

SPECIFICATION

Harbour Improvements
Hnaua, Manitoba

Solicitation No. F2470-140019/A



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01 11 05 – GENERAL INSTRUCTIONS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 DESCRIPTION OF WORK

- .1 The work site described in this specification as located at Hnausa, Manitoba. The site is located on the west side of Lake Winnipeg approximately 120 kilometres from Winnipeg via Highway 8.
- .2 The work under this contract covers the following:
 - .1 Demolish designated existing concrete deck on wharf approach.
 - .2 Install granular base for concrete material.
 - .3 Supply and install new concrete deck on wharf approach.
 - .4 Supply and install new expanded metal grating transition plate.
 - .5 Supply and install new timber curb.
 - .6 Demolish and remove existing underground lift station to cut grade.
 - .7 Clear, grub, and compact existing ground under new granular launch ramp and parking area.
 - .8 Excavate material for launch ramp and dispose of excess material.
 - .9 Supply and install geotextile.
 - .10 Supply, install and compact granular sub-base and granular base for launch ramp and parking area.
 - .11 Construct north and south rock approaches.
 - .12 Supply and install two new aluminum ramps.
 - .13 Replace plywood surface on existing aluminum ramp.
 - .14 Replace approach stairs to timber crib wharf.
 - .15 Demolish and remove existing culvert.
- .3 The work to be done by the Contractor under this Contract shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, insurance, and all things necessary for and incidental to the satisfactory performance and completion of all work as specified herein. All work to be done in accordance with details shown on the accompanying plans as specified herein.

1.3 DEFINITIONS

- .1 The word "provide" means "supply and install".
- .2 For purposes of this contract, "Departmental Representative", "Architect/Engineer" and "Engineer" shall have the same meaning.

1.4 WORK SCHEDULE

- .1 Provide within 10 working days after Contract award, schedule showing anticipated progress stages and final completion of work within time period required by contract documents.
- .2 Provide sufficient details in schedule to clearly illustrate entire instrumentation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
- .3 As a minimum, work schedule to be prepared and submitted indicating work activities, tasks and other projects elements, their anticipated durations and planned dates for achieving key activities and major project milestones. It shall include sufficient details and supported by narratives to demonstrate a reasonable plan for completion of project within designated time.
- .4 Submit schedule updates on a minimum monthly basis and more often, when requested by Engineer. Provide a narrative explanation of necessary changes and schedule revisions at each update. Take all necessary measures to complete work within approved time.
- .5 Work under this contract is to be performed Completion in a timely manner. Commence planning and preparatory work immediately upon receipt of official notification of acceptance of Contract and schedule the work so that the project will be complete by the following dates:
 - .1 All concrete related work as well as any excavation and backfilling that requires compaction (work above water level) shall be completed by **November 1, 2014**.
 - .2 The remainder of the work in the contract shall be completed by **March 6, 2015**.
- .6 Work sequence:
 - .1 Before work is undertaken, ensure that all materials and trades required are available to finish work in as short a period as possible.
 - .2 No area to be renovated shall be placed out of service until it is confirmed that there shall be no need to stop the work waiting for receipt of materials, equipment or labour.

1.5 CERTIFICATES AND TRANSCRIPTS

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

1.6 FEES, PERMITS AND CERTIFICATES

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and work permits required.
- .3 Furnish certificates and permits when requested.

1.7 MEASUREMENT FOR PAYMENT

- .1 Notify Engineer sufficiently in advance of operations to permit required measurements for payment.
- .2 Submit to Engineer, at least 14 days before Information for first application for payment, cost breakdown, Progress Payment in detail as directed by Engineer, for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment. After approval by Engineer, cost breakdown will be used as basis for progress payments.

1.8 INTERPRETATION OF DOCUMENTS

- .1 In the event of discrepancies or conflicts in interpreting the Plans (drawings) and Specifications, Specifications take precedence over drawings bound with specifications.
- .2 Drawings and specifications are complementary. When work is shown or mentioned on the drawings but is not indicated in the specifications, or when work is indicated in the specifications but is not shown or mentioned on the drawings, it shall nevertheless be included in the Contract.
- .3 The sub-division of the Specification into sections, identified by title and number, is for convenience only and does not modify the singularity of the document, nor does it operate to make or imply that the Engineer is an arbiter to establish the limits or extent of contract between Contractor and Subcontractors or to determine the limits or extents of work that may be decided by trade unions or contractors' organizations. Extras to the Contract will not be considered on the grounds of differences in interpretation of the Specification and/or Drawings as to which trade performs the work.
- .4 Do not scale off drawings.

1.9 CONTRACTOR'S USE OF SITE

- .1 Co-ordinate use of premises under direction of the Engineer.
- .2 Do not unreasonably encumber the site with materials and equipment.
- .3 Assume full responsibility for protection and safekeeping of products under this Contract.
- .4 Move stored products or equipment which interfere with operations of Engineer or other harbour users.
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Engineer.

- .8 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.10 EXISTING SERVICES

- .1 Notify Engineer and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Engineer 72 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Engineer of findings.
- .4 Submit schedule to and obtain approval from Engineer for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .5 Where unknown services are encountered, immediately advise Engineer and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.

1.11 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 Change Orders.
 - .6 Other Modifications to Contract.
 - .7 Copy of Approved Work Schedule.
 - .8 Health and Safety Plan and Other Safety Related Documents.
 - .9 Other documents as specified.

1.12 CONTRACT METHOD

- .1 Construct Work under a combined price contract. All costs for work not specifically identified as a unit price item shall be included in the lump sum arrangement.

1.13 CODES AND STANDARDS

- .1 Perform work in accordance with latest editions of National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Work to meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

1.14 PROJECT MEETINGS

- .1 Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.15 SETTING OUT OF WORK

- .1 Engineer will provide only those survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give engineer reasonable notice of requirements for such control points and stakes.
- .2 Set grades and lay out work in detail from control points and grades established by Engineer.
- .3 Provide devices needed to lay out and construct work.
- .4 Supply such devices needed to lay out and construct work.
- .5 Supply such devices as straight edges and templates required to facilitate Engineer's inspection of work.
- .6 Supply stakes and other survey markers required for laying out work.

1.16 ADDITIONAL DRAWINGS

- .1 Engineer may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.
- .2 When additional drawings and instructions are required by the Contractor, provide reasonable notice in writing to the Engineer in advance of the date they are required.

1.17 EXAMINATION

- .1 Before submitting tender, examine existing conditions and determine conditions affecting work.
- .2 Obtain all information which may be necessary for proper execution of Contract.

1.18 SITE INSPECTION

- .1 The submission of a tender is deemed to be a confirmation of the fact that the Tenderer has inspected the site and is fully conversant with all the conditions under which the work is to be carried out.

1.19 MATERIAL AND EQUIPMENT

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

1.20 SECURING WORK AREA

- .1 Secure the work areas in each stage in an approved manner. This includes fencing or barricades to prevent public access to any areas where construction activities occur and construction materials are stored.

1.21 VEHICLE AND PEDESTRIAN PROTECTION

- .1 Provide snow fencing, wooden barriers, or other approved barriers to prevent vehicles and pedestrians from accessing the site during construction.
- .2 Contractor shall provide appropriate signage for vehicle and pedestrian protection.
- .3 All barriers shall include delineation and reflectors to stand out at nightfall.

1.22 DRAWINGS

- .1 The following drawings are to be read in conjunction with this specification:

- .1 H-1, H-2, H-3, H-4, H-5, H-6 & H-7 Harbour Improvements

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

01 35 29 – HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Manitoba
 - .1 The Workers Compensation Act (latest edition).

1.3 SUBMITTALS

- .1 Submit site-specific Health and Safety Plan: Within 10 days after date of Notice to Proceed and prior to commencement of Work.
- .2 Submit copies of incident and accident reports to Engineer.
- .3 Submit WHMIS MSDS – Material Safety Data Sheets to Engineer.
- .4 Engineer will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor after receipt of plan. Revise plan as appropriate and resubmit plan to Engineer within 5 days after receipt of comments from Engineer.
- .5 Engineer's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .6 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

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

1.5 SAFETY ASSESSMENT

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

1.6 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

- .2 Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Worker's Compensation Board and municipal statutes and authorities.
- .3 In the event of a conflict between any provisions of above authorities having the most stringent provision will apply.

1.7 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.

1.8 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province having jurisdiction and advise Engineer verbally and in writing.

1.9 HEALTH AND SAFETY CO-ORDINATOR

- .1 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 dock reconstruction at an active harbour site.
 - .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.

1.10 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative verbally and in writing.

1.11 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or Departmental Representative.

- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

01 35 43 – ENVIRONMENTAL PROCEDURES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No separate measurement will be for work of this section. Work is incidental to the project cost.

1.2 FIRES

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

1.3 DRAINAGE

- .1 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment will enter and leave the lake at such a location and in such a manner that disturbance to the lakeshore.
- .2 No construction debris from work activities will be allowed to enter the lake. The work site must be cleaned daily. Every effort will be made to minimize the introduction of sediment to the lake during work activities.
- .3 Do not use waterway beds for borrow material.
- .4 Waterways to be free of excavated fill, waste material and debris.
- .5 Design and construct temporary crossings to minimize erosion to waterways.
- .6 Do not skid logs or construction materials across waterways.
- .7 Avoid damage to shoreline.
- .8 Supply, install, and maintain approved erosion control blankets to unprotected slopes until revegetation is established.
- .9 Any impacts below ordinary high water mark that are not shown on the site plan are not permitted without written approval from the Engineer. Up to 30 days may be required for approval.

- .10 Reclaim and restore disturbed areas to previous or better condition.
- .11 Areas used for stockpiling construction materials, including fill or other equipment storage will be well back from the edge of the water body and, if possible, in areas which have already been disturbed or are devoid of vegetation.
- .12 All required machinery should be supplied with appropriate spill containment kits as a precaution in the event of accidental fuel spills or hydraulic leaks. Additional kits should be available on site with the capacity to contain any spills of deleterious substances that may be reasonably expected to occur. Contractors should ensure that all personnel are familiar with the spill kits.
- .13 The Contractor shall report spills of fuels or other contaminants to the Engineer.
- .14 The Contractor shall not remove, destroy or disturb species pursuant to Provincial Threatened Endangered and Extirpated Species regulation, or species listed in the federal Species at Risk Act.
- .15 The Contractor shall not disturb migratory bird nests.

1.5 POLLUTION CONTROL

- .1 Control emissions from equipment and plant to local authorities' emission requirements.
- .2 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .4 Locate temporary fuel storage 100 metres from shore and comply with Provincial Environmental Legislation.
- .5 Refueling, servicing, or cleaning of equipment on ice or within 100 metres of shore is prohibited. Contractor to ensure all equipment operating on project is free of external fluid leaks, grease, oil, and mud.
- .6 Contractor to contain all oil leaks from equipment working adjacent to waterways.
- .7 No maintenance of vehicles or equipment in construction areas.
- .8 Use drip pans to catch leaking oil from compressors, pumps, etc.
- .9 Keep an emergency spill kit for in-water use on site during construction.

1.6 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. Hazardous wastes including fuels, oils and lubricants to be disposed of by

a licensed hazardous waste carrier/handler in accordance with Provincial Environment Legislation.

- .3 Collect all rubbish and waste material and dispose of in accordance with applicable governing authorities.
- .4 Do not allow debris of any type to enter waterway.

1.7 PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties.
- .2 Avoid disturbance of topsoil and vegetation unless otherwise specified. Contractor is responsible to restore all impacted areas to original state.
- .3 The Contractor shall revegetate soil in areas exposed by construction with vegetation species native to the area. These areas shall be revegetated as quickly as possible following construction to prevent soil erosion and establishment of noxious weeds.

1.8 VERTICAL SILT CURTAIN

- .1 Contractor to isolate the work area for the launch ramp from the lake with an approved silt curtain to prevent the drift of sediment from the work area into the lake as required. The silt curtain must extend from the top of the ice/water to within 300mm of the lake bottom. The silt curtain must be left in place until all suspended sediments are settled out. On completion of the project carefully remove silt curtain to ensure settled sediment is not disturbed. An acceptable product is "Tough Guy" Type 1E Turbidity Barrier or approved equivalent. Costs for supply, installation, maintenance, and removal to be included in lump sum costs.
- .2 Construction shall be monitored to ensure that the mitigation measures are effective at containing the sediment to the launch ramp construction area. Adjustments may have to be made to get the containment to function properly.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

01 45 00 – QUALITY CONTROL

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 INSPECTION

- .1 Allow Engineer 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 Engineer.
- .3 Engineer 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 may be engaged by Engineer for purpose of inspecting and/or testing portions of Work.
- .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 Engineer at no cost to. Pay costs for retesting and reinspection.

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 PROCEDURES

- .1 Notify Engineer 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 Engineer 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 Engineer 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 Engineer.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

1.8 MILL TESTS

- .1 Submit mill test certificates as requested.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

01 77 00 – CLOSEOUT PROCEDURES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor to conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Engineer.
 - .2 When Work incomplete according to Engineer, complete outstanding items and request re-inspection.
 - .3 Final Payment:
 - .1 When Engineer considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .4 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

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

1.4 RECORD DRAWINGS

- .1 Maintain project “as-built” record drawings and record accurately significant deviations from Contract documents caused by site conditions and changes ordered by Engineer.
- .2 Mark “as-built” changes in red coloured ink.
- .3 Record the following information:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by Change Order or Field Order.
- .4 At completion of project and prior to final inspection, neatly transfer “as-built” notations to second set and submit both sets to Engineer.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

01 82 01 – WEIGH SCALES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Weigh all stone placed in the Work and measured in tonnes at the quarry or project site on a scale approved and certified as correct. Prior to use, have weigh scale certified as meeting requirements of Statutes of Canada, Chapter 36, Weights and Measures Act 1971 and subsequent amendments. Provide the Departmental Representative with a copy of the certificate and display certificate in prominent location. Costs for maintenance and operation of scale shall be considered incidental to the work.
- .2 Provide the Departmental Representative with weigh tickets at time of delivery to site.

Part 2 Products

2.1 EQUIPMENT

- .1 Provide weigh scales of sufficient capacity to weigh loaded vehicles in a single operation.
- .2 Provide scale house to enclose mass indicator and in which Contractor's representative can perform work and maintain records.
- .3 Scale house to be waterproof and have one sliding window facing scale platform. Entrance door not face scale platform.

Part 3 Execution

3.1 INSTALLATION

- .1 Provide, install and maintain scale at quarry or project site at location approved by Engineer.
- .2 Remove scale and scale house when no longer required and level approach ramps.

3.2 OPERATION

- .1 Contractor's representative will be responsible for weighing materials.

3.3 MAINTENANCE

- .1 Maintain scale platform and scale mechanism clean and free from gravel, snow, ice and debris.
- .2 Maintain approach roads in good condition free from sags and ruts.
- .3 Have scales retested and recertified if requested by Engineer.

END OF SECTION

02 41 13 – SELECTIVE SITE DEMOLITION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Mobilization, demobilization, all materials and work required for the demolition, removal and disposal of the existing concrete deck, existing concrete lift station, culvert and any other materials that form part of the above mentioned components shall be included in the lump sum amount for the project.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Storage and Protection.
 - .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Engineer and at no cost to Engineer.
 - .2 Remove and store materials to be salvaged, in manner to prevent damage.
 - .3 Store and protect in accordance with requirements for maximum preservation of material.
 - .4 Handle salvaged materials as new materials.

1.3 SITE CONDITIONS

- .1 Site Environmental Requirements:
 - .1 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Ensure proper disposal procedures are maintained throughout the project.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.

3.3 REMOVAL FROM SITE

- .1 Dispose of materials not designated for salvage or re-use in work, off-site at location acceptable to Engineer.

3.4 RESTORATION

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.
- .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

END OF SECTION

03 10 00 - CONCRETE FORMING AND ACCESSORIES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121-M1978(R2003), Douglas Fir Plywood.
 - .4 CSA O151-04, Canadian Softwood Plywood.
 - .5 CSA O153-M1980(R2003), Poplar Plywood.
 - .6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.
 - .7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
 - .8 CSA S269.1[1975(R2003), Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit shop drawings for formwork and falsework.
- .2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, and locations of temporary embedded parts.
- .3 Indicate sequence of erection and removal of formwork/falsework as directed by Engineer.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86.
- .2 Form release agent: non-toxic.
- .3 Form stripping agent: colourless mineral oil, non-toxic, free of kerosene, with viscosity between 15 to 24 mm²/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.

- .4 Falsework materials: to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .4 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .5 Use 25 mm chamfer strips on external corners unless specified otherwise.
- .6 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .7 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .8 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.
- .9 Relative alignment between adjacent formed concrete surfaces shall be less than or equal to 5 mm.
- .10 Plumbness of slab edges shall be within 1:400 measured at any one surface.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 7 days for slabs.
- .2 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

03 20 00 – CONCRETE REINFORCING

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.
- .2 Include reinforcement costs in items of concrete work in Section 32 13 13 Concrete Paving.

1.2 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .3 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice SP-66.
- .2 Shop Drawings:
 - .1 Submit drawings with the following:
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Engineer, with identifying code marks to permit correct placement without reference to structural drawings.
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.
 - .1 Provide Type B unless otherwise indicated.

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Engineer.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .5 Mechanical splices: subject to approval of Engineer.
- .6 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Engineer's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Engineer's, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Engineer.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.

- .3 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Engineer's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

05 14 12 – ALUMINUM GANGWAY FABRICATION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Supply and installation of new aluminum gangways and any required fasteners will be paid for per unit supplied and installed.
- .2 Replacing plywood surface on existing aluminum ramp and installation of new timber cleats shall be included in the lump sum amount for the project.

1.2 REFERENCES

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
 - .1 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM A325-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .3 ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength.
 - .4 ASTM A490-09, Standard Specification for Structural Bolts Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
 - .5 ASTM A490M-09a, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3 for Structural Steel Joints.
 - .6 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .7 ASTM B210M-05, Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
 - .8 ASTM B211M-03, Standard Specification for Aluminum and Aluminum Alloy Bar, Rod and Wire.
 - .9 ASTM F593-02(2008), Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .3 CSA International
 - .1 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .2 CAN/CSA-S157/S157.1-05, Strength Design in Aluminum/Commentary on CAN/CSA-S157, Strength Design in Aluminum.
 - .3 CSA W47.2-M1987(R2008), Certification of Companies for Fusion Welding of Aluminum.
 - .4 CSA W59.2-M1991(R2008), Welded Aluminum Construction.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).
- .5 Master Painters Institute (MPI)
 - .1 MPI - EXT 5.5D, Bituminous Finish.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural aluminum and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 QUALITY ASSURANCE

- .1 Submit 1 copy of mill test reports showing chemical and physical properties and other details of aluminum to be incorporated into work, at least 4 weeks prior to fabrication of structural aluminum. Mill test reports to be certified by metallurgists qualified to practice in Province of Manitoba, Canada.
- .2 Fabricator of structural aluminum to provide an affidavit stating that materials and products used in fabrication conform to applicable material and products standards called for by design drawings and specifications.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect structural aluminum from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Aluminum bar, rod, wire: to ASTM B211M.
- .2 Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Shapes, and Tubes: to ASTM B221M.
- .3 Aluminum sheet or plate: to ASTM B209M.
- .4 Aluminum drawn tubes: to ASTM B210M.
- .5 Aluminum bolts and rivets: to ASTM B316M.
- .6 Aluminum welding wire: to AWS - A5.10/A5.10M.

- .7 Stainless steel bolts: to ASTM F593.
- .8 Steel bolts: to ASTM A307.
- .9 Bituminous paint: MPI - EXT 5.5D, without thinner.
- .10 Galvanizing: hot dip galvanize steel bolts to CAN/CSA-G164, minimum zinc coating of 600 g/m².

2.2 FABRICATION

- .1 Fabricate to CAN/CSA-S157 and in accordance with approved shop drawings.

2.3 FINISHES

- .1 Finish: plain mill as indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 Do structural aluminum work: to CAN/CSA-S157.
- .2 Do welding: to CSA W59.2.

3.2 CONNECTION TO EXISTING WORK

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Departmental Representative for direction before starting fabrication.

3.3 ERECTION

- .1 Erect structural aluminum as indicated and to CAN/CSA-S157 and approved erection drawings.
- .2 No field cutting or altering structural members.

3.4 JOINT SEALING AND PAINTING

- .1 Surface preparation of aluminum in contact with or embedded in dissimilar materials: to CAN/CSA-S157. Treat locations as if there is moisture present.
- .2 Paint to CAN/CSA-S157.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.

END OF SECTION

05 50 00 – METAL FABRICATIONS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Supply and installation of steel transition plate and any required fasteners will be paid for per unit supplied and installed. Contractor to submit shop drawings and proposed method of installation for transition plate to Engineer for approval prior to fabrication.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A307[07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16-09, Design of Steel Structures.
 - .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 Submit drawings indicating materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Bolts and anchor bolts: to ASTM A307, galvanized where exposed to weather.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.

2.4 SHOP PAINTING

- .1 Primer: VOC limit 250 g/L maximum to GS-11 CCD-047a CCD-048.
- .2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .4 Clean surfaces to be field welded; do not paint.

2.5 NEW CAP CHANNELS ON STEEL SHEET PILING

- .1 Steel channels: prime painted, sizes indicated.
- .2 Finish: shop painted.
 - .1 Primer: VOC limit 250 g/L maximum to GS-11 when applied on site.

2.6 NEW LADDERS

- .1 Stringers 63.5 x 63.5 x 6 mm angles, prime painted, cut to lengths as indicated.
- .2 Fixed rungs: 20 mm diameter, prime painted, sizes as indicated. Shop weld to stringers at 300 mm centres.

- .3 Brackets: prime painted, sizes and shapes as indicated. Weld to stringers at top and bottom.
- .4 Primer: VOC limit 250g/L Maximum to GS-11 when applied on site.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.

3.2 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Engineer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to be hot dipped galvanized and /or shall be compatible with material through which they pass.
- .5 Make field connections with bolts to CSA S16.
- .6 Touch-up field welds, bolts and burnt or scratched surfaces with primer;
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.
- .7 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.

3.3 CLEANING

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste off site at regular intervals for disposal.
- .3 Do not burn waste materials on site. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 When Work is substantially completed, remove surplus products, tools, and equipment not required to complete remaining work.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.

- .2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

06 05 73 – WOOD TREATMENT

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 REFERENCES

- .1 American Wood-Preservers' Association (AWPA)
 - .1 AWWA M2-01, Standard for Inspection of Treated Wood Products.
 - .2 AWWA M4-06, Standard for the Care of Preservative-Treated Wood Products.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA O80 Series-97(R2002) - O80S2-05, Wood Preservation.
 - .2 CSA O80.20-1.1-M97(R2002), This Standard applies to the fire-retardant treatment of lumber by pressure processes..
 - .3 CSA O80.27-1.1-M97(R2002), This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes.
 - .4 CSA O80.201-M89, This Standard covers hydrocarbon solvents for preparing solutions of preservatives.
 - .5 CSA O322-02, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

Part 2 Products

2.1 MATERIALS

- .1 Preservative treatment by a pressure process to CSA O80 Series.

Part 3 Execution

3.1 APPLICATION: PRESERVATIVE

- .1 Treat timber to CSA O80 Series preservative to obtain minimum net retention of 6.4 kg/m³ of wood.

3.2 CARE OF PRESSURE-TREATED WOOD PRODUCTS

- .1 Apply the recommended and accepted practices followed in the care and handling of all wood products to pressure-treated wood products.
- .2 Avoid damage of field fabrication causing alteration of the original pressure-treated surface.

- .3 Thoroughly saturate all cuts or injuries occurring subsequent to pressure treatment by liberal brushing, spraying, dipping, soaking or coating with preservative solution.
- .4 Fill holes necessarily bored after pressure treatment with preservative solution to allow ample soaking time for penetration of solution.
- .5 Use in any of the above the same preservative solution as that used in the original pressure treatment or a field treating solution of colour to match original treatment.

END OF SECTION

06 10 00 – ROUGH CARPENTRY

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Payment for the treated timber curb shall be per linear meter supplied and installed.
- .2 Preservative treatment and fasteners shall be deemed incidental and included with the treated timber curb item.

1.2 RELATED REQUIREMENTS

- .1 Section 06 05 73 – Wood Treatment.

1.3 REFERENCES

- .1 CSA International
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O141-05(R2009), Softwood Lumber.
 - .3 CAN/CSA-Z809-08, Sustainable Forest Management.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 05 – General Instructions.

1.5 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse or recycling.

Part 2 Products

2.1 LUMBER MATERIAL

- .1 Lumber: unless specified otherwise, Group A Douglas Fir, rough sawn, moisture content 19% or less in accordance with following standards:
 - .1 Grade: Structural, No.2 or better.
 - .2 CSA O141.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 CAN/CSA-Z809 or FSC or SFI certified.

2.2 ACCESSORIES

- .1 Nails, spikes and staples: to CSA B111.
- .2 Bolts: 19 mm diameter unless indicated otherwise, complete with nuts and washers, galvanized.

2.3 FINISHES

- .1 Galvanizing: to ASTM A123/A123M, use galvanized fasteners for exterior work pressure- preservative treated lumber.

2.4 WOOD PRESERVATIVE

- .1 Refer to Section 06 05 73 Wood Treatment.

Part 3 Execution

3.1 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.2 INSTALLATION

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Install new treated timber curbs and spacers as indicated and secure using galvanized anchor bolts c/w nuts and washer.

3.3 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

END OF SECTION

31 11 00 – CLEARING AND GRUBBING

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 Measure following items in square metres within limits as indicated:
 - .1 Clearing, Grubbing, Sub-Base Compaction & Proof Rolling

1.2 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments of specified size to not less than specified depth below existing ground surface.

1.4 SUBMITTALS

- .1 Submit to Engineer 2 weeks before clearing and grubbing, the proposed disposal area.

1.5 STORAGE AND PROTECTION

- .1 Prevent damage to existing roads which are to remain.
 - .1 Repair damaged items to approval of Engineer.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of any excavated or identified waste materials off-site at the contractors expense.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

- .1 Inspect site and verify with Engineer, items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Engineer immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Engineer in ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.3 CLEARING

- .1 Clearing includes trimming and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.
- .2 Cut off branches overhanging area cleared as directed by Engineer.

3.4 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 100 mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.5 COMPACTION

- .1 Level and compact the top 150 mm of existing ground above the water line to 95% standard proctor density prior to placing geotextile or granular base.
 - .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Obtain Engineer approval of compacted existing ground prior to placement of geotextile or granular base. Allow time for compaction testing as part of Engineers approval.

3.6 PROOF ROLLING

- .1 Exposed sub-grade should be proof-rolled prior to placement of the next layer of fill.
- .2 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.
- .3 Obtain written approval from Engineer to use non-standard proof rolling equipment.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove sub-base material and compact to depth and extent as directed by Departmental representative.
 - .2 Replace sub-base material and compact.
- .6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.7 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site to disposal area approved by Engineer.

3.8 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate grading operations to approval of Engineer.

3.9 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

31 23 33 – EXCAVATING, TRENCHING AND BACKFILLING

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Excavation for the installation of all granular material for the launch ramp will not constitute a measurement for payment. Include costs in lump sum costs for the project. Estimated volume of class B (common) excavation required is 2000 cubic metres.
- .2 Supply and installation of new granular 100 mm down sub-base material for the launch ramp will be paid for by the tonne supplied, installed, compacted and remaining in work.
- .3 Supply and installation of new granular 50 mm down base material for the launch ramp and parking areas will be paid for by the tonne supplied, installed, compacted and remaining in work.
- .4 Supply and installation of new granular base material for the concrete deck will be paid for by the cubic meter supplied, installed and remaining in work. Removal of existing granular or rock material to install specified granular to be included in lump sum costs for the project.
- .5 Contractor to make own arrangements with Provincial authorities, municipalities and owners of private properties, for the quarrying and transportation of rock materials and machinery for work over their property, roads or streets.

1.2 SUBMITTALS

- .1 Submit to Engineer for approval, two weeks before excavation, the proposed location of spoil area for excavated material.

1.3 SOURCE SAMPLING

- .1 Inform Engineer of proposed source of materials and provide access for sampling at least 2 weeks prior to commencing work

1.4 DEFINITIONS

- .1 Class A material: solid rock requiring drilling and blasting to loosen, which cannot be removed by means of heavy duty mechanical excavating equipment, and boulders or rock fragments of individual volumes 1.5 m³ or more.
- .2 Class B material: loose or shale rock, layered limestone rock, silt, sand, quick sand, mud, shingle, gravel, clay, sand, gumbo, boulders, hardpan and debris of individual volumes less than 1.5 m³.

Part 2 Products

2.1 MATERIALS

- .1 100 mm Granular sub-base material for launch ramp: in accordance with following requirements:

- .1 Crushed, pit run or screened stone, or gravel.
- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
- .3 The gradation and physical requirements to be as follows:

Sieve Designation	% Passing
100 mm	75-100
4.75 mm	22-85
0.425 mm	5-30
0.074 mm	0-10

- .1 50 mm Granular base material for the launch ramp, approaches and parking area: in accordance with following requirements:

- .1 Crushed, pit run or screened stone, or gravel.
- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
- .3 The gradation and physical requirements to be as follows:

Sieve Designation	% Passing
50 mm	75-100
15.9 mm	45-80
4.75 mm	25-55
1.20 mm	12-35
0.3 mm	7-20
0.08 mm	3-8

- .1 Granular base material for concrete deck: Limestone A-base 20mm minus.

- .1 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
- .2 The gradation and physical requirements to be as follows:

Sieve Designation	% Passing
20 mm	100
10 mm	35-85
5 mm	15-65
0.08 mm	0-12

Part 3 Execution

3.1 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions shown on drawings.
- .2 Excavation must not damage or interfere with adjacent foundations.
- .3 Keep excavated and stockpiled materials safe distance away from edge of excavation.
- .4 Dispose of surplus and unsuitable excavated material off site.
- .5 Do not obstruct flow of surface drainage or natural watercourses.

3.2 PLACEMENT AND INSTALLATION

- .1 Place granular base after sub-grade surface is tested and inspected and approved by Engineer.
- .2 Placing:
 - .1 Construct granular sub-base and granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Begin spreading base material on crown line.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .8 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compacting:
 - .1 Compaction equipment to be capable of obtaining required material densities.
 - .2 Ensure compaction equipment is capable of obtaining required material densities.
 - .3 Compact to density not less than 100% corrected maximum dry density.
 - .4 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .5 Apply water as necessary during compacting to obtain specified density.
 - .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Engineer.
 - .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
 - .8 For underwater compaction provide adequate compaction by means of backhoe bucket or other approved method.

3.3 PROOF ROLLING

- .1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.
- .2 Obtain written approval from Engineer to use non-standard proof rolling equipment.
- .3 Proof roll at level in granular base as indicated.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove sub-base material and compact to depth and extent as directed by Departmental representative.
 - .2 Replace sub-base material and compact.
- .6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.4 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.5 PROTECTION

- .1 Maintain finished granular surface in condition conforming to this section until granular surfacing is accepted by Engineer.

END OF SECTION

31 32 19 – GEOTEXTILES

Part 1 General

1.1 MEASUREMENT AND PAYMENT

- .1 Measure geotextiles in square metres of surface covered by material. No allowance will be made for seams and overlaps.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-[2004], Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-M85 Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1860-November 2010, Material Specification for Geotextiles.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Test and Evaluation Reports:
 - .1 If requested, submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

1.4 SAMPLES

- .1 Submit to the Engineer the following samples at least 1 week prior to commencing work:
 - .1 Minimum of 1 m of roll width of geotextile

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIAL

- .1 Non-woven geotextiles shall be Class II and consist of a manufactured sheet, web, or batt of directionally or randomly oriented fibres, filaments, or other elements produced by bonding or interlocking the elements by mechanical, thermal, or chemical means.
- .2 Tensile strength, Marv, minimum 660 N to CAN/CGSB 148.1, Method No. 7.3.
- .3 Elongation at break, typical, >50% to CAN/CGSB 148.1, Method No. 7.3.
- .4 Tear strength, MARV, minimum, 250 N to CAN/CGSB 4.2, Method No. 12.2.
- .5 Puncture strength, MARV minimum, 1375 N to ASTM D 6241.
- .6 Permittivity, minimum, to 0.05 CAN/CGSB 148.1, Method No. 4 s⁻¹.
- .7 Ultraviolet stability, minimum, 50% retained tensile strength at 500 hours to ASTM D 4355.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Engineer.
 - .2 Inform Engineer of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins and washers.

- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .4 Pin successive strips of geotextile with securing pins at 2000 mm interval at midpoint of lap as indicated.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within 4 hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Engineer.
- .8 Place and compact soil layers in accordance with relevant specification sections.

3.3 CLEANING

- .1 Progress Cleaning:
 - .2 Leave Work area clean at end of each day.
 - .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

32 13 13 – CONCRETE PAVING

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Payment for the reinforced concrete deck shall be by cubic metres of concrete poured in place, based upon the design finished grade.
- .2 Payment for formwork and falsework, reinforcing steel, and joints are incidental and are deemed to be included with the reinforced concrete deck item.
- .3 Sawcutting of concrete deck (control joints) to be paid for by the lineal meter.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A23.3-04, Design of Concrete Structures.
 - .3 CSA-A23.4-05, Precast Concrete - Materials and Construction.
 - .4 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
 - .5 CAN/CSA-G30.18-(R2002), Billet-Steel Bars for Concrete Reinforcement.
 - .6 CSA-W59-03, Welded Steel Construction (Metal Arc Welding) (Metric version).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Concrete hauling time: provide for review by Engineer deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIALS

- .1 Air content when tested in accordance with CAN/CSA-A23.2, (4C), immediately after discharge: in accordance with CSA A23.1 Table 10.
- .2 Use of chemical admixture will be approved only when specified mix requirements or workability cannot be achieved by proportioning of aggregates, water, cement and air entraining admixture.
- .3 Water: to CSA A23.1/A23.2.
- .4 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.
- .5 Aggregates: to CSA 23.1.
- .6 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .7 Anchors and supports: to CAN/CSA-G40.21 Type 300 W.
- .8 Welding materials: to CSA W48.
- .9 Curing compound: to ASTM C309, type 1-D or 2.

2.2 MIXES

- .1 Concrete:
 - .1 Alternative 1 - Performance Method for specifying concrete: to meet Engineer performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Minimum compressive strength at 28 days: 30 MPa.
 - .3 Surface texture: light broom finish in the transverse direction.
 - .4 Course aggregate, ASTM D4791, Table 3, Group 1, 20 mm size.
 - .5 Entrained air 6 +/- 1 percent.
 - .6 Slump at point of discharge 80 +/- 20 mm.
 - .7 Water/cement ratio to be 0.45 or less.
 - .8 Cement content to be 290-335 kg per cubic meter.
 - .9 Cement: Type 10.
 - .2 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .3 Concrete supplier's certification.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Engineer with certified copies of quality control tests related to this project as specified in CSA-A23.4.

- .2 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
- .3 Concrete hauling time: deliver to site of work and discharged within 120 minutes maximum after batching.

Part 3 Execution

3.1 FORMWORK

- .1 Provide forms of sufficient strength to support and keep alignment under weight of spreading and finishing machines.
- .2 Set forms true to line and grade, join neatly and tightly and secure to resist concrete pressure and impact from tampers without springing.
- .3 Clean and oil forms before each use.
- .4 Obtain Engineers approval of forms before placing concrete.

3.2 SUBGRADE AND SUBBASE PREPARATION

- .1 Subbase to consist of specified material and have a compacted thickness of not less than specified.
- .2 Subbase shall be compacted to specified density.
- .3 Prepared subbase shall be checked for conformity with the cross-section and grade tolerances. Finished surface of subbase shall not deviate more than 0 mm above and 20 mm below specified grade and cross-section, and surface shall not deviate more than 10 mm at any place on a 3 mm template.
- .4 Repair damage to subbase resulting from hauling or equipment operations.
- .5 Prior to placing concrete, subbase shall be thoroughly wetted. Wetting shall be carried out, such that standing water is not present on grade.
- .6 Surface condition of base to be approved by Engineer before placing concrete.

3.3 REINFORCING

- .1 Place steel as indicated to Section 03 20 00 Concrete Reinforcing.
- .2 Remove oil, grease, dirt and deleterious material from reinforcing bars before placing concrete.
- .3 Steel placement to be approved by Engineer before placing concrete.

3.4 PLACING

- .1 Provide Engineer 24 hours notice before each concrete pour.

- .2 Place concrete to latest edition of CSA A231.1.
- .3 Place concrete to lines, grades and depths as indicated.
- .4 No concrete shall be placed during rain.
- .5 When rain appears imminent pouring operation should cease. Protect freshly laid concrete from rain damage and adverse weather condition and in accordance with CAN/CSA A23.1. Extend protective coverings over edges of concrete and arrange so as not to bear on unprotected edges.
- .6 Protect granular base so that it is entirely free of water when concrete is placed.
- .7 Remove and replace at own expense concrete damage by freezing or which is unsatisfactory due to placement at too high a temperature.
- .8 Discharge concrete into forms as soon as practical after mixing.
- .9 Use hand placing where machine spreading is not feasible.
- .10 Spread uniformly with approved equipment to thickness sufficient to allow for proper consolidation and finishing.
- .11 When completing concrete placement for day, carry placement through to scheduled control joint location.
- .12 Where concrete placement is stopped for more than 30 minutes due to breakdowns, weather or other reasons, construct extra bulkhead and construction joint as directed by Engineer.
- .13 Do not place concrete on frozen surface.
- .14 Concrete placed when the ambient temperature is at or above 27 degrees C to be cured by continuous water curing from soaker hoses providing complete coverage of the pavement to minimize the temperature rise of the concrete.
- .15 When concrete has been placed in cold weather and the surface temperature is expected to drop below 5 degrees C, insulating curing blankets or other suitable material shall be placed on the concrete pavement and weighted to prevent movement. Curing to continue until the cumulative number of days, or fraction thereof, during which the temperature of the concrete is 10 degrees C, has totalled a minimum of 7 days.
- .16 Tolerances
 - .1 The average thickness of the deck shall be no more than 10 mm less thickness than the specified thickness and no individual thickness measurement shall be more than 20 mm less than the specified thickness.
 - .2 Finished elevation of deck shall be within ± 5 mm from design elevations.
 - .3 The average slope of the finished floor shall not exceed 1:400 from the design centerline profile and deck-fall.

3.5 CONTROL JOINTS

- .1 Cut control joints in deck at locations indicated, to CSA A23.1/A23.2 and install specified cement grout and acrylic bonding agent.

3.6 CONSOLIDATION

- .1 Use hand operated vibrator on slabs. Do not set vibrator in one location longer than 20 minutes.
- .2 Ensure concrete adjacent to edge forms or previously constructed slabs is thoroughly vibrated.

3.7 FINISHING

- .1 After consolidation by vibration, finish with approved equipment.
- .2 Finish concrete surface with an approved float at proper time as directed by Engineer. Operate from edge to edge with a wiping motion meanwhile advancing several feet with each succeeding pass overlapping previous one. A light, smooth fluting at least one metre long may be used if approved.
- .3 Finish edges of slabs with edging tool to form a smooth squared surface.

3.8 SURFACE TEXTURING

- .1 Commence texturing immediately after float finishing.
- .2 Provide surface texture by light broom finish.
- .3 Texturing to be straight and not damaging to pavement edges during operation.

3.9 TOLERANCES

- .1 Finished pavement surface to be within 6 mm of design elevation but not uniformly high or low.
- .2 Vertical deviation not to exceed 6 mm from a 3 metre straight edge when placed in any direction and location on pavement surface.

3.10 CONTROL JOINTS

- .1 Cut control joints in deck at locations indicated, to CSA A23.1/A23.2 and install specified joint filler.

3.11 PROTECTION

- .1 Do not open concrete pavement to traffic or construction equipment until concrete reaches 70% of specified strength or until approved by Engineer.
- .2 When placing concrete in lanes adjacent to existing concrete, operated placing equipment on rubber wheels or pads to prevent damage to existing surface.

3.12 CURING

- .1 As soon as possible after completing finishing operations, cover concrete to retard evaporation. If covering cannot be done soon enough to prevent undue evaporation, keep concrete surface damp by spraying with water until surface is protected.
- .2 Placed concrete to be maintained at temperature of minimum 10°C for not less than 72 hours after placing and then above 5°C for minimum 4 additional days.
- .3 Cure for minimum 4 days by using this method:
 - .1 With curing compound:
 - .1 Apply two pressure sprays with approved equipment. Mechanically agitate compound before and during use.
 - .2 Apply first spray as soon as excess water has evaporated from surface and indented by moderate finger pressure.
 - .3 Apply second spray within 24 hours of first.
 - .4 Each spray to be at a rate equal to application rate recommended by manufacturer.
 - .5 Spray slab edges within one hour of removal of forms.
 - .2 With paper:
 - .6 Cover slab with waterproof paper as soon as concrete has set sufficiently to bear weight without marking.
 - .7 On leading slabs place paper cover at least 36 inches wider than slab and after removal of side form fold down edges of paper and bank with soil, sand or gravel to prevent air circulation.
 - .8 Batten down paper surface to prevent free access of air.
 - .9 Keep paper in place during curing period and promptly repair any deterioration to surface.
 - .3 Do not open concrete pavement to traffic or construction equipment until concrete reaches 70% of specified strength or until approved by Engineer.

3.13 DEFECTIVE WORK

- .1 Concrete is defective when:
 - .1 Containing excessive honeycombing or embedded debris.
 - .2 28 day strength in a defined area is less than 95% of specified minimum average strength.
 - .3 Surface irregularities exceed specified amount including edge slumping.
- .2 Repair of defective concrete work:
 - .1 Repair defective areas while concrete is still plastic, otherwise wait until curing is completed. Do not fill depressions with fines.

- .2 Grind off high surface variations where directed.
- .3 Remove and replace defective concrete slab where directed.

END OF SECTION

35 31 24 – RIP-RAP & CORE STONE

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Supply and installation of rip-rap for construction of North and South rock approaches to be measured in tonnes of material supplied and installed.
- .2 Supply and installation of core stone for construction of North and South rock approaches to be measured in tonnes of material supplied and installed.
- .3 Maintenance of haul roads to be incidental to this work.
- .4 Contractor to make own arrangements with Provincial authorities, municipalities and owners of private properties, for the quarrying and transportation of rock materials and machinery for work over their property, roads or streets.

1.2 SOURCE SAMPLING

- .1 Inform Engineer of proposed source of materials and provide access for sampling at least 2 weeks prior to commencing work.

Part 2 Products

2.1 MATERIALS

- .1 Rock materials:
 - .1 Rip-rap:
 - .1 Greatest dimension of each stone not to exceed two times least dimension.
 - .2 Stone sizes to be in range of 300 mm to 600 mm. Rip-rap to be fractured and angular. Field stone not acceptable.
 - .3 Material to be free of roots and other deleterious material.
 - .4 Free from cracks, seams and other defects which may impair durability. The Los Angeles abrasion loss determined using ASTM procedures shall not exceed 35%.
 - .2 Core stone:
 - .1 Quarry run core: percent by mass passing 12.5mm sieve not to exceed 10. Maximum size to be 300mm.
 - .2 Material to be free of roots and other deleterious material.

Part 3 Execution

3.1 RIP-RAP

- .1 Place rip-rap to lines, grades and dimensions as indicated.

- .2 Place rip-rap in thickness courses to total layer thickness as shown on the drawing.
- .3 Place each rip-rap in stable position.
- .4 Remove ice from sides of approach prior to installing rip-rap.

3.2 TOLERANCES

- .1 Completed component layers to be within following tolerances of lines and grades as indicated:
 - .1 Rip-Rap: plus or minus 200 mm.
 - .2 Core: plus or minus 100mm.

3.3 HAUL ROADS

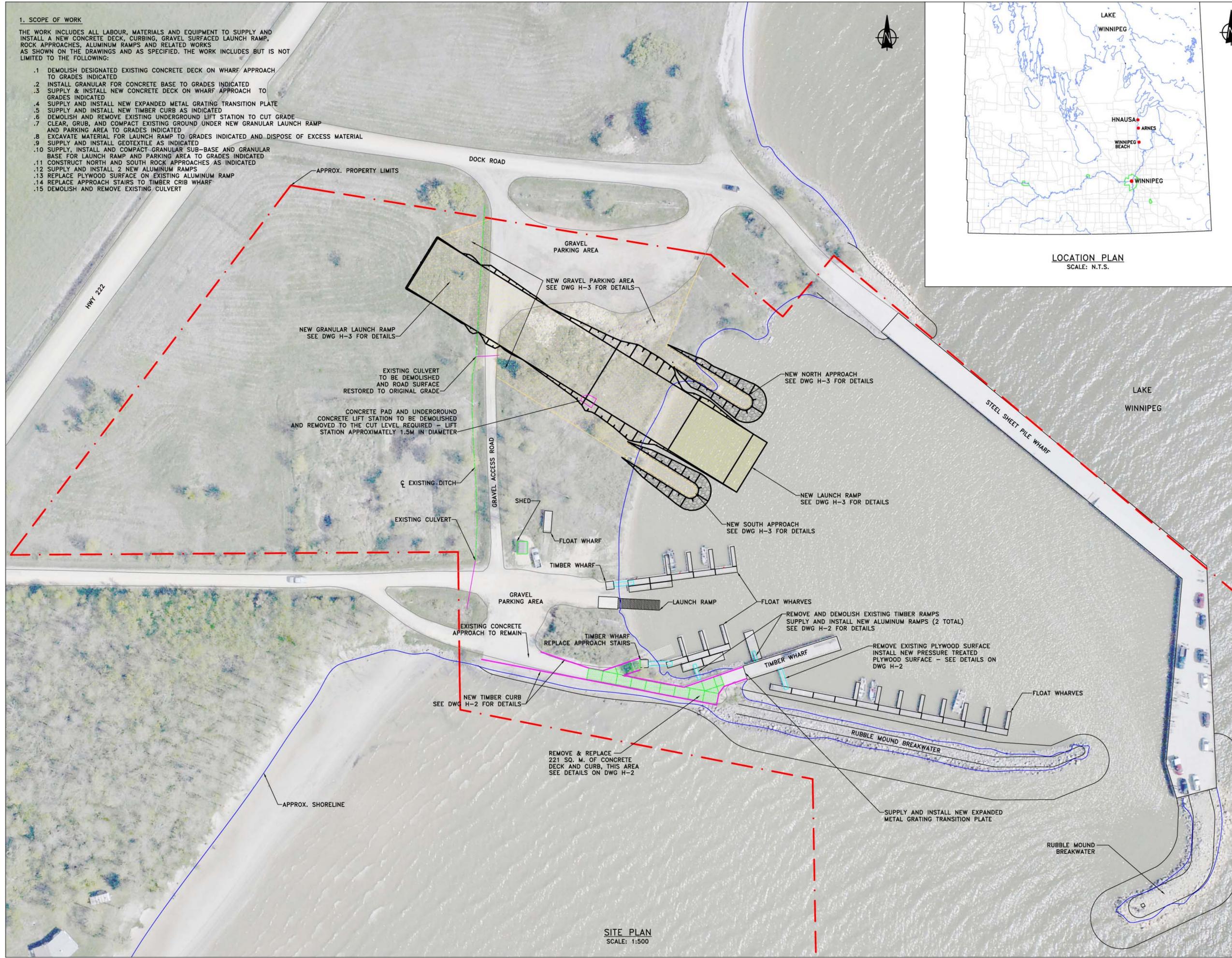
- .1 Be solely responsible for construction and maintenance of haul roads. Remove haul roads from site upon completion of project. No separate payment to be made for construction, maintenance and removal of haul roads.
- .2 Contractor to be responsible for obtaining approval from applicable agencies for using access roads to site. Contractor is not to use existing launch ramp as a haul road.
- .3 Contractor to repair any damage caused to roads or property as a result of hauling operations.

END OF SECTION

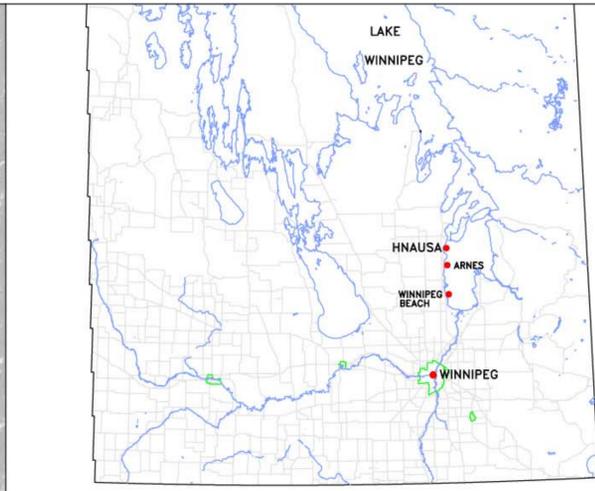
1. SCOPE OF WORK

THE WORK INCLUDES ALL LABOUR, MATERIALS AND EQUIPMENT TO SUPPLY AND INSTALL A NEW CONCRETE DECK, CURBING, GRAVEL SURFACED LAUNCH RAMP, ROCK APPROACHES, ALUMINUM RAMPS AND RELATED WORKS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED. THE WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

- .1 DEMOLISH DESIGNATED EXISTING CONCRETE DECK ON WHARF APPROACH TO GRADES INDICATED
- .2 INSTALL GRANULAR FOR CONCRETE BASE TO GRADES INDICATED
- .3 SUPPLY & INSTALL NEW CONCRETE DECK ON WHARF APPROACH TO GRADES INDICATED
- .4 SUPPLY AND INSTALL NEW EXPANDED METAL GRATING TRANSITION PLATE
- .5 SUPPLY AND INSTALL NEW TIMBER CURB AS INDICATED
- .6 DEMOLISH AND REMOVE EXISTING UNDERGROUND LIFT STATION TO CUT GRADE
- .7 CLEAR, GRUB, AND COMPACT EXISTING GROUND UNDER NEW GRANULAR LAUNCH RAMP AND PARKING AREA TO GRADES INDICATED
- .8 EXCAVATE MATERIAL FOR LAUNCH RAMP TO GRADES INDICATED AND DISPOSE OF EXCESS MATERIAL
- .9 SUPPLY AND INSTALL GEOTEXTILE AS INDICATED
- .10 SUPPLY, INSTALL AND COMPACT GRANULAR SUB-BASE AND GRANULAR BASE FOR LAUNCH RAMP AND PARKING AREA TO GRADES INDICATED
- .11 CONSTRUCT NORTH AND SOUTH ROCK APPROACHES AS INDICATED
- .12 SUPPLY AND INSTALL 2 NEW ALUMINUM RAMPS
- .13 REPLACE PLYWOOD SURFACE ON EXISTING ALUMINUM RAMP
- .14 REPLACE APPROACH STAIRS TO TIMBER CRIB WHARF
- .15 DEMOLISH AND REMOVE EXISTING CULVERT



SITE PLAN
SCALE: 1:500



LOCATION PLAN
SCALE: N.T.S.

**SMALL CRAFT HARBOURS
CENTRAL AND ARCTIC REGION**



- NOTES:**
1. ALL SOUNDINGS & ELEVATIONS IN METRES
 2. COORDINATES FOR THE HORIZONTAL CONTROL ARE GIVEN ON THE U.T.M. MAPPING PLANE, ZONE 14, USING THE NORTH AMERICAN DATUM OF 1983 (NAD83)
 3. ELEVATIONS ARE GIVEN USING THE CANADIAN GEODETIC DATUM OF 1927 (CGVD27)
 4. DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED
 5. ENGINEER WILL PROVIDE STAKES FOR CONTROL POINTS. GIVE ENGINEER REASONABLE NOTICE OF REQUIREMENTS FOR THE INSTALLATION OF CONTROL POINT STAKES

REVISIONS:	DATE:
0 ISSUED FOR TENDER	JULY 24, 2014

SCALE: AS SHOWN	CLASS:
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PROJECT: **HARBOUR IMPROVEMENTS**

DESCRIPTION: **SITE PLAN AND CONSTRUCTION DETAILS**

DRAWN: SCH	APPROVED: SCH
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DATE: JULY 2014	DATE: JULY 2014
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LOCATION: **HNAUSA, MB**

DRAWING NO.: H-1 OF 7	LOCATOR CODE: 5526
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SMALL CRAFT HARBOURS
 CENTRAL AND ARCTIC REGION



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0 ISSUED FOR TENDER	JULY 24, 2014

SCALE: AS SHOWN	CLASS:
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PROJECT: HARBOUR IMPROVEMENTS

DECK REPAIRS
 CONSTRUCTION DETAILS

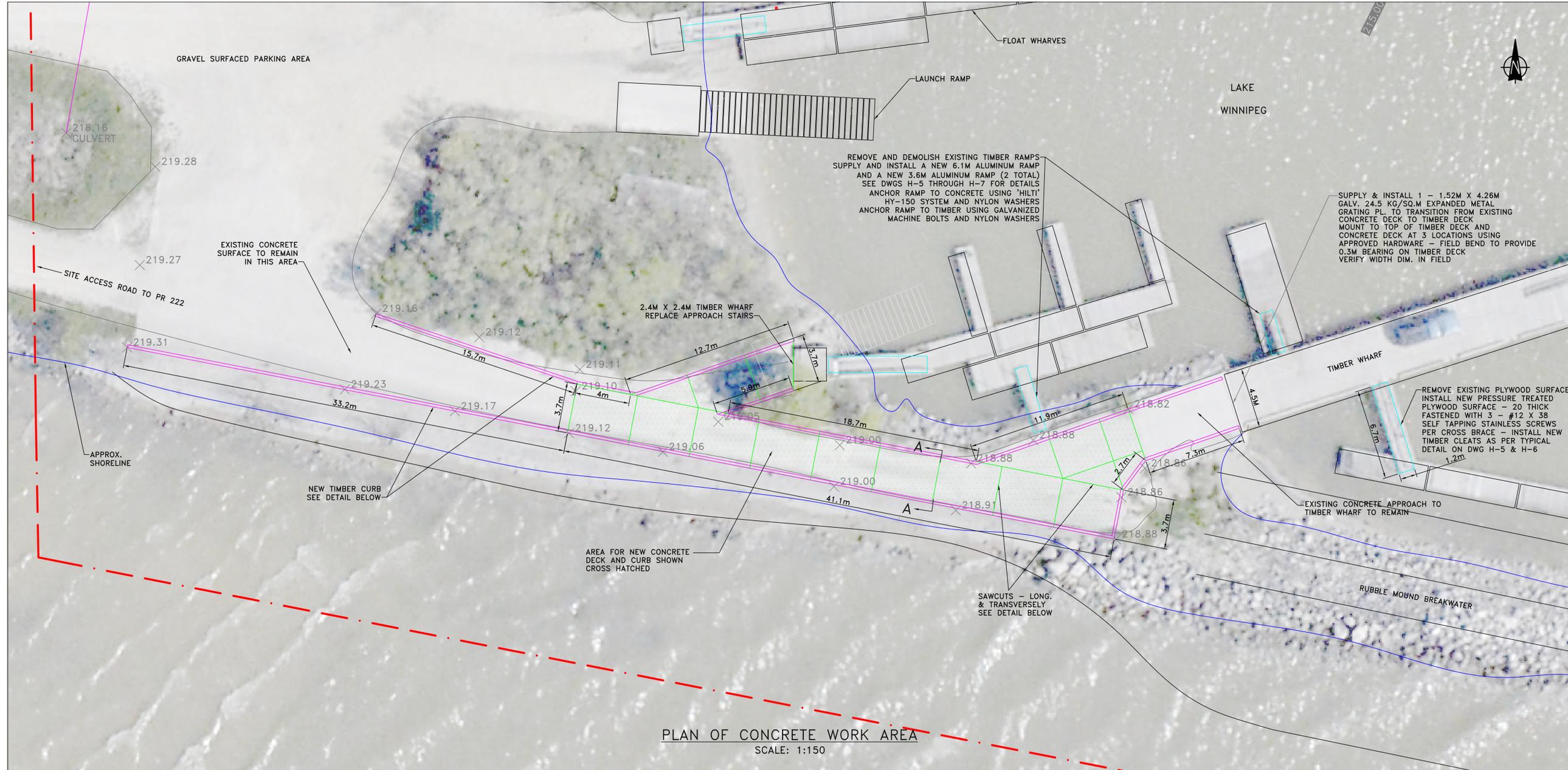
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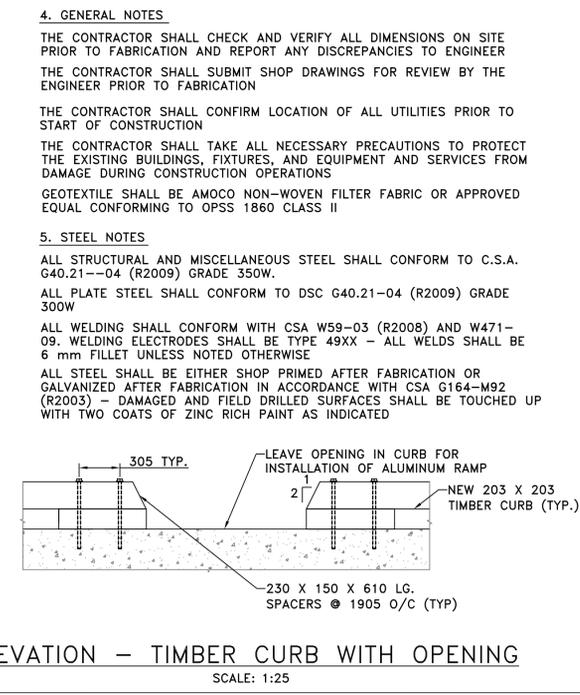
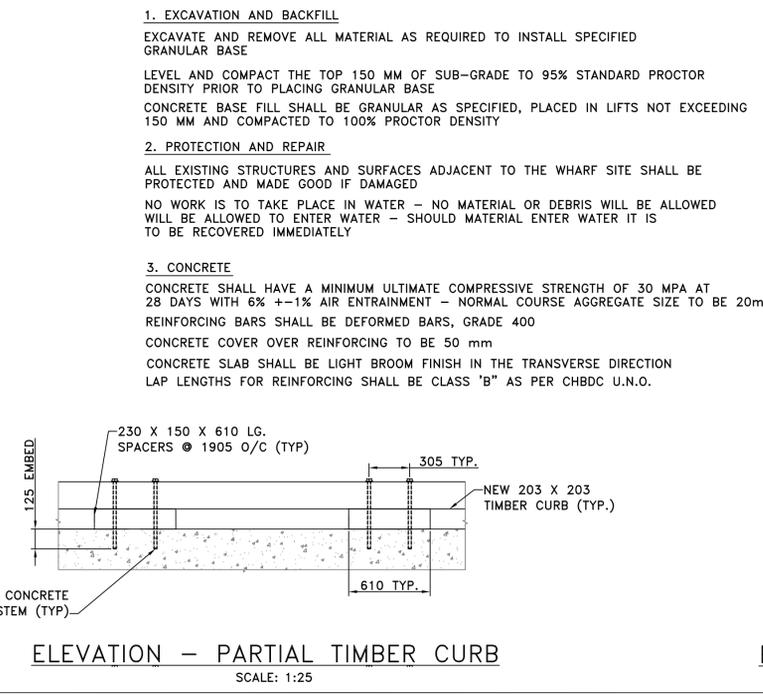
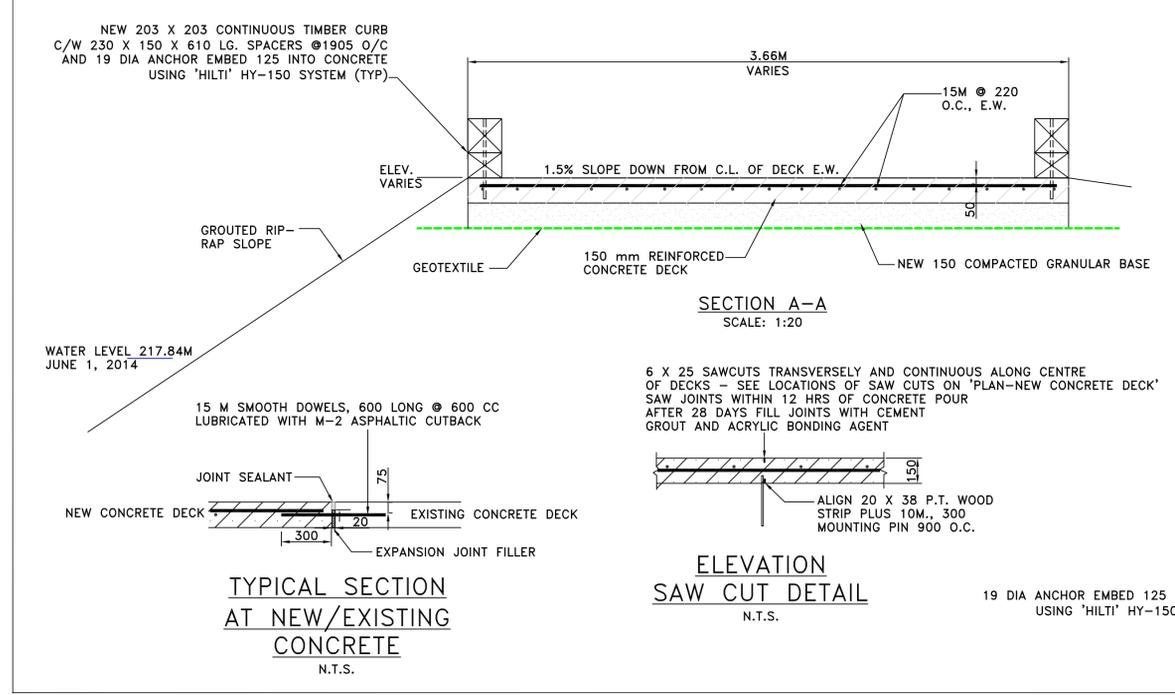
DATE: JULY 2014	DATE: JULY 2014
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LOCATION: HNAUSA, MB

DRAWING NO.: H-2 OF 7	LOCATOR CODE: 5526
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PLAN OF CONCRETE WORK AREA
 SCALE: 1:150



- EXCAVATION AND BACKFILL**
 EXCAVATE AND REMOVE ALL MATERIAL AS REQUIRED TO INSTALL SPECIFIED GRANULAR BASE
 LEVEL AND COMPACT THE TOP 150 MM OF SUB-GRADE TO 95% STANDARD PROCTOR DENSITY PRIOR TO PLACING GRANULAR BASE
 CONCRETE BASE FILL SHALL BE GRANULAR AS SPECIFIED, PLACED IN LIFTS NOT EXCEEDING 150 MM AND COMPACTED TO 100% PROCTOR DENSITY
- PROTECTION AND REPAIR**
 ALL EXISTING STRUCTURES AND SURFACES ADJACENT TO THE WHARF SITE SHALL BE PROTECTED AND MADE GOOD IF DAMAGED
 NO WORK IS TO TAKE PLACE IN WATER - NO MATERIAL OR DEBRIS WILL BE ALLOWED TO BE ALLOWED TO ENTER WATER - SHOULD MATERIAL ENTER WATER IT IS TO BE RECOVERED IMMEDIATELY
- CONCRETE**
 CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 30 MPA AT 28 DAYS WITH 6% +/- 1% AIR ENTRAINMENT - NORMAL COURSE AGGREGATE SIZE TO BE 20mm
 REINFORCING BARS SHALL BE DEFORMED BARS, GRADE 400
 CONCRETE COVER OVER REINFORCING TO BE 50 mm
 CONCRETE SLAB SHALL BE LIGHT BROOM FINISH IN THE TRANSVERSE DIRECTION
 LAP LENGTHS FOR REINFORCING SHALL BE CLASS "B" AS PER CHBDC U.N.O.
- GENERAL NOTES**
 THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO FABRICATION AND REPORT ANY DISCREPANCIES TO ENGINEER
 THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW BY THE ENGINEER PRIOR TO FABRICATION
 THE CONTRACTOR SHALL CONFIRM LOCATION OF ALL UTILITIES PRIOR TO START OF CONSTRUCTION
 THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING BUILDINGS, FIXTURES, AND EQUIPMENT AND SERVICES FROM DAMAGE DURING CONSTRUCTION OPERATIONS
 GEOTEXTILE SHALL BE AMOCO NON-WOVEN FILTER FABRIC OR APPROVED EQUAL CONFORMING TO OPSS 1860 CLASS II
- STEEL NOTES**
 ALL STRUCTURAL AND MISCELLANEOUS STEEL SHALL CONFORM TO C.S.A. G40.21-04 (R2009) GRADE 350W.
 ALL PLATE STEEL SHALL CONFORM TO DSC G40.21-04 (R2009) GRADE 300W
 ALL WELDING SHALL CONFORM WITH CSA W59-03 (R2008) AND W471-09. WELDING ELECTRODES SHALL BE TYPE 49XX - ALL WELDS SHALL BE 6 mm FILLET UNLESS NOTED OTHERWISE
 ALL STEEL SHALL BE EITHER SHOP PRIMED AFTER FABRICATION OR GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH CSA G164-M92 (R2003) - DAMAGED AND FIELD DRILLED SURFACES SHALL BE TOUCHED UP WITH TWO COATS OF ZINC RICH PAINT AS INDICATED

SMALL CRAFT HARBOURS
CENTRAL AND ARCTIC REGION



- NOTES:
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 2. DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED
 3. ENGINEER WILL PROVIDE STAKES FOR CONTROL POINTS. GIVE ENGINEER REASONABLE NOTICE OF REQUIREMENTS FOR THE INSTALLATION OF CONTROL POINT STAKES
 4. EXCAVATE AND REMOVE ALL MATERIAL AS REQUIRED TO INSTALL SPECIFIED GRANULAR BASE
 5. LEVEL AND COMPACT THE TOP 150MM OF EXISTING GROUND ABOVE THE WATER LINE TO 95% STANDARD PROCTOR DENSITY PRIOR TO PLACING GRANULAR BASE
 6. ALL FILL SHALL BE GRANULAR AS SPECIFIED, PLACED IN LIFTS NOT EXCEEDING 150 MM AND COMPACTED TO 100% PROCTOR DENSITY

REVISIONS:	DATE:
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SCALE: AS SHOWN	CLASS:
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PROJECT: HARBOUR IMPROVEMENTS

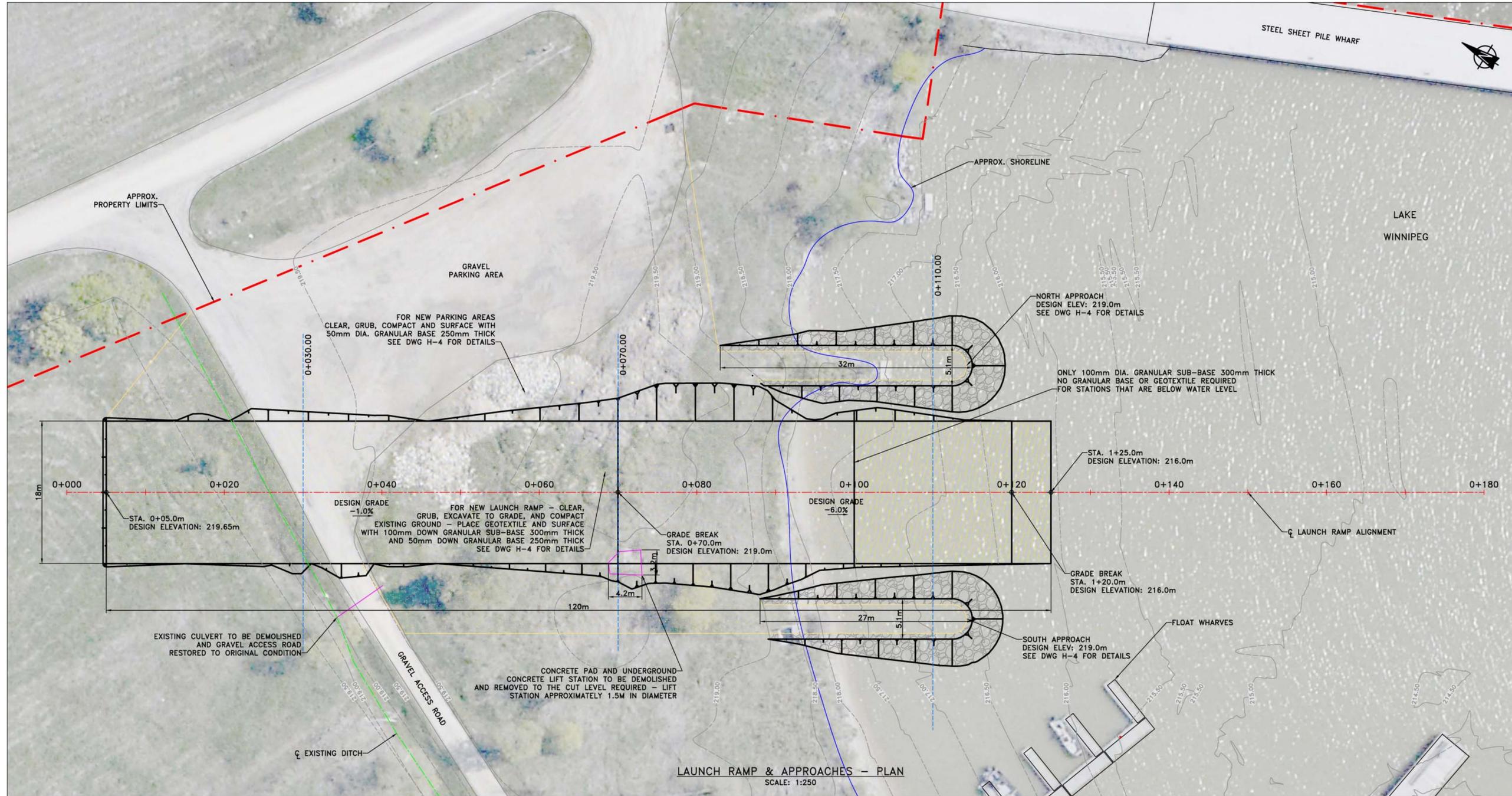
DESCRIPTION: LAUNCH RAMP PLAN & PROFILE

DRAWN: SCH	APPROVED: SCH
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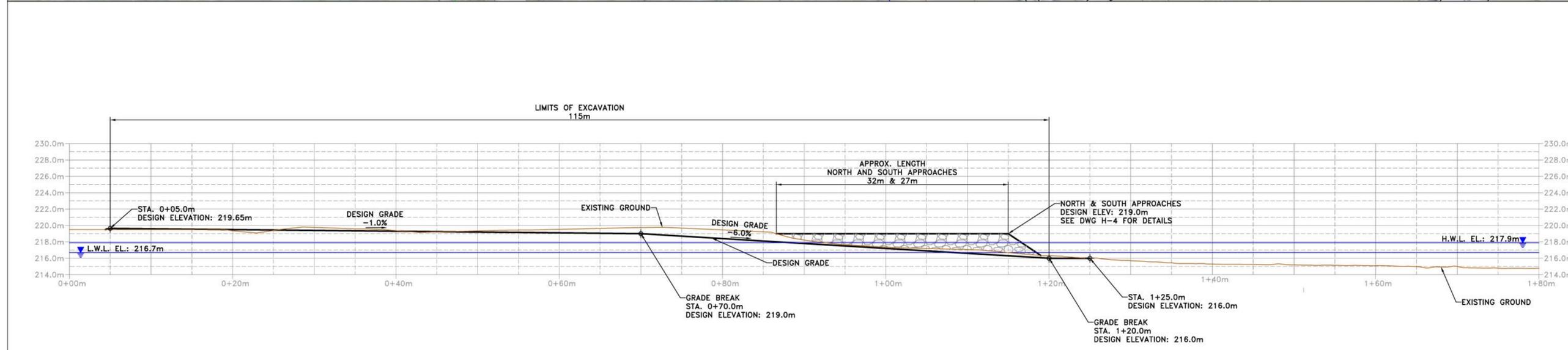
DATE: JULY 2014	DATE: JULY 2014
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LOCATION: HNAUSA, MB

DRAWING NO.: H-3 OF 7	LOCATOR CODE: 5526
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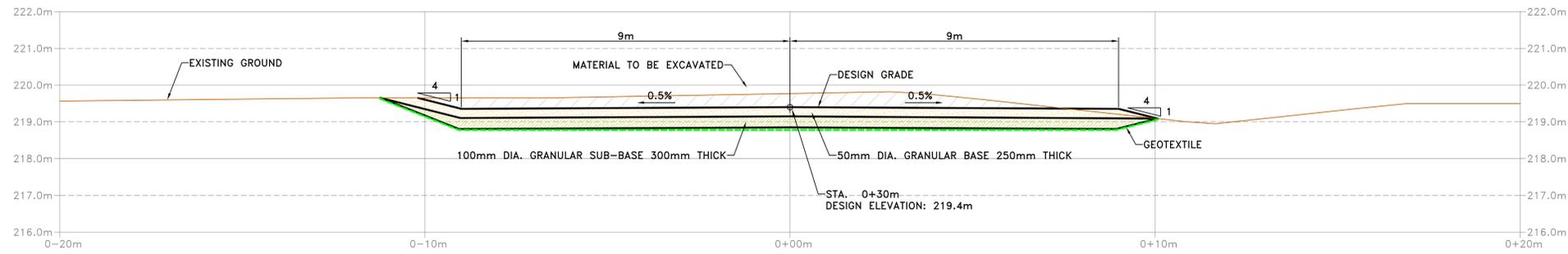


LAUNCH RAMP & APPROACHES - PLAN
SCALE: 1:250

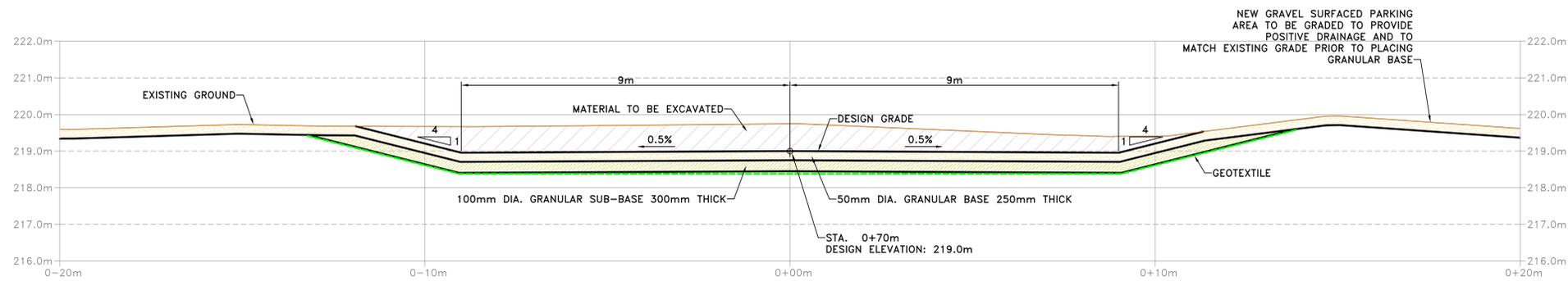


LAUNCH RAMP & APPROACHES - PROFILE
SCALE: 1:250

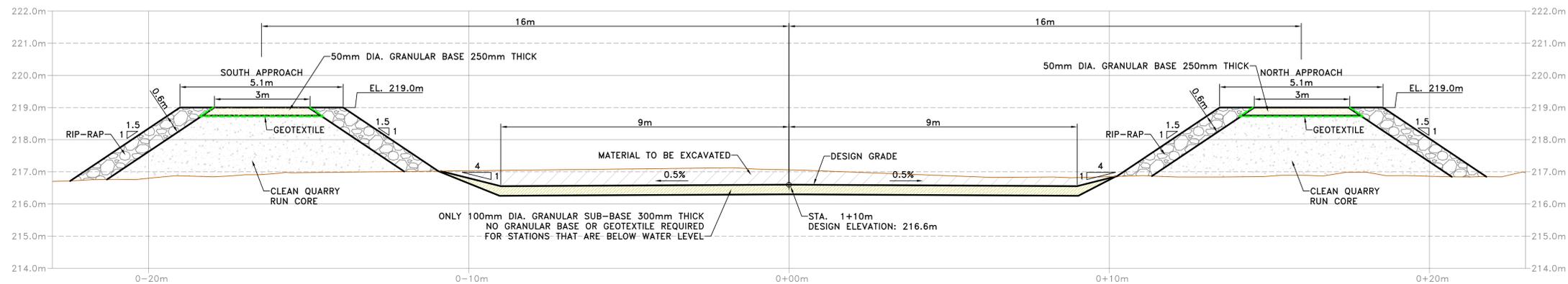
SMALL CRAFT HARBOURS
CENTRAL AND ARCTIC REGION



SECTION - STA. 0+30m
SCALE: 1:75



SECTION - STA. 0+70m
SCALE: 1:75



SECTION - STA. 1+10m
SCALE: 1:75

NOTES:

1. ALL SOUNDINGS & ELEVATIONS IN METRES
2. DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED
3. ENGINEER WILL PROVIDE STAKES FOR CONTROL POINTS. GIVE ENGINEER REASONABLE NOTICE OF REQUIREMENTS FOR THE INSTALLATION OF CONTROL POINT STAKES
4. EXCAVATE AND REMOVE ALL MATERIAL AS REQUIRED TO INSTALL SPECIFIED GRANULAR BASE
5. LEVEL AND COMPACT THE TOP 150MM OF EXISTING GROUND ABOVE THE WATER LINE TO 95% STANDARD PROCTOR DENSITY PRIOR TO PLACING GRANULAR BASE
6. ALL FILL SHALL BE GRANULAR AS SPECIFIED, PLACED IN LIFTS NOT EXCEEDING 150 MM AND COMPACTED TO 100% PROCTOR DENSITY

REVISIONS:	DATE:
0	ISSUED FOR TENDER
	JULY 24, 2014

SCALE:	CLASS:
AS SHOWN	

PROJECT:
HARBOUR IMPROVEMENTS

DESCRIPTION:
LAUNCH RAMP SECTIONS

DRAWN:	APPROVED:
SCH	SCH

DATE:	DATE:
JULY 2014	JULY 2014

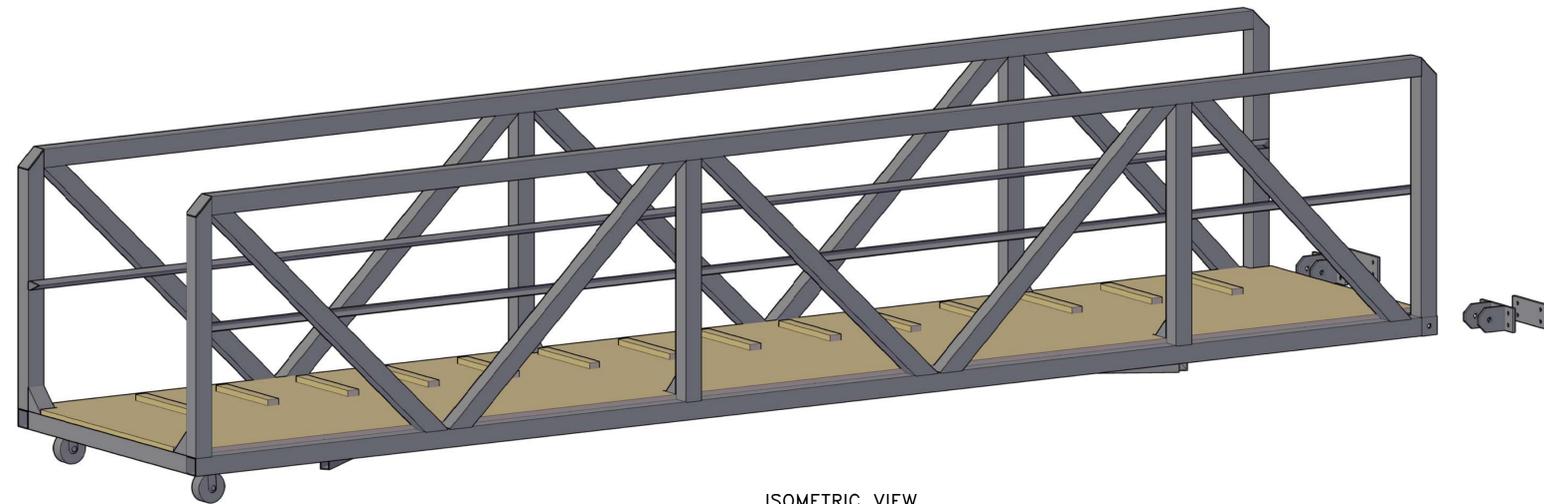
LOCATION:
HNAUSA, MB

DRAWING NO.:	LOCATOR CODE:
H-4 OF 7	5526

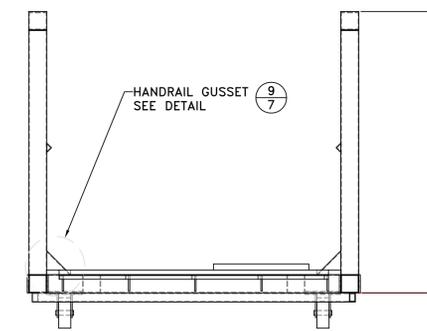
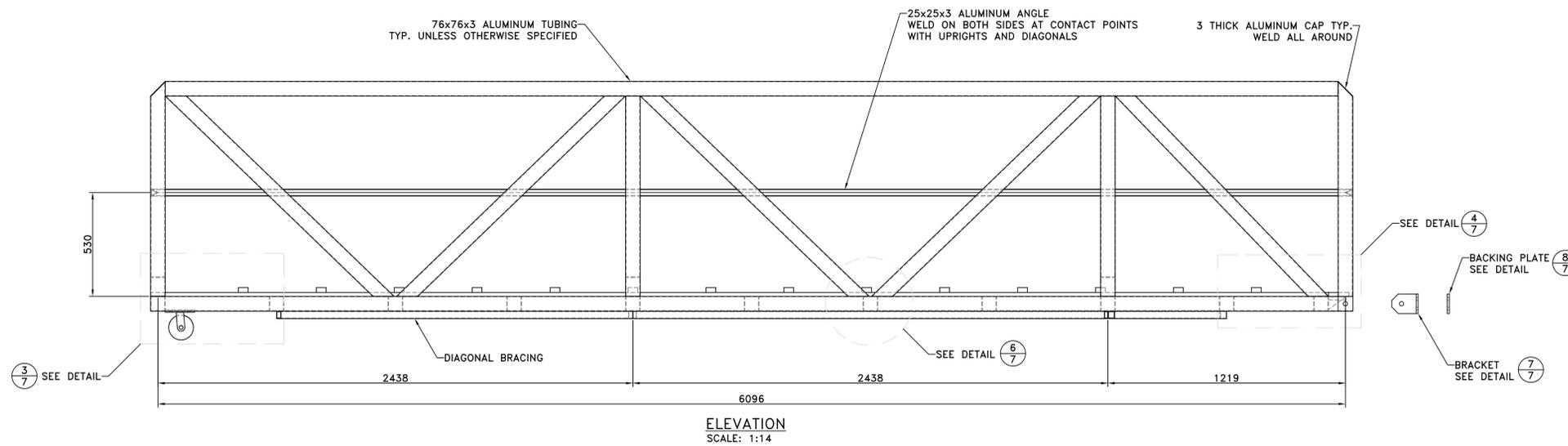
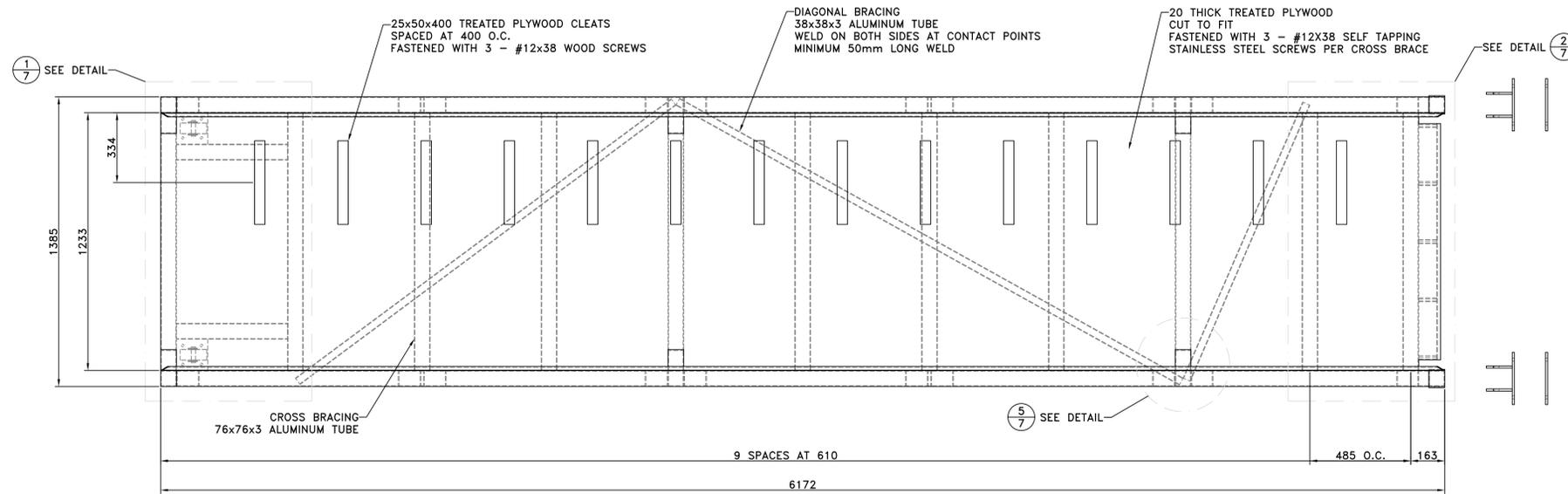
SMALL CRAFT HARBOURS
CENTRAL AND ARCTIC REGION



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
 2. ALL JOINTS TO BE WELDED ALL AROUND EXCEPT WERE NOTED
 3. ALL EXPOSED SURFACES AND WELDED JOINTS SHALL BE SMOOTH AND FREE OF SHARP OR JAGGED EDGES
 4. ALL ALUMINUM TUBING TO HAVE ROUNDED EDGES
 5. ALUMINUM TUBING AND ANGLE TO BE ALLOY 6051-T6
 6. ALUMINUM PLATE TO BE ALLOY 6061-T651
 7. TUBING TO BE WELDED TOGETHER ON BOTH SIDES



ISOMETRIC VIEW
NOT TO SCALE



ELEVATION
SCALE: 1:14

REVISIONS:	DATE:
0 ISSUED FOR TENDER	JULY 24, 2014

SCALE: AS SHOWN	CLASS:
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PROJECT: HARBOUR IMPROVEMENTS

DESCRIPTION: 6.096m ALUMINUM RAMP CONSTRUCTION DETAILS

DRAWN: SCH	APPROVED: SCH
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DATE: JULY 2014	DATE: JULY 2014
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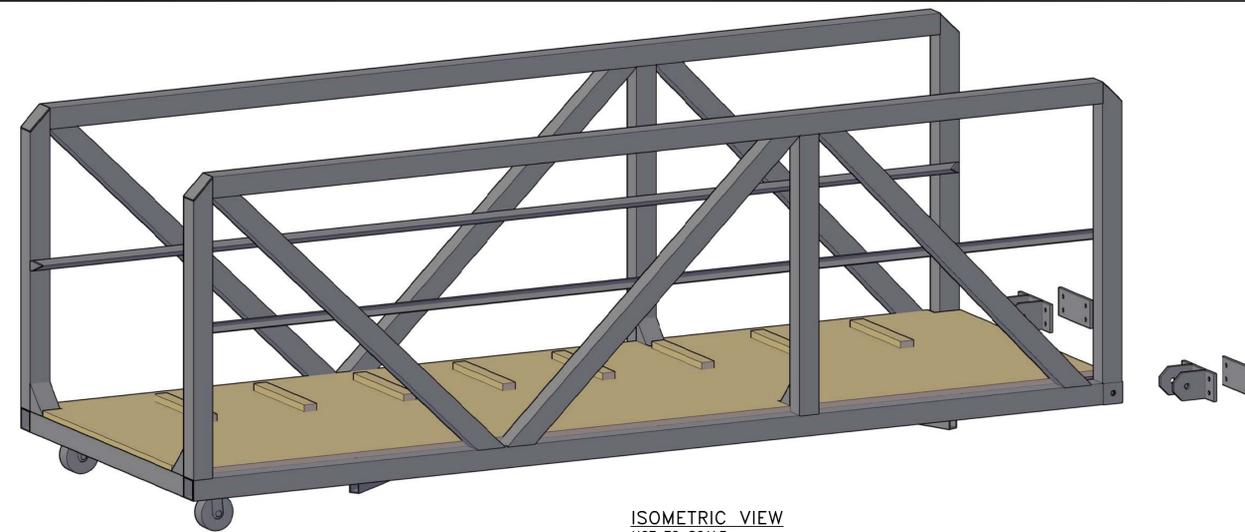
LOCATION: HNAUSA, MB

DRAWING NO.: H-5 OF 7	LOCATOR CODE: 5526
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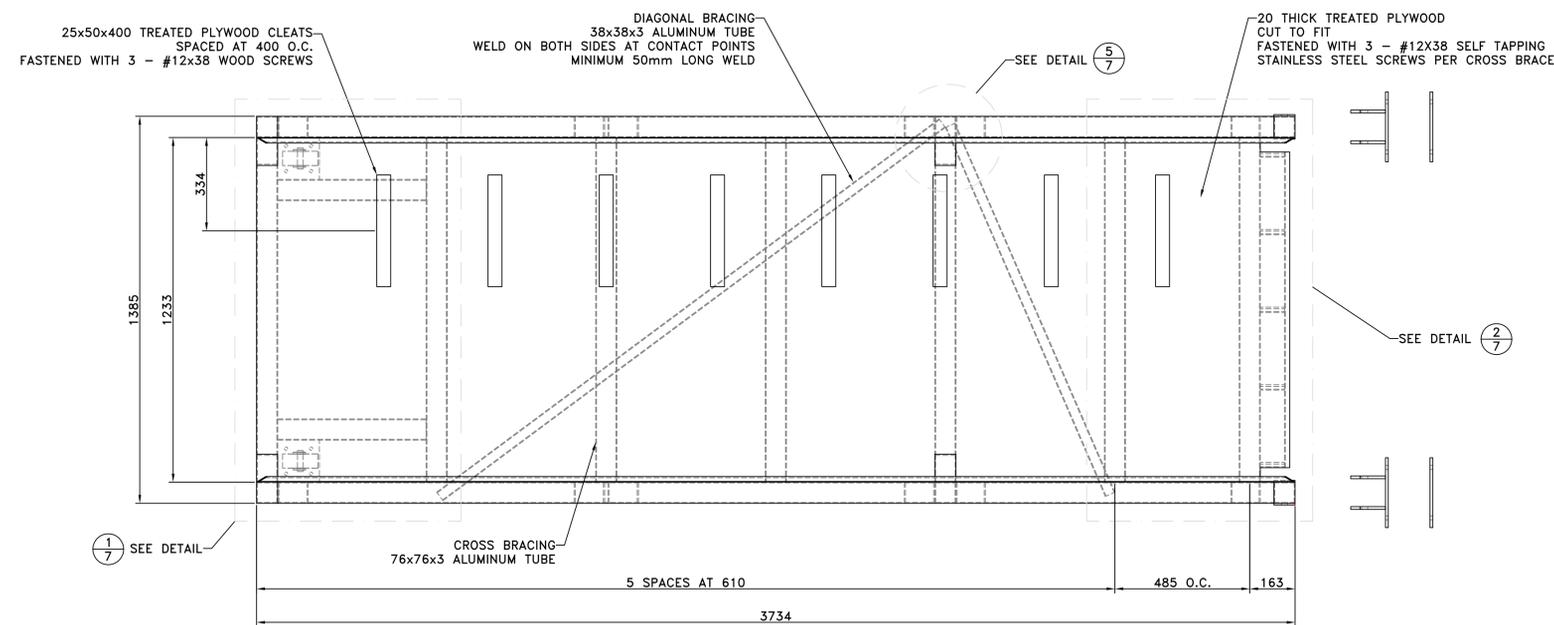
SMALL CRAFT HARBOURS
CENTRAL AND ARCTIC REGION



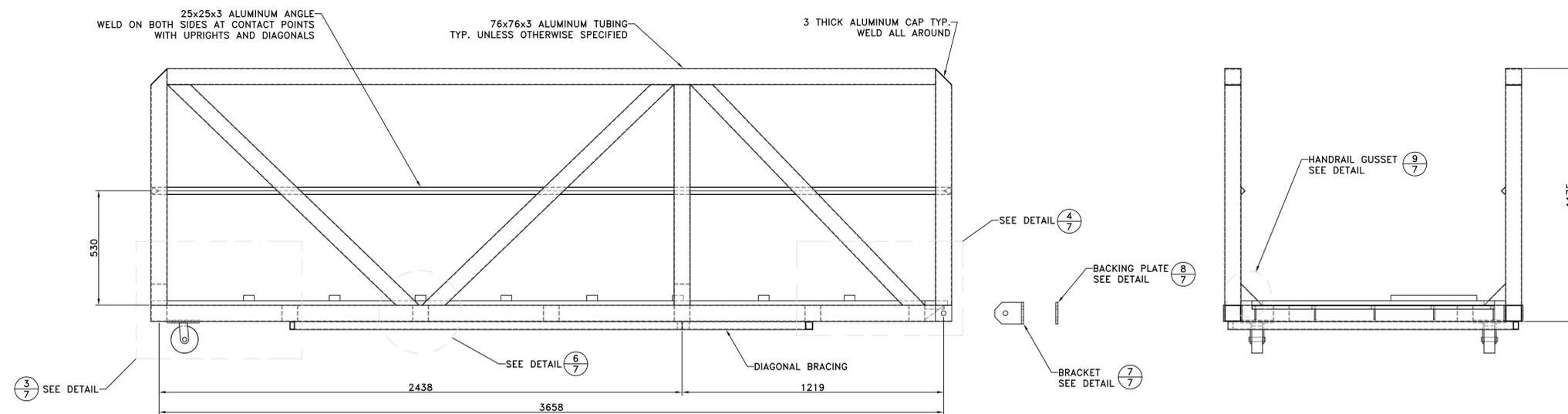
- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
 2. ALL JOINTS TO BE WELDED ALL AROUND EXCEPT WHERE NOTED
 3. ALL EXPOSED SURFACES AND WELDED JOINTS SHALL BE SMOOTH AND FREE OF SHARP OR JAGGED EDGES
 4. ALL ALUMINUM TUBING TO HAVE ROUNDED EDGES
 5. ALUMINUM TUBING AND ANGLE TO BE ALLOY 6051-T6
 6. ALUMINUM PLATE TO BE ALLOY 6061-T651
 7. TUBING TO BE WELDED TOGETHER ON BOTH SIDES



ISOMETRIC VIEW
NOT TO SCALE



PLAN
SCALE: 1:12



ELEVATION
SCALE: 1:12

ELEVATION
SCALE: 1:12
NOTE: BRACKET AND BACKING PLATE NOT SHOWN FOR CLARITY

REVISIONS:	DATE:
0	ISSUED FOR TENDER
	JULY 24, 2014

SCALE:	CLASS:
AS SHOWN	

PROJECT:

HARBOUR IMPROVEMENTS

DESCRIPTION:

3.658m ALUMINUM RAMP
CONSTRUCTION DETAILS

DRAWN:	APPROVED:
SCH	SCH

DATE:	DATE:
JULY 2014	JULY 2014

LOCATION:

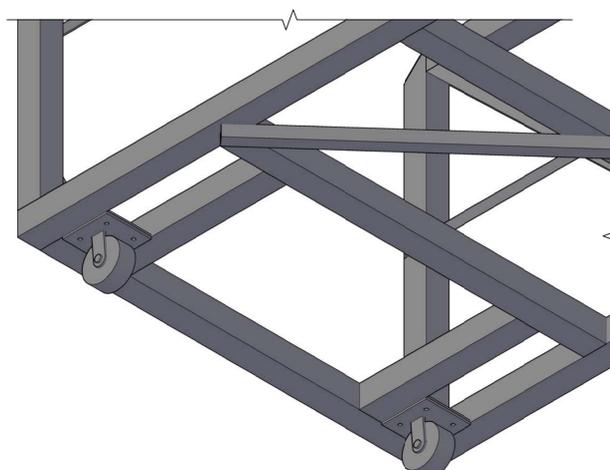
HNAUSA, MB

DRAWING NO.:	LOCATOR CODE:
H-6 OF 7	5526

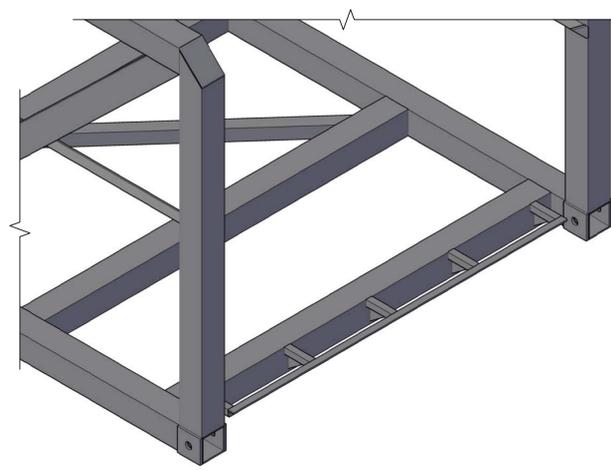
SMALL CRAFT HARBOURS
 CENTRAL AND ARCTIC REGION



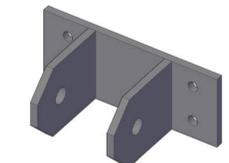
- NOTES:
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED
 2. ALL JOINTS TO BE WELDED ALL AROUND EXCEPT WERE NOTED
 3. ALL EXPOSED SURFACES AND WELDED JOINTS SHALL BE SMOOTH AND FREE OF SHARP OR JAGGED EDGES
 4. ALL ALUMINUM TUBING TO HAVE ROUNDED EDGES
 5. ALUMINUM TUBING AND ANGLE TO BE ALLOY 6051-T6
 6. ALUMINUM PLATE TO BE ALLOY 6061-T651
 7. TUBING TO BE WELDED TOGETHER ON BOTH SIDES



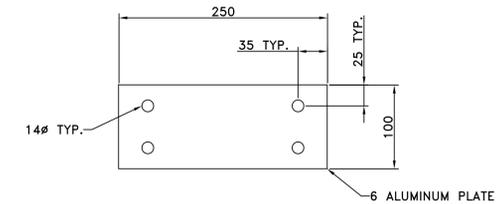
CASTER END DETAIL (ISOMETRIC)
 NOT TO SCALE
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



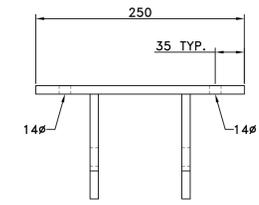
BRACKET END DETAIL (ISOMETRIC)
 NOT TO SCALE
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



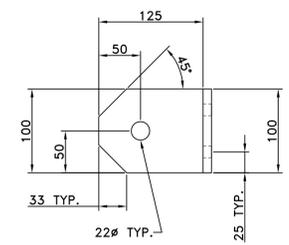
BRACKET DETAIL (ISOMETRIC)
 NOT TO SCALE



BACKING PLATE DETAIL
 SCALE: 1:4



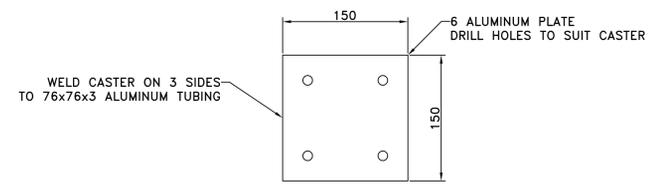
PLAN VIEW



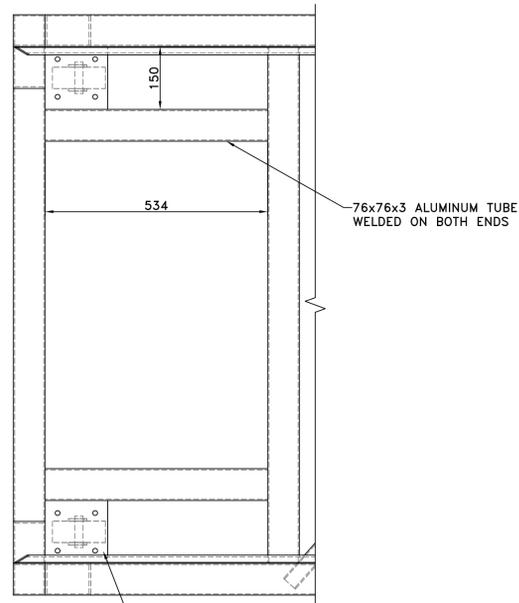
SIDE VIEW

BRACKET DETAIL
 SCALE: 1:16

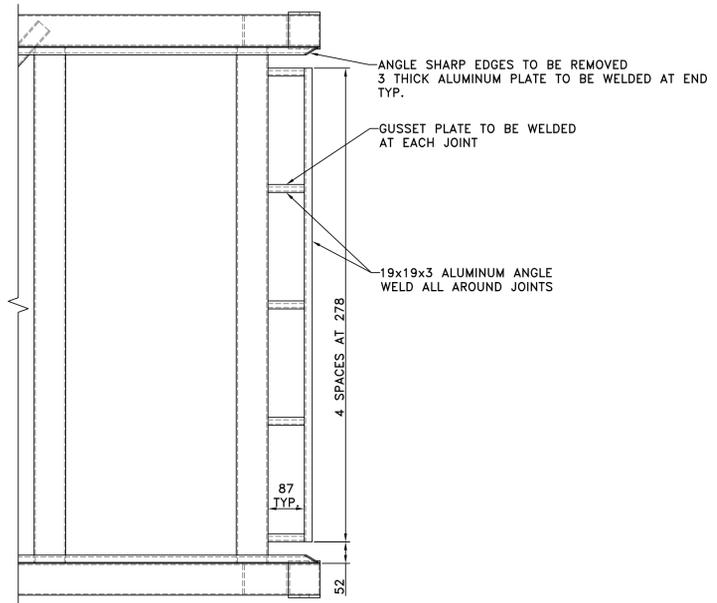
- NOTE: 2 BRACKETS REQ. PER GANGWAY
 EACH BRACKET COMES WITH:
 1-19mm x 150mm GALVANIZED MACHINE BOLT
 2-21mm NYLON WASHER
 1-19mm GALVANIZED LOCK NUT



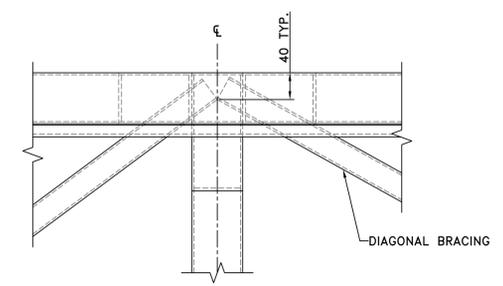
CASTER SUPPORT PLATE DETAIL
 SCALE: 1:4



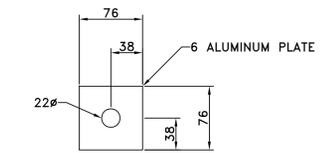
DETAIL (PLAN)
 SCALE: 1:8
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



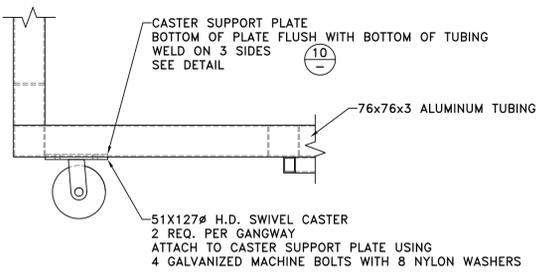
DETAIL (PLAN)
 SCALE: 1:8
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



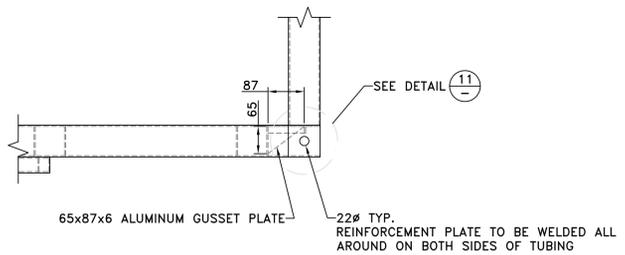
CROSS BRACING DETAIL (PLAN)
 SCALE: 1:5
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



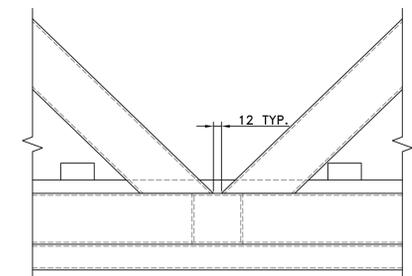
REINFORCEMENT PLATE DETAIL
 SCALE: 1:4



DETAIL (ELEVATION)
 SCALE: 1:8
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



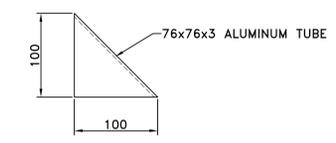
DETAIL (ELEVATION)
 SCALE: 1:8
 NOTE: PLYWOOD NOT SHOWN FOR CLARITY



HANDRAIL DETAIL (ELEVATION)
 SCALE: 1:5



HANDRAIL GUSSET DETAIL (ISOMETRIC)
 NOT TO SCALE



HANDRAIL GUSSET DETAIL (ELEVATION)
 SCALE: 1:4

REVISIONS:	DATE:
0	ISSUED FOR TENDER
	JULY 24, 2014

SCALE:	CLASS:
AS SHOWN	

PROJECT:
HARBOUR IMPROVEMENTS

DESCRIPTION:
ALUMINUM RAMP CONSTRUCTION DETAILS

DRAWN:	APPROVED:
SCH	SCH

DATE:	DATE:
JULY 2014	JULY 2014

LOCATION:
HNAUSA, MB

DRAWING NO.:	LOCATOR CODE:
H-7 OF 7	5526