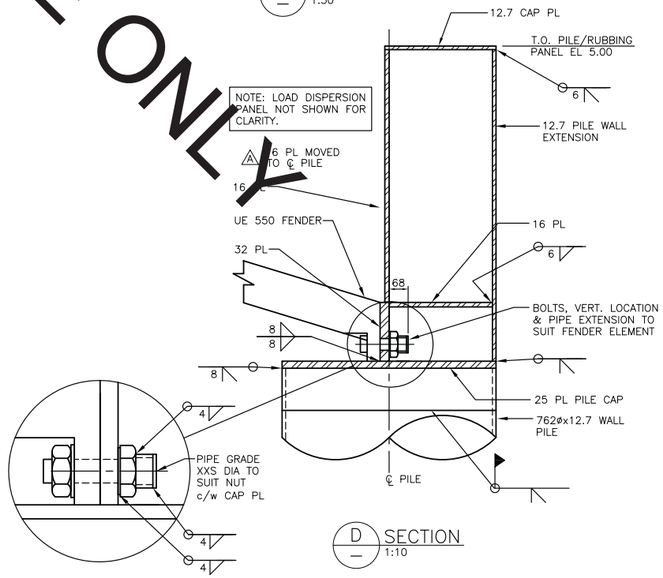
C — ELEVATION
1:50



2 — DETAIL
1:20
SPLICE NOT SHOWN



3 — DETAIL
1:20
SPLICE NOT SHOWN



D — SECTION
1:10

Public Works and Government Services Canada
Travaux publics et Services gouvernmentaux Canada
Pacific Region
Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04-2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920-7979 FAX: (250) 920-7911

CAD FILE No. – SHEET 5

KM ENGINEERING PROJECT No. – KM 04-03

A	AS BUILT	DEC. 3, 2004
number	revision revision	date

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

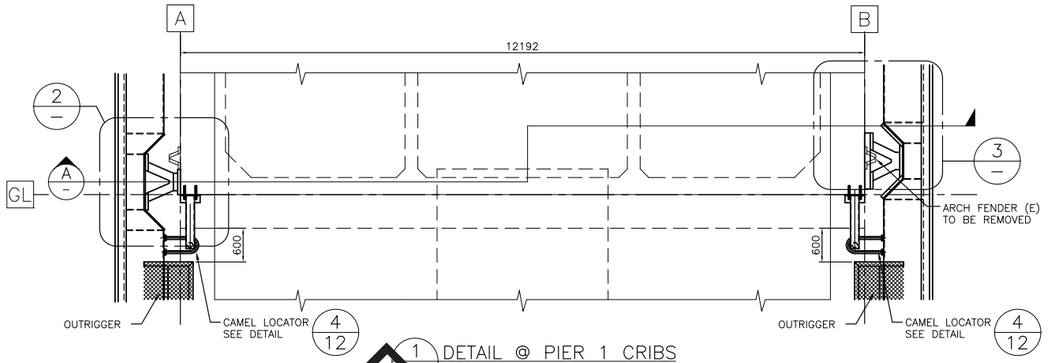
DETAILS AT PIER 1 BENTS

designed MAHOMED KATHRADA, P. ENG. / concu
date 03.03.03 / date
drawn ARLEN DONNELLY / dessine
date 03.03.10 / date
approved / approuve
date / date
Tender / Soumission
PWGSC Project Manager / Administrateur de projets TPSGC
project number / numéro du projet

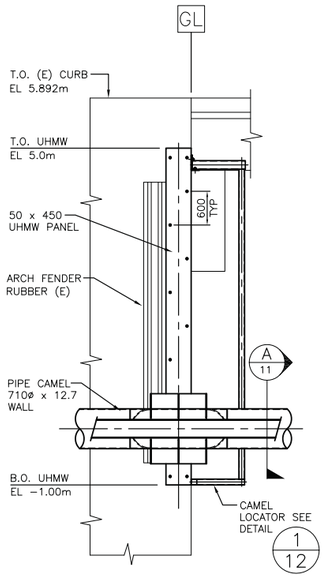
853033

drawing number / numéro du dessin: 005
rev.: A

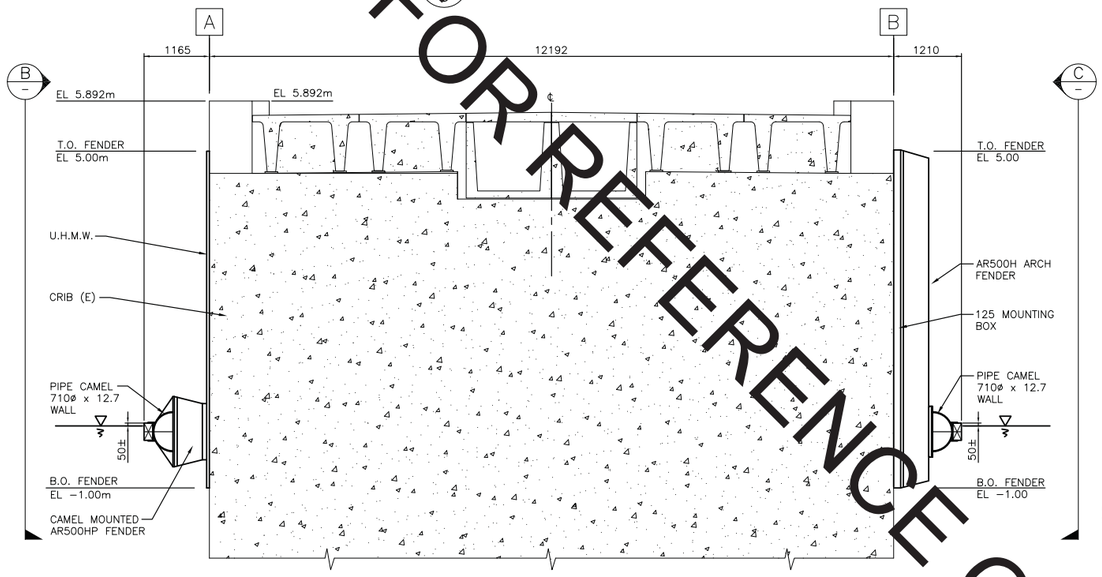
05-22-03



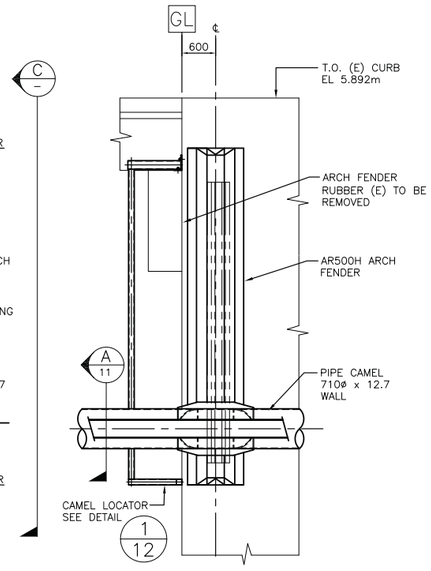
1 DETAIL @ PIER 1 CRIBS
1:50



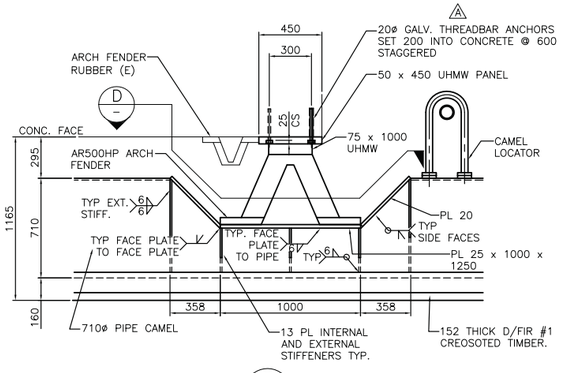
B ELEVATION
1:50



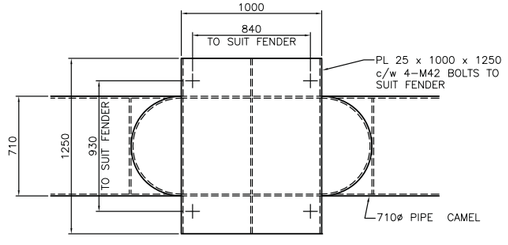
A SECTION
1:50



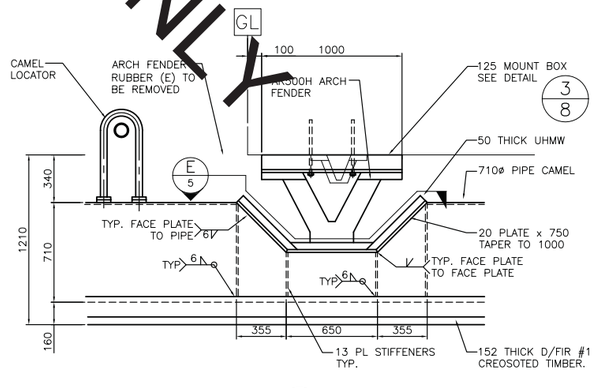
C ELEVATION
1:50



2 DETAIL
1:20
SPLICE NOT SHOWN



D 710ø CAMEL
1:20
SPLICE AND ARCH
FENDER NOT SHOWN



3 DETAIL
1:20
SPLICE NOT SHOWN

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Pacific Region
Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers
KM 04−2003
Suite 305 − 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920−7979 FAX: (250) 920−7911

CAD FILE No. − SHEET 6

KM ENGINEERING PROJECT No. − KM 04−03

number	revision	revision	date
A	AS BUILT		DEC. 6, 2004

A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

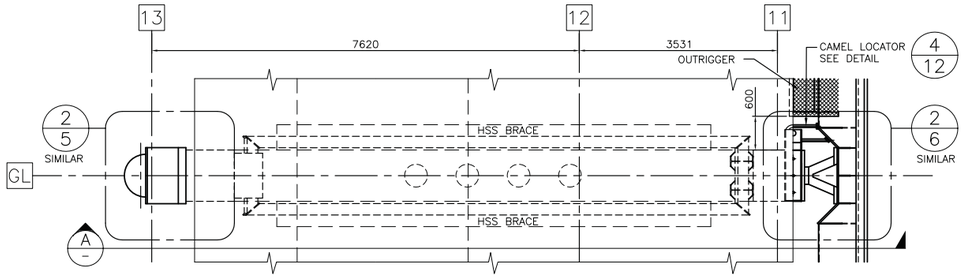
drawing / dessin

DETAILS AT PIER 1 CRIBS

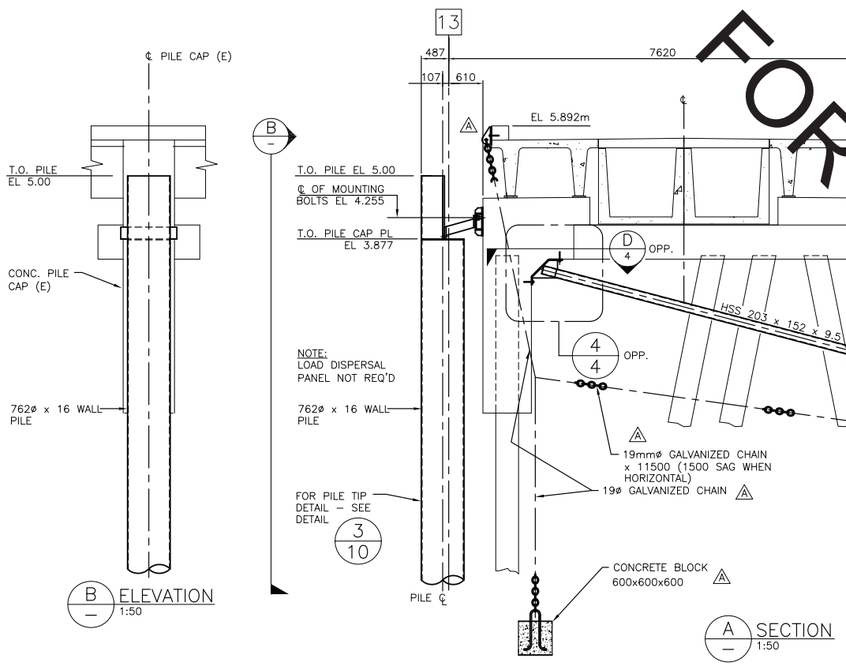
designed: MAHOMED KATHRADA, P. ENG. — concu
date: 03.03.03 — date
drawn: ARLEN DONNELLY — dessine
date: 03.03.10 — date
approved — approuve
date — date
Tender — Soumission

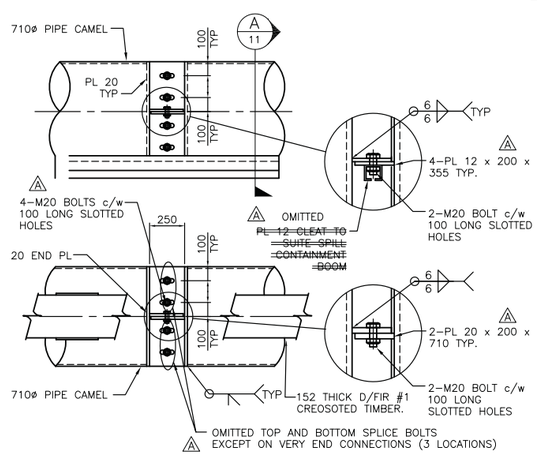
PWGSC Project Manager — Administrateur de projets TPSGC
project number / numéro du projet: 853033
drawing number / numéro du dessin: 006
rev.: A

05−22−03

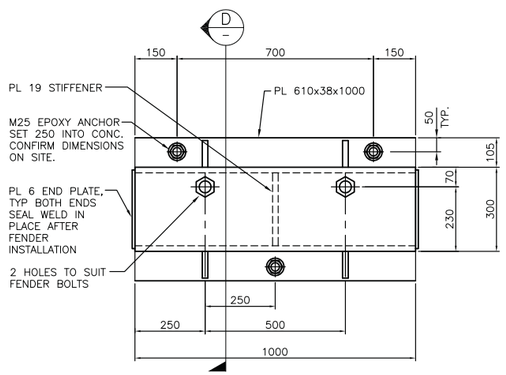


1/3 DETAIL @ CROSS PIER BENTS
1:50

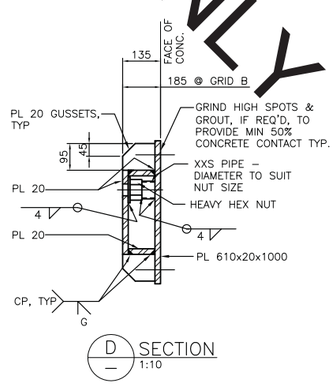




2/3 TYP SPLICE DETAIL
1:20



3/– UE FENDER MOUNT DETAIL
1:10



D SECTION
1:10

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada
Pacific Region
Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 7

KM ENGINEERING PROJECT No. – KM 04–03

number	revision	revision	date
A	AS BUILT		DEC. 3, 2004

A/C A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.
A/B|C

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

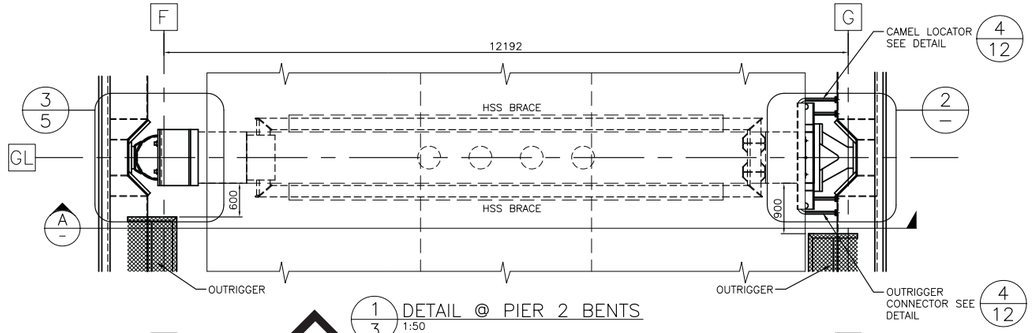
DETAILS AT CROSS PIER BENTS

designed MAHOMED KATHRADA, P. ENG. concu
date 03.03.03 date
drawn ARLEN DONNELLY dessine
date 03.03.10 date
approved approuve
date date
Tender Soumission

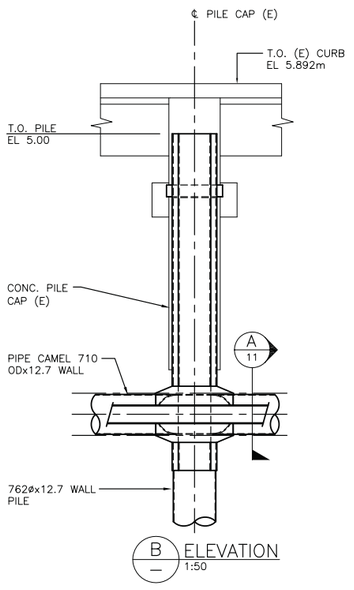
PWGSC Project Manager Administrateur de projets TPSGC
project number / numéro du projet
853033

drawing number / numéro du dessin: 007
rev.: A

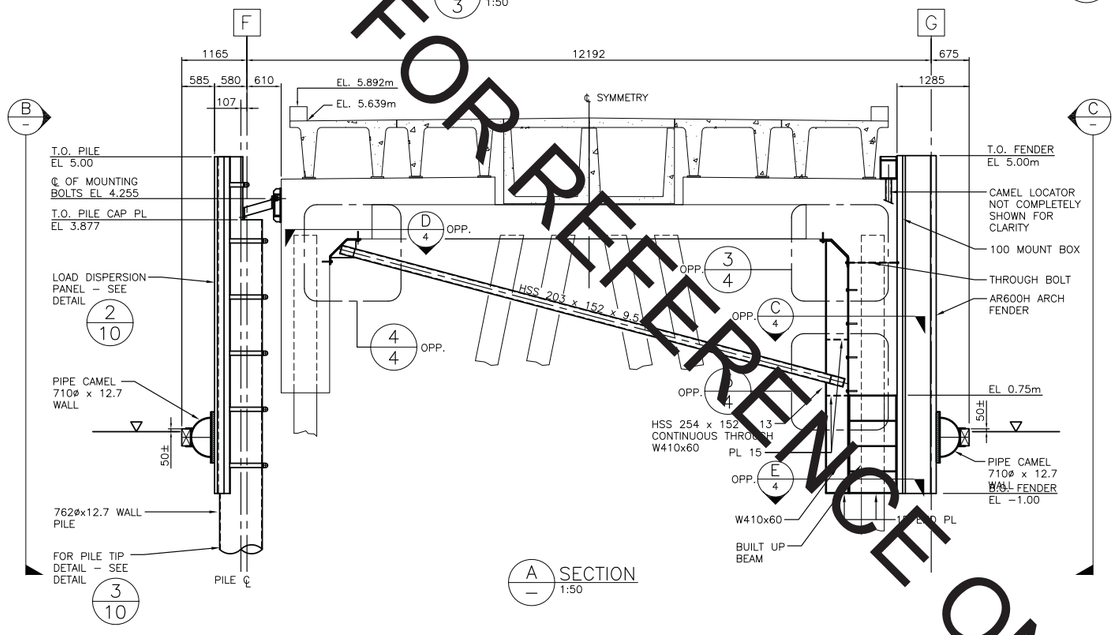
05–22–03



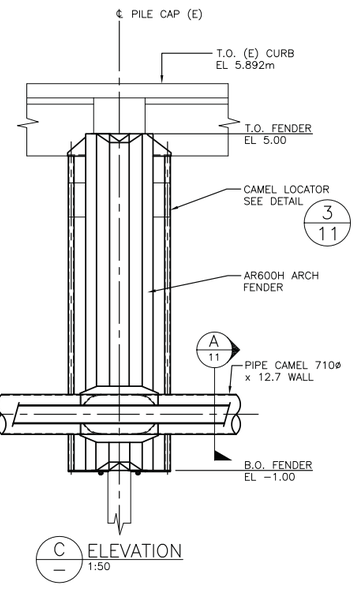
1/3 DETAIL @ PIER 2 BENTS
1:50



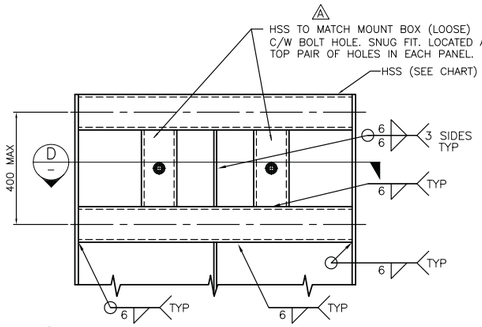
B/– ELEVATION
1:50



A/– SECTION
1:50

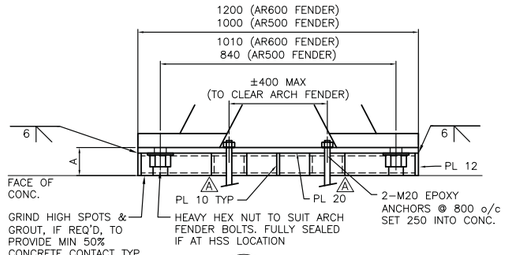


C/– ELEVATION
1:50

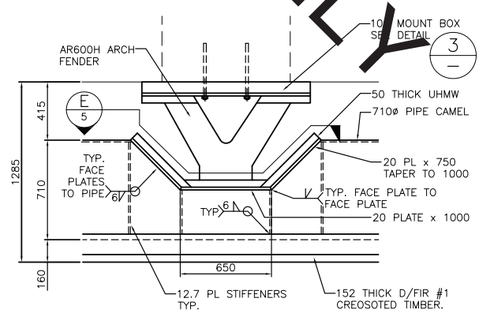


3/– ARCH FENDER MOUNT BOX DETAIL
1:10

BOX TYPE	DIM A	HSS
100 MOUNT BOX	96	HSS 127 x 76 x 9.5
125 MOUNT BOX	122	HSS 152 x 102 x 9.5
150 MOUNT BOX	172	HSS 152 x 152 x 9.5



D/– SECTION
1:10



2/– DETAIL
1:20

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 8

KM ENGINEERING PROJECT No. – KM 04–03

A	AS BUILT	DEC. 3, 2004
number	revision / revision	date

A/C A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.
A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

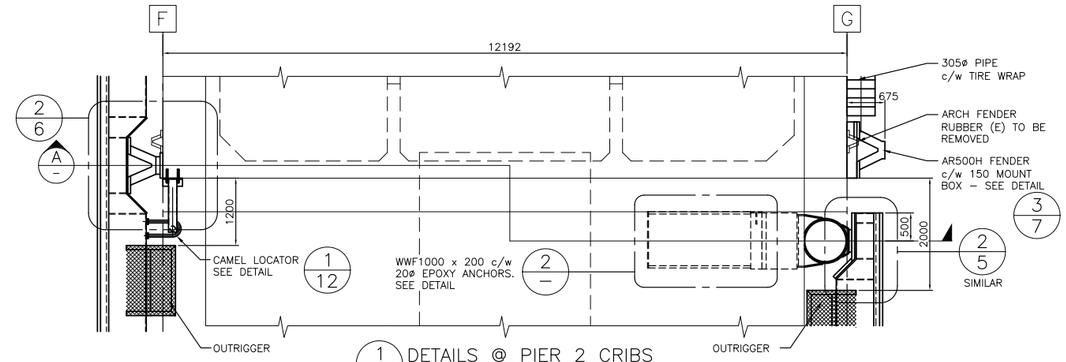
DETAILS AT PIER 2 BENTS

designed MAHOMED KATHRADA, P. ENG. concu
date 03.03.03 date
drawn ARLEN DONNELLY dessine
date 03.03.10 date
approved approuve
date date
Tender Soumission

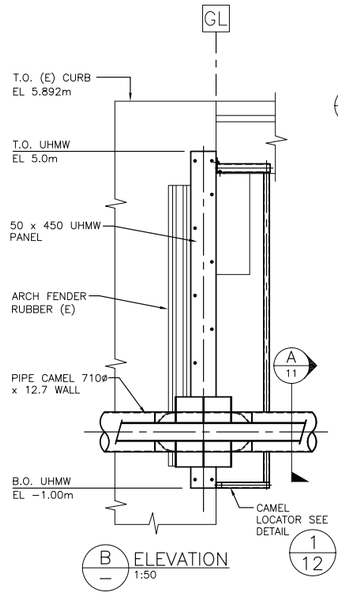
PWGSC Project Manager Administrateur de projets TPSGC
project number / numéro du projet
853033

drawing number / numéro du dessin: 008
rev.: A

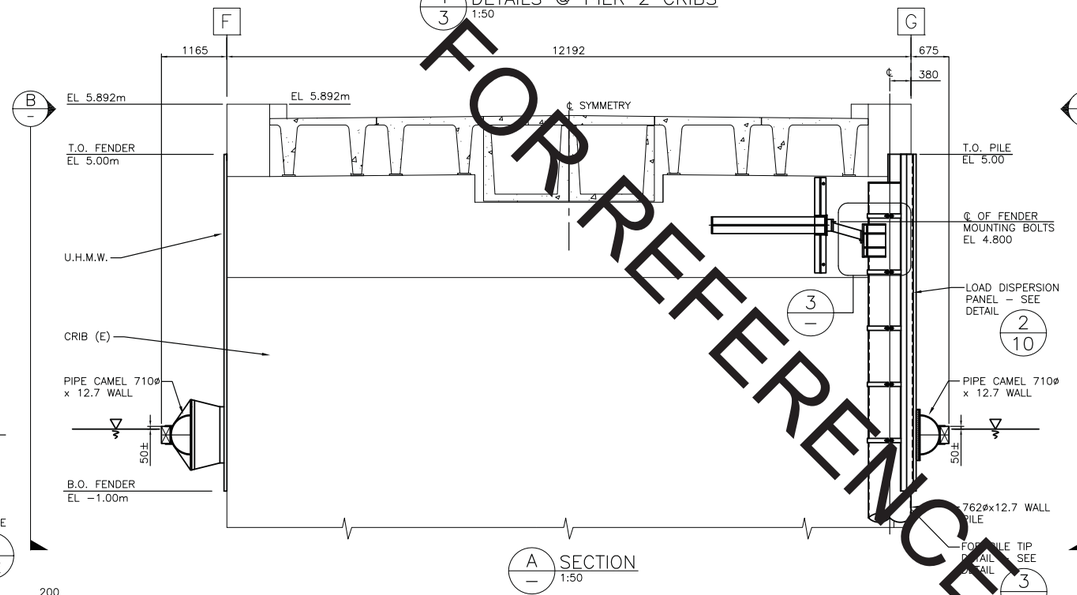
05–22–03



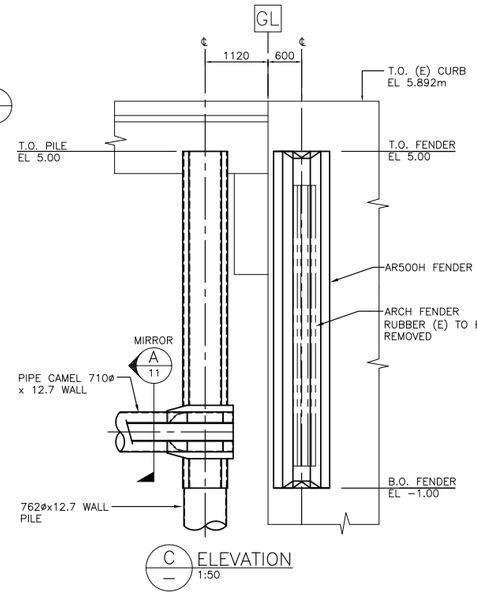
1/3 DETAILS @ PIER 2 CRIBS
1:50



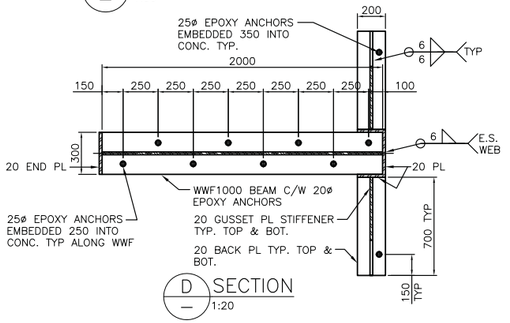
B/– ELEVATION 1:50 (1/12)



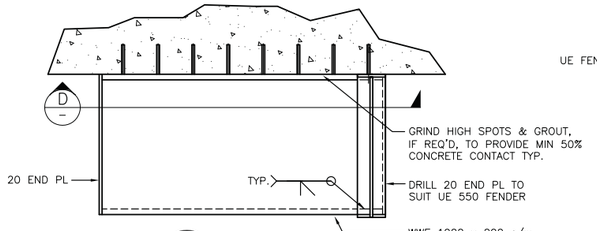
A/– SECTION 1:50



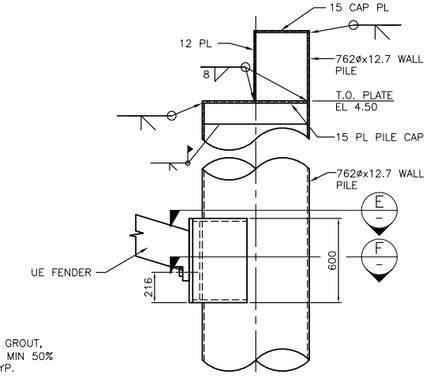
C/– ELEVATION 1:50



D/– SECTION 1:20

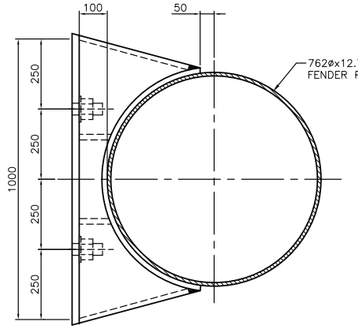


2/– DETAIL 1:20

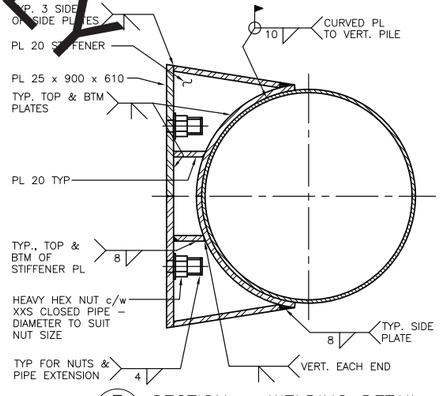


NOTE: LOAD DISPERSION PANEL NOT SHOWN FOR CLARITY.

3/– DETAIL 1:20



E/– SECTION 1:10



F/– SECTION – WELDING DETAIL 1:10

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 9

KM ENGINEERING PROJECT No. – KM 04–03

number	revision	revision	date
A	AS BUILT (NO CHANGE)		DEC. 7, 2004

A/C detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.
A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

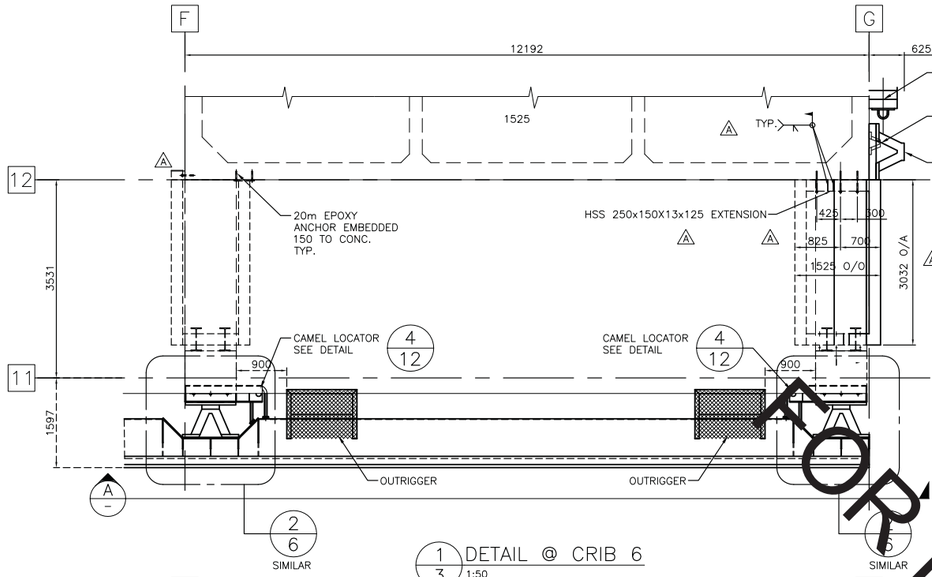
DETAILS AT PIER 2 CRIBS

designed	MAHOMED KATHRADA, P. ENG.	concu
date	03.03.03	date
drawn	ARLEN DONNELLY	dessine
date	03.03.10	date
approved		approuve
date		date
Tender		Soumission
PWGSC Project Manager		Administrateur de projets TPSGC

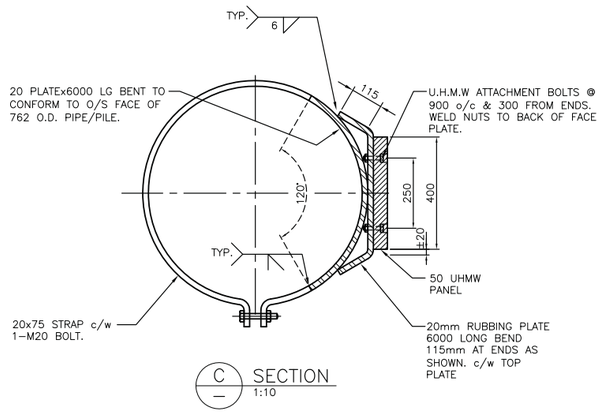
project number / numéro du projet: 853033

drawing number / numéro du dessin: 009 | rev.: A

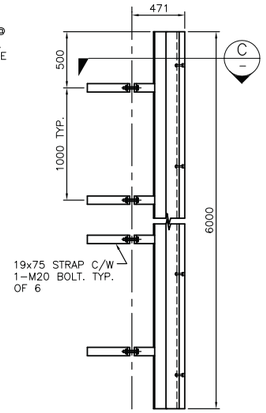
05-22-03



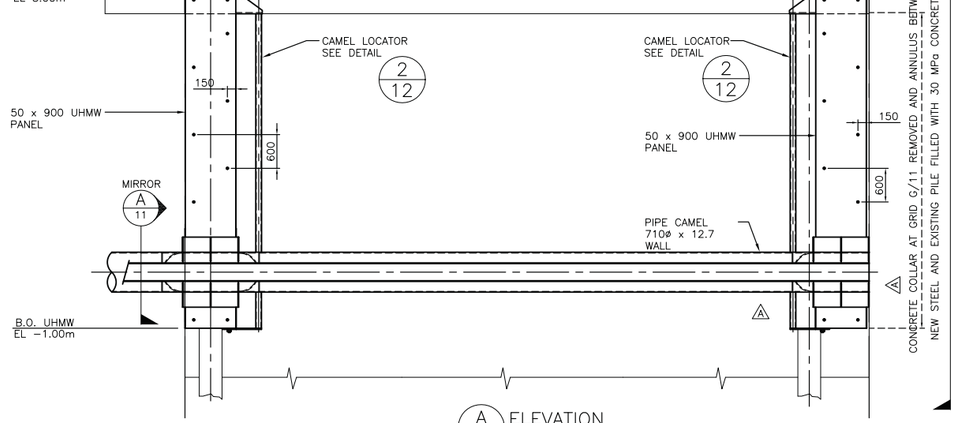
1/3 DETAIL @ CRIB 6
1:50



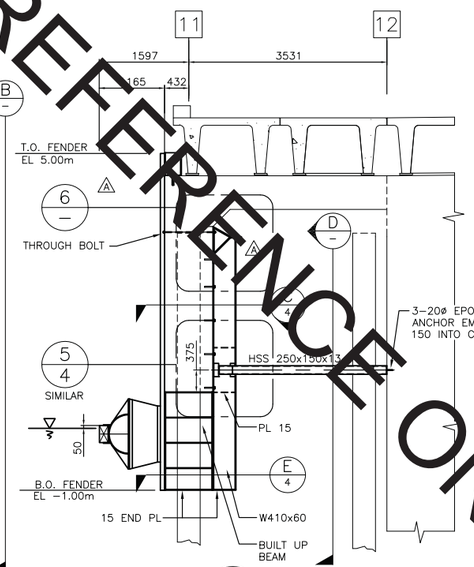
C/– SECTION
1:10



2/– DETAIL – LOAD DISPERSION PANEL
1:25



A/– ELEVATION
1:50



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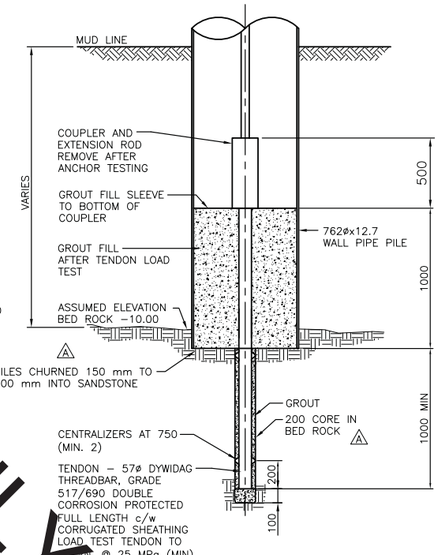
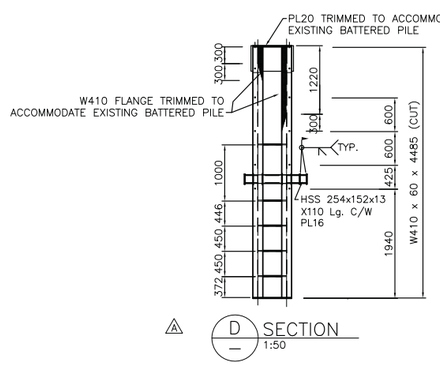
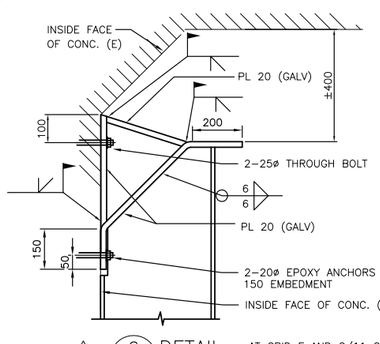
1:50



3/– PILE TIP DETAIL
1:20



A/– D SECTION
1:50



A/– 6 DETAIL AT GRID F AND G/11 ONLY
1:10

M9D – FENDER MOUNT DETAIL MODIFICATION
GRID 11/G

Public Works and Government Services Canada | Travaux publics et Services gouvernmentaux Canada

Pacific Region | Region du Pacifique

Fisheries and Oceans Canada

KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 10

KM ENGINEERING PROJECT No. – KM 04–03

number	revision	revision	date
A	AS BUILT		DEC. 5, 2004

A/C A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.
A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

DETAILS AT CRIB 6

designed	MAHOMED KATHRADA, P. ENG.	concu
date	03.03.03	date
drawn	ARLEN DONNELLY	dessine
date	03.03.10	date
approved		approuve
date		date
Tender		Soumission

PWGSC Project Manager / Administrateur de projets TPSGC

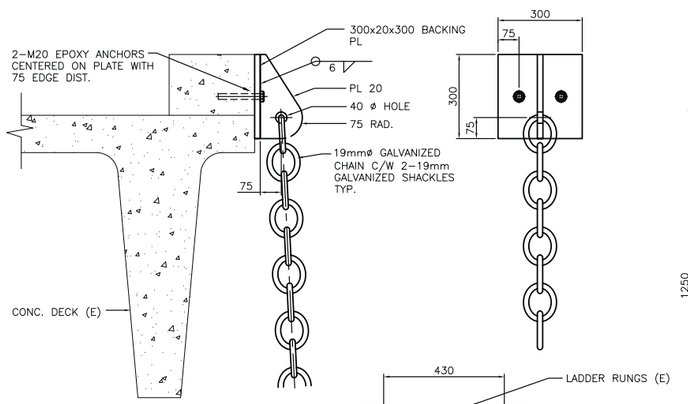
project number / numéro du projet

853033

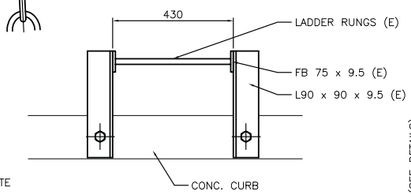
drawing number / numéro du dessin: 010

rev.: A

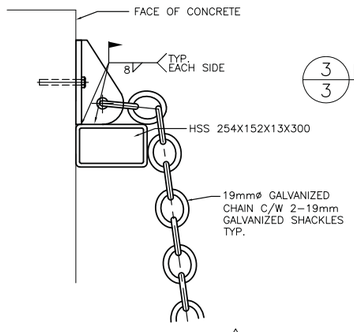
05–22–03



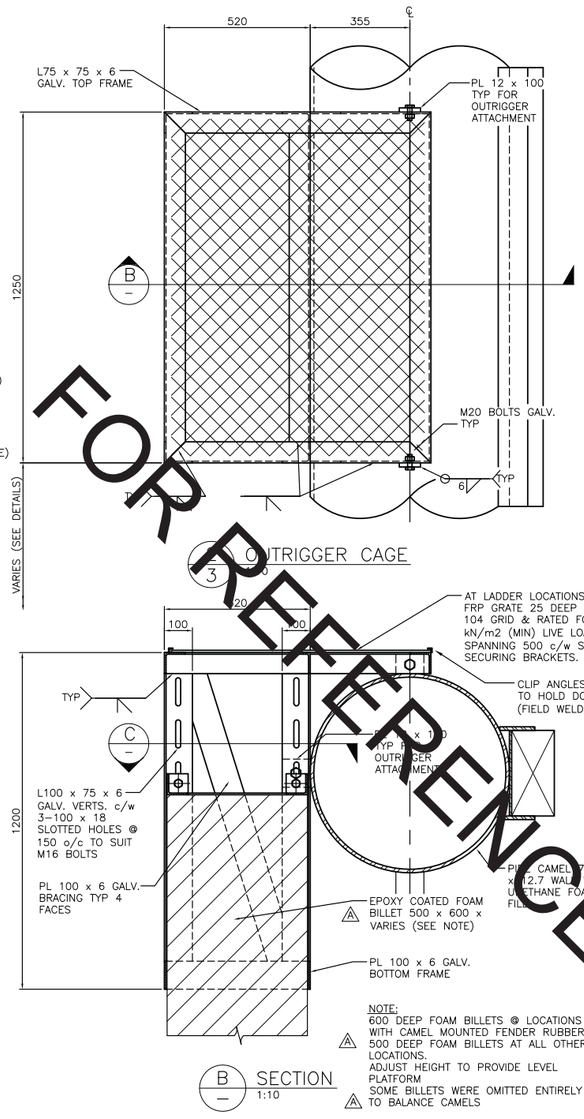
6/3 HANGER
1:10



3/3 LADDER DETAIL (E)
1:20
RE–ATTACH AS PER EXISTING

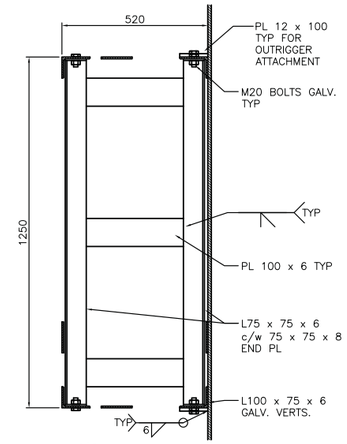


5/3 HANGER WITH CHAIN SUPPORT
1:10

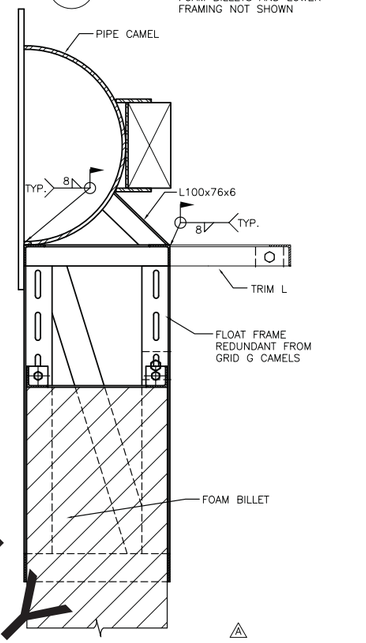


3/3 OUTRIGGER CAGE

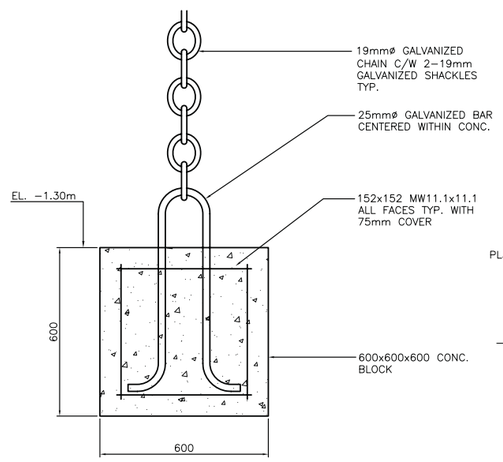
B/– SECTION
1:10



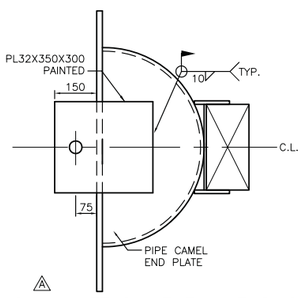
C/– SECTION
1:10
FOAM BILLETS AND LOWER FRAMING NOT SHOWN



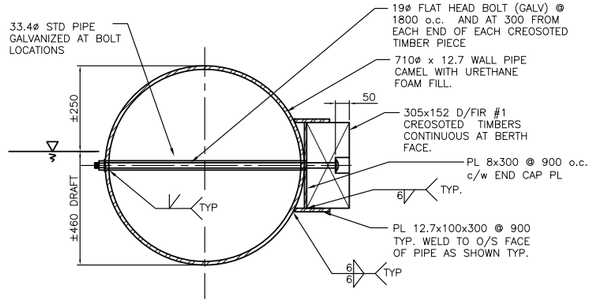
ADD FLOATATION – END CAMELS
1:10 THREE LOCATIONS



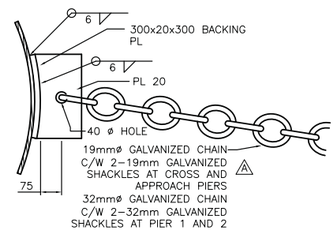
1/3 FENDER RETAINING CHAIN
1:10



7/11 CHAIN ATTACHMENT – END CAMELS
1:10



A/– TYP. SECTION
1:10



4/3 HORIZONTAL CHAIN TIE
1:20

Public Works and Government Services Canada | Travaux publics et Services gouvernmentaux Canada

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KM Engineering Group Inc.
Consulting Engineers KM 04–2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920–7979 FAX: (250) 920–7911

CAD FILE No. – SHEET 11

KM ENGINEERING PROJECT No. – KM 04–03

A	AS BUILT	DEC. 7, 2004
	revision	

A/C A detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.
A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

OUTRIGGER AND CAMEL LOCATING CHAIN DETAILS

designed	MAHOMED KATHRADA, P. ENG.	concu
date	03.03.03	date
drawn	ARLEN DONNELLY	dessine
date	03.03.10	date
approved		approuve
date		date
Tender		Soumission

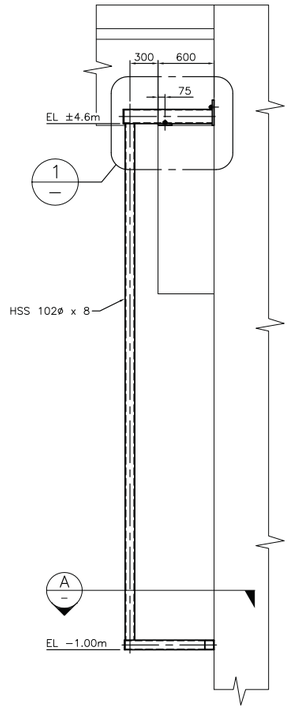
PWGSC Project Manager / Administrateur de projets TPSGC

project number / numéro du projet: 853033

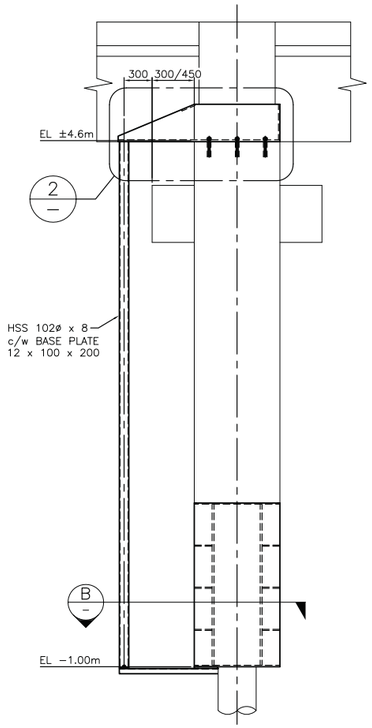
drawing number / numéro du dessin: 011

rev.: A

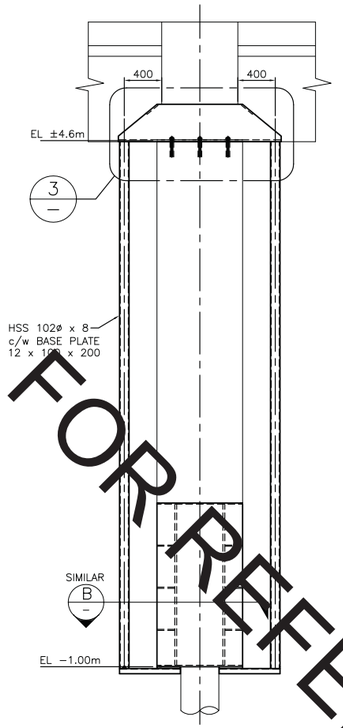
05–22–03



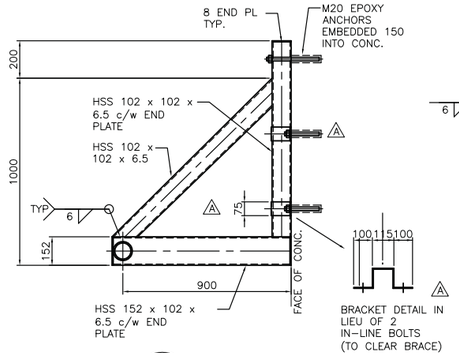
1 / — CAMEL LOCATOR FOR CRIBS
1:30 — 1/6
CAMELS AND FENDERS NOT SHOWN OPPOSITE AS SHOWN IN SOME LOCATIONS



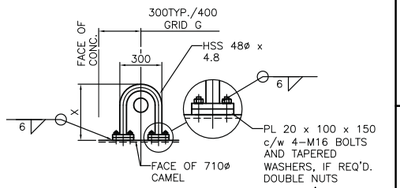
2 / — CAMEL LOCATOR FOR BENTS
1:30 — 2/4
APPROACH PIER SHOWN
CAMELS AND FENDERS NOT SHOWN OPPOSITE AS SHOWN IN SOME LOCATIONS
⚠ OMITTED AT BENTS 6 AND 10 ON APPROACH PIER



3 / — CAMEL LOCATOR FOR BENTS @ GRID
1:30 — 3/8
CAMELS AND FENDERS NOT SHOWN
CROSS PIER SIMILAR (1 SIDE ONLY)

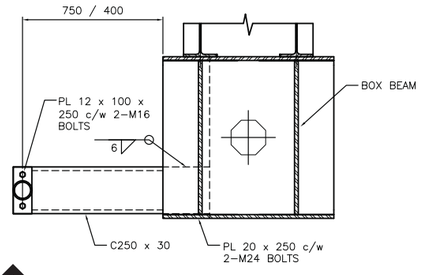


A / — SECTION
1:15

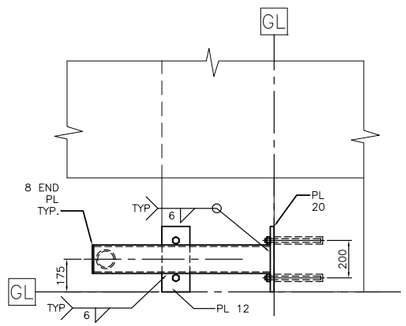


4 / — CAMEL LOCATOR
1:20

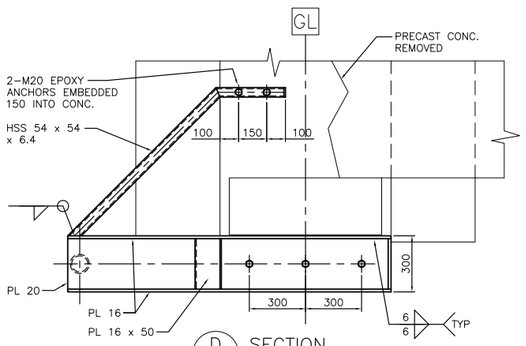
LOCATION	X DIM
APPROACH PIER	750
PIER 1 CRIB, GRID A	725
PIER 1 CRIB, GRID B	750
PIER 2 CRIB, GRID F	725
PIER 2 BENT, GRID G	800
CROSS PIER, GRID 11	750



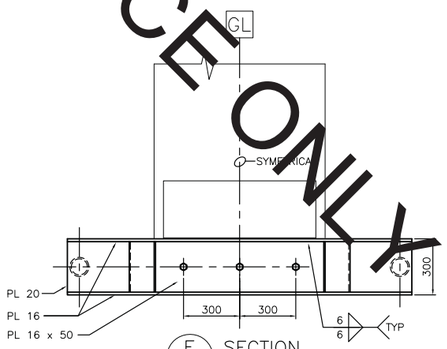
B / — SECTION
1:15



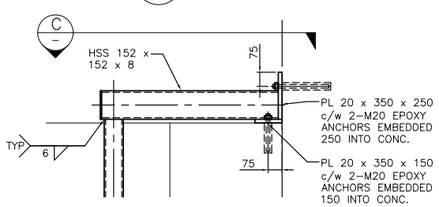
C / — SECTION
1:15



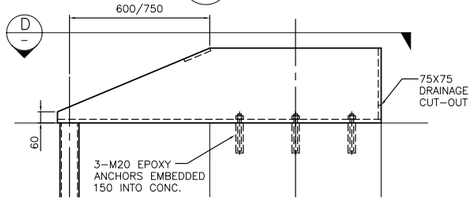
D / — SECTION
1:15



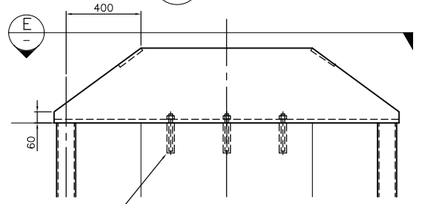
E / — SECTION
1:15



1 / — DETAIL
1:15



2 / — DETAIL
1:15



3 / — DETAIL
1:15

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Consulting Engineers KM 04-2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920-7979 FAX: (250) 920-7911

CAD FILE No. – SHEET 12

KM ENGINEERING PROJECT No. – KM 04-03

number	revision	revision	date
A	AS BUILT		DEC. 7, 2004

A/C — A detail number / number du detail; B source drawing no. / de dessin no.; C detail on drawing no. / detail sur dessin no. — A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

CAMEL LOCATING HSS & FRAME DETAILS

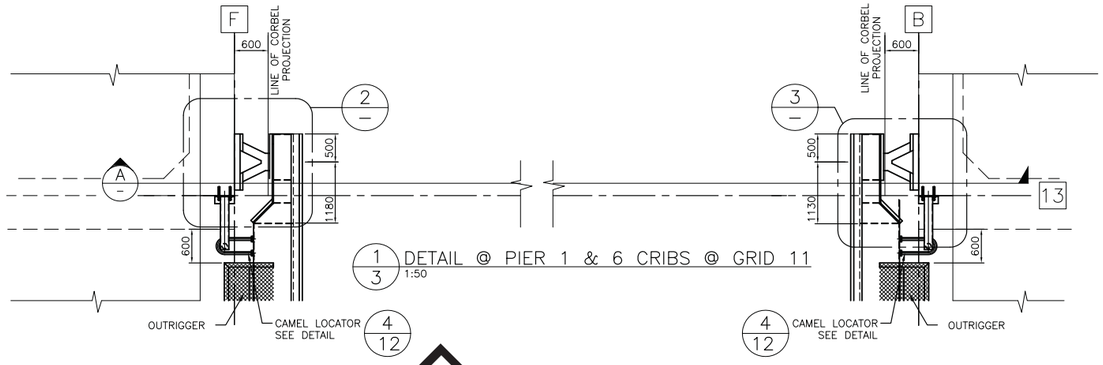
designed	MAHOMED KATHRADA, P. ENG.	concu
date	03.03.03	date
drawn	ARLEN DONNELLY	dessine
date	03.03.10	date
approved		approuve
date		date
Tender		Soumission

PWGSC Project Manager / Administrateur de projets TPSGC

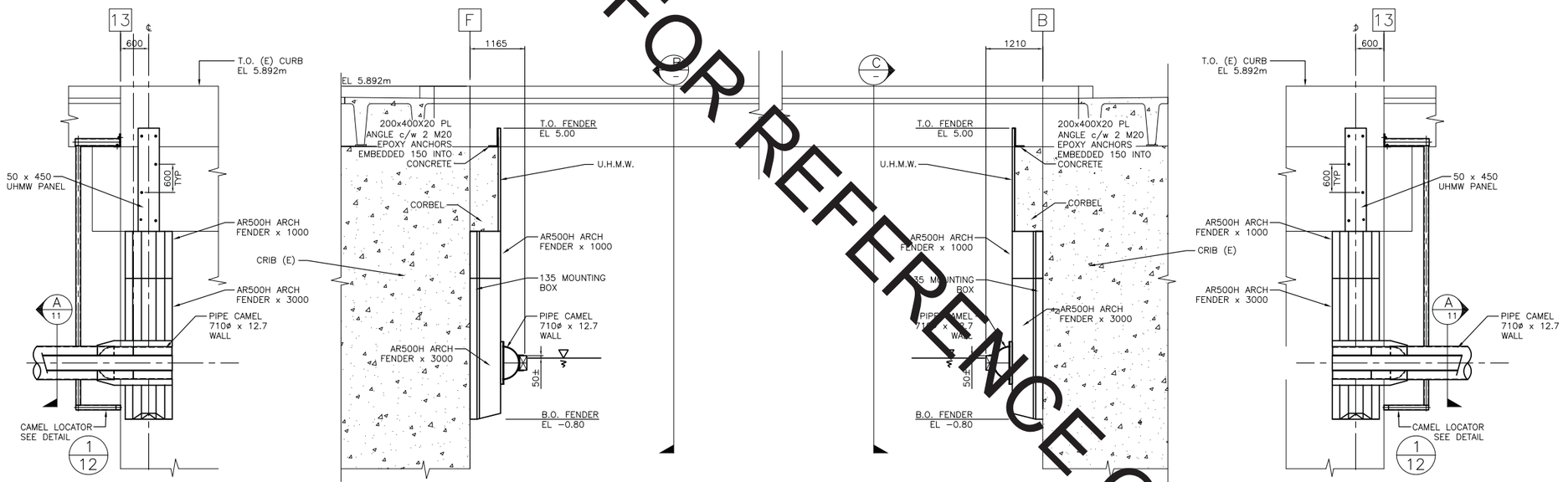
project number / numéro du projet: 853033

drawing number / numéro du dessin: 012 — rev.: A

05-22-03



1/3 DETAIL @ PIER 1 & 6 CRIBS @ GRID 11
1:50



B/— ELEVATION
1:50

A/— SECTION
1:50

C/— ELEVATION
1:50

2/— DETAIL
1:20

E/— SECTION
1:20

DETAIL 2/—
1:20

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Pacific Region
Region du Pacifique

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Consulting Engineers
KM 04-2003
Suite 305 – 895 Fort Street, Victoria, B.C. V8W 1H7
TEL: (250) 920-7979 FAX: (250) 920-7911

CAD FILE No. – SHEET 6

KM ENGINEERING PROJECT No. – KM 04-03

number	revision	revision	date
A	AS BUILT (NO CHANGE)		DEC. 7, 2004

A/C detail number / number du detail
B source drawing no. / de dessin no.
C detail on drawing no. / detail sur dessin no.

A/BC

project / projet

PATRICIA BAY, B.C.
INSTITUTE OF OCEAN SCIENCES
MAIN WHARF
FENDERING UPGRADE

drawing / dessin

DETAILS AT CRIBS 1 & 6
ON GRID 13

designed	MAHOMED KATHRADA, P. ENG.	concu
date	03.03.03	date
drawn	ARLEN DONNELLY	dessine
date	03.03.10	date
approved		approuve
date		date
Tender		Soumission

PWGSC Project Manager / Administrateur de projets TPSGC

project number / numéro du projet

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rev.: A

10-27-03