PARKS CANADA AGENCY

JOHNSON LAKE DOCKS AND BEACH REHABILITATION

PERFORMANCE SPECIFICATION FOR

SWIM FLOATS (INCLUDING ANCILLIARY STRUCTURES) AND WASH STATION

Purpose:

The Owner wishes to enter into a contractual agreement with a qualified firm, for the design, construction and implementation of:

- Two swim floats to be installed at Johnson Lake, Banff, Alberta, complete with ancillary infrastructure including shoreline abutments, hinged gangways and moorings, and;
- A wash station to be installed adjacent to the existing Johnson Lake parking lot, Banff, Alberta

This document outlines the performance requirements that must be achieved by the delivered systems and which must be demonstrated by the contractor as the basis for evaluation, by the Owner, of the compliance of the successful Contractor with the terms of the contract.

WASH STATION

Features:

- General configuration as illustrated by enclosed drawing 36161-S01 Rev 2 – Parking Area Wash Station – Plan and Elevation
- Simple design, tamper resistant, easily dismantled and removable from site by Owner's labour force with hiab truck crane and flat deck truck.
- High density polyethylene tank, dome top, conical bottom, 5680 litre nominal capacity, 1830mm nominal diameter, 2900mm nominal overall height. Tank to be equipped with lockable man access hatch at top; fill vent; nominal 63mm diameter fill piping equipped with cam-lock coupling compatible with tank truck; nominal 63mm diameter drain plumbing and valve; nominal 20mm supply piping, complete with shut-off valve. Barr Plastics dome top, cone bottom tank part no. 43854 or equivalent.
- Painted fabricated steel cone bottom tank stand. Barr Plastics Steel Stand – Cone Bottom drawing no. 63934 or equivalent.
- Tank founded on raised compact granular base designed to place the bottom of the tank approximately 600mm above the mean grade at the installation site. The perimeter of the raised base shall be vertical or near vertical and shall be formed from elements proposed by the contractor that will serve the containment purpose and provide adequate structural support for the wash station.
- The base of the tank shall be supported with appropriate surfacing elements that will ensure even bearing of the tank base on the granular fill and prevent progressive settlement of the tank and base from the plumb position.
- Tank to be screened with cedar blinding to full height of tank constructed to provide the general character illustrated by drawing 36161-S01 Rev 2: Preservative treated dimensioned 4x4 corner

posts; preservative treated dimensioned 2x4 rails; rough cedar boards. One face equipped with hanger suitable for the support of 1.5m of nominal 20mm diameter rubber garden hose. Opposite face equipped with lockable door providing restricted access to tank fill quick connect coupler. Screening to be constructed in panels, bolted together at corners, easily dismantled.

- Supply piping from tank to terminate at outside face of screening where it will be equipped with 1.5m of nominal 20mm diameter rubber garden hose equipped with spring loaded, trigger actuated hose nozzle.
- Drain basin formed of clear crush gravel to be constructed 500mm deep and 1500mm wide along entire width of face of screening equipped with hose and hanger. Finished surface of drain basin to be approximately coincident with adjacent compacted granular base for tank support and approximately coincident with surrounding grade, suitable for standing on during operation of the hose.

SWIM FLOATS AND GANGWAYS

<u>Environmental Effects:</u>

Water levels:

- Swim floats and ancillary structures shall be designed to accommodate 0.5 m of seasonal fluctuation in Johnson lake water levels. Lake levels are anticipated to range from a maximum of El 1414.25 m on an average year to a minimum of El 1414.00. Note that extreme high water (1/1000 year) is El 1414.73 m. (Values based on Dam Safety Review report by Dessau, 2014-07-25).

Wind:

- Swim floats and ancillary structures shall be designed to resist the effect of wind acting horizontally on exposed surface areas above the waterline approaching from a direction selected to produce the maximum effect. Unfactored wind forcing utilized for design shall total 0.72 kPa.

Current:

- Swim float and ancillary structure design shall consider and resist the effect of currents acting on submerged surfaces oriented perpendicular to the mean current direction. Unfactored current forcing utilized for design shall total 0.72 kPa.

Waves:

- Swim float and ancillary structure design shall consider and resist the effect of waves acting on surfaces. Significant wave height of 0.37 m shall be utilized for design.

Ice:

- Swim float and ancillary structure design shall consider and resist the effect of ice loading as crushing, lifting, impact or sheet loads without damage. Displacement of the float is acceptable under ice loading. Ice can reportedly reach 0.75 m thick.

Precipitation:

- Swim float and ancillary structure design shall accommodate the following loads associated with precipitation:
    - Snow: Ss = 3.6 kPa
    - Rain: Sr = 0.1 kPa
- Decks and or surfaces shall integrate features, such as cross slope, drains or perforations designed to shed precipitation.
- Submergence of the swim float when subjected to the specified design snow load is acceptable. However, submergence and potential contact of the float with the lake bottom must not result in damage to float or ancillary structures.

Use and Occupancy Effects:

Dead Loads:

- Dead loads shall include the weight of all materials utilized for construction and shall include all ancillary equipment, moorings or other similar items permanently attached or supported.
- Cross slopes of swim float, when subjected to dead loads only, shall not exceed 2%.
- Swim float shall provide a maximum of 250 mm of freeboard to the top surface of the deck when subjected to dead loads alone.

Live Loads:

- Structural design of swim float shall be based upon:
    - Uniform live load of 1.2 kPa applied to the deck surface of the swim float in combination with a live load of 0.96 kPa applied to the deck surface of the gangway;
    - A concentrated live load of 2.0 kN applied to the deck surface for maximum effect.
- Structural design of gangways shall be based upon:
    - Uniform live load of 2.4 kPa applied to the deck surface of the gangway.
- Cross slopes of swim float shall not exceed 2% when subjected to the following:
    - Dead loads in combination with specified uniform live load;
    - Dead loads in combination with specified concentrated live load applied not closer than 300 mm from any edge of the float.
- Swim float shall provide a minimum of 100 mm of freeboard to the top surface of the deck when subjected to the dead and live load combinations specified above for cross slopes.
- The construction of the swim floats shall utilize materials selected to minimize the dead load and, consequently, the draught of the float. The float must not contact the lakebed under any loading conditions at lowest water level.
- Swim floats shall provide a minimum of 0.75 kPa reserve live load capacity over and above the live and dead load combinations specified above for cross slopes before full submergence of the deck surface.

Materials:

General:

- Materials utilized for the swim floats, gangways and ancillary structures shall be selected to: maximize durability and resistance to vandalism; minimize maintenance requirements; provide high value at minimal cost, and; be compatible with overall aesthetic of Johnson Lake.
- Swim floats, gangways and ancillary structures shall provide a service life of at least 10 years.

Swim Floats:

- Plan view width of the swim floats shall be 2.0m +/- 0.2m. At each of the two installation sites at Area 1, the final swim float installation shall provide at least 16.0 m2 of float deck surface area.
- Materials selected for the structural frame and buoyancy elements, that are generally not visible, are at the discretion of the contractor.
- Buoyancy elements, whether separate from or integrated within the structural frame, shall be completely filled with new expanded polystyrene foam.
- Structural frame and buoyancy elements shall be capable of: resisting without damage the effects of ice when entirely locked within frozen lake surface during winter months, and; resisting without damage the effects of coming to rest on the lake bottom.
- Visible surfaces of the floats above the waterline shall be formed of preservative treated timber attached to the structural frame with corrosion resistant fasteners. Timber species and preservative application shall comply with the latest edition of CSA O80 – Series 15 – Wood Preservation. Cedar is the preferred species or approved equivalent

Moorings:

- Each swim float shall be secured at the specified location within Johnson Lake with gravity post moorings, the design of which will generally conform to the conceptual arrangement illustrated by the contract drawings. Proponents are advised that gravity post moorings are considered more desirable than more conventional mooring designs involving driven piles or mooring lines for the following reasons:
    - Geotechnical characterization of the lake bed soils has not been conducted but it is anticipated that the lake bed stratigraphy is comprised of a thin veneer of fine grain soils overlying bedrock;
    - The shallow water depths at the installation site suggest that mooring lines and ancillary gravity anchors may be partially exposed. Exposed components are considered to be a detriment to the aesthetic and recreational enjoyment of park users.
- The design of the gravity post moorings is at the discretion of the successful proponent. However, the following is envisaged:
    - A massive base plate constructed of steel or concrete, sized to resist specified loads, free of sharp edges or features that could result in harm to users, and buried flush with or below the existing lake bed surface;
    - A vertical steel (or equivalent) shaft attached to the massive gravity base and extending upward to an elevation of at least 1.0m above the float surface during

the specified 1/1000 year water level event. The top of the vertical shaft shall be closed;

- Mooring hoops (or equivalent) attached to the swim float and securing the float to the gravity post anchors.

Gangways:

- Gangways shall span a horizontal distance of 3.66 m and shall be fitted with a hinge connection to the abutment at the landward end and with a hinge connection to the swim float at the offshore end. Hinge design shall accommodate limited lateral and torsional displacement of the offshore end of the gangway without damage.
- Gangways shall provide a clear unobstructed width of 1.83 m minimum and shall match the width and appearance of the float.
- During the summer season, gangways shall accommodate specified seasonal variation in lake levels and shall provide a structural attachment of the nearshore end of the swim float to the abutment. Structural design of the gangway shall accommodate all specified loads, excluding the effects of ice.
- Gangways shall be capable of being easily detached from the swim float
- Materials selected for the structural frame are at the discretion of the contractor.
- Visible surfaces of the gangways shall be formed of preservative treated timber attached to the structural frame with corrosion resistant fasteners. Timber species and preservative application shall comply with the latest edition of CSA O80 – Series 15 – Wood Preservation. The timber must match the float.

Johnson Lake Docks and Beach Rehabilitation – Supplemental Specification

MEASUREMENT AND PAYMENT

The principal works to be undertaken under this contract include, but are not limited to the following items, as listed in the BID AND ACCEPTANCE FORM APPENDIX 1. This section describes the scope, measurement and payment procedures for each line item in APPENDIX 1. This section replaces the measurement and payment items for this project in the NMS.

1 General

1.1 Payment will be made only for the quantities listed in APPENDIX 1 unless a written CHANGE ORDER has been processed to modify the quantities for payment.

1.2 Measurement during the project will not be made except as quality control to verify that the contractor has met the requirement of the contract.

1.2.1 Measurement for Payment will only be made if a written CHANGE ORDER has modified the quantities for payment.

1.3 Payment for UNIT PRICE items will be made upon substantial completion of the project unless noted otherwise below or approved by written CHANGE ORDER.

1.4 Unit Prices shall apply to any CHANGE ORDERS for the project.

2 Lump Sum:

2.1 Wash Station. Lump sum cost includes:

2.1.1 All design, materials, equipment, labour, and anything else required for construction to provide a fully functioning wash station as per the tender drawings and performance specification to meet the intended use, including:

2.1.1.1 Earthworks, grading, geotextile and associated drain and base materials.

2.1.1.2 Fencing (blind) and associated materials.

2.1.1.3 Cistern and associated structural supports and mechanical fittings

2.1.1.4 Mechanical timer and hose assembly

2.1.1.5 Any other items on the documents not listed here.

2.1.2 All items shown on Drawing S-01, as well as associated materials and notes on Drawing C-05.

2.1.3 All items described in the Performance Specification for the Wash Station.

2.1.4 Concept drawing of the proposed system to be provided for approval by PCA.

2.1.5 Payment shall be 50% upon project start up and 50% upon project completion.

3 Unit Price Table:

3.1 Mobilization and Demobilization. Cost includes:

3.1.1 Mobilization and/or demobilization of all crew, equipment and material on and off site and clean up after completion of work.

3.1.1.1 Area 2 Access and transportation of materials and equipment

3.1.2 General:

3.1.2.1 Items included under general conditions.

3.1.2.2 Overhead costs associated with contract work.

3.1.2.3 Any costs that are not included elsewhere in the UNIT PRICE TABLE for execution of the project.

3.1.3 Traffic control necessary for pedestrian and vehicular traffic during construction.

3.1.4 Project survey for quality control, measurement and record documents.

3.1.5 Site Preparation and Restoration

3.1.5.1 Work associated with preparing the site for construction of the proposed work within the limits of construction access identified on the drawings.

3.1.5.2 Temporary removal and reinstatement of surface items, for example no-post barriers or signage, in order to perform contract works

3.1.5.3 Protection of existing vegetation and reinstatement of any disturbed vegetation.

3.1.6 Payment shall be 50% upon project start up and 50% upon project completion.

3.2 Isolation. Cost includes:

3.2.1 Environmental protection and sediment controls during construction. Supply, install, maintain and remove post-construction.

3.2.2 Installation and maintenance of a silt curtain for any work in the water under PCA's environmental approval.

3.2.2.1 Correction of any environmental incompliance due to the non-performance of the isolation, such as excessive turbidity levels in the natural lake water.

3.2.3 Shut down work if required while environmental controls are re-established for compliance.

3.2.4 Isolation methodology to be submitted to PCA for review and approval.

3.2.5 Payment shall be 50% upon project start up and 50% upon project completion.

3.3 Floats. Cost includes:

3.3.1 All design, materials, equipment, labour, and anything else required to supply and install the fully functioning float system to work with the moorings and ramp as per the tender drawings and performance specification to meet the intended use, including:

3.3.1.1 Design of the floats and submission of concept drawing for approval

3.3.1.2 Fabrication and installation of the float system, including attachment to moorings and ramp.

3.3.1.3 Mechanical connections and structural components as needed

3.4 Mooring Posts. Cost includes:

3.4.1 All design, materials, equipment, labour, and anything else required to supply and install the fully functioning mooring system to work with the floats and ramp as per the tender drawings and performance specification to meet the intended use, including:

3.4.1.1 Design of the mooring posts, gravity base anchors and mooring attachments for the anticipated loading and submission of concept drawing for approval

3.4.1.2 Fabrication and installation of the mooring system, including earthworks

3.4.1.3 Mechanical connections and structural components as needed

3.5 Ramps. Cost includes:

3.5.1 All design, materials, equipment, labour, and anything else required to supply and install the fully functioning ramp system to work with the floats, abutment and moorings as per the tender drawings and performance specification to meet the intended use, including:

3.5.1.1 Design of the structural ramp and hinge connections for the anticipated loading and submission of concept drawing for approval

3.5.1.2 Fabrication and installation of the ramp system

3.5.1.3 Mechanical connections and structural components as needed

3.6 Abutment Structure. Cost includes:

3.6.1 Timber abutment crib structure with all hardware and attachments

3.6.2 All materials, equipment, labour, and anything else required to supply and install the fully functioning abutment structure to work with the ramps as per the tender drawings to meet the intended use.

3.6.2.1 Earthworks are not included in this line item.

3.7 Excavation. Cost includes:

3.7.1 All excavation required for the project, inclusive of equipment, labour, and anything else required to excavate and stockpile material on site.

3.7.1.1 Stockpiled material is intended for reuse as backfill or disposal under separate line items.

3.8 Disposal. Cost includes:

3.8.1 Remove and dispose of excess native material previously excavated

3.8.2 All removal of native material required for the project, inclusive of equipment, labour, and anything else required to properly dispose of the material.

3.8.2.1 The quantity indicated in the Unit Price Table is the anticipated excess material to be disposed of. If the volume is found to be different then a CHANGE ORDER would be required to adjust the quantities.

3.9 Backfill. Cost includes:

3.9.1 Place and compact native material previously excavated

3.9.2 All native backfill material required for the project, inclusive of equipment, labour, and anything else required to properly place and compact the material as per the tender drawings.

3.9.2.1 The quantity indicated in the Unit Price Table is the anticipated native material to be backfilled. If the volume is found to be different then a CHANGE ORDER would be required to adjust the quantities.

3.10 Drain Rock. Cost includes:

3.10.1 Supply, place and compact drain rock material as per tender documents

3.10.2 All drain rock material required for the project, inclusive of equipment, labour, and anything else required to properly place and compact the material as per the tender drawings.

3.10.2.1 The drain rock used in the Wash Station is NOT included in this line item; it is with the lump sum for the Wash Station.

3.10.2.2 Transporting drain rock to Area 2 is included in Line Item 1 - General

3.11 Clean Sand. Cost includes:

3.11.1 Supply, place and grade clean beach sand material as per tender documents

3.11.2 All clean sand material required for the project, inclusive of equipment, labour, and anything else required to properly place and grade the material as per the tender drawings.

3.12 Clean Gravel. Cost includes:

3.12.1 Supply, place and grade clean beach gravel material as per tender documents

3.12.2 All clean rounded gravel material required for the project, inclusive of equipment, labour, and anything else required to properly place and grade the material as per the tender drawings.

3.12.3 Placement in the water conducted with care and in isolation of the environment.

3.13 Riprap. Cost includes:

3.13.1 Supply and place compacted riprap rock material as per tender documents

3.13.2 All riprap rock material required for the project, inclusive of equipment, labour, and anything else required to properly place and compact the material as per the tender drawings to form a dense, well-keyed stable slope.

3.13.3 Placement in the water conducted with care and in isolation of the environment.

3.14 Stone Steps. Cost includes:

3.14.1 Supply and place compacted stones to form stable steps for swimmers' egress from the water as per tender documents

3.14.2 All stone step materials required for the project, inclusive of equipment, labour, and anything else required to properly place and compact the material as per the tender drawings to form a dense, well-keyed stable stairway.

3.14.2.1 Transporting stone step material to Area 2 is included in Line Item 1 - General

Approved: 2013-06-30

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Alberta

.1 Occupational Health and Safety Act, R.S.A. – Updated 2013.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan and Alberta Core Certification: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operations.

.3 Radio communication plan: There is cellular communication available at Johnson Lake.

.3 Submit PDF copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit to Departmental Representative copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets to Departmental Representative.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 4 days after receipt of comments from Departmental Representative.

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

.9 Submit to Departmental Representative a PDF copy of on-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations

1.3 SAFETY ASSESSMENT

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

1.4 MEETINGS

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

1.5 REGULATORY REQUIREMENTS

.1 The contractor shall perform Work in accordance with National Parks Act.

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 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.7 RESPONSIBILITY

.1 The Contractor will assume all roles and responsibilities of Prime Contractor as described by Occupational Health and Safety Act (OHSA).

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

.3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg.

.2 Comply with R.S.Q., c. S-2.1, an Act respecting Health and Safety, and c. S-2.1, r.4 Safety Code for the Construction Industry.

.3 Comply with Occupational Health and Safety Regulations, 1996.

.4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 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 Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.10 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Safety Representative. Safety Representative must:

.1 Have site-related working experience.

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

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

.4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.11 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.

1.12 CORRECTION OF NON-COMPLIANCE

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

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

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.13 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Mitigations Measures – BNP-1160 – Environmental Impact Analysis

Contractor to refer to BNP-1160 Environmental Impact Analysis – Whirling Disease Eradication from Johnson Lake, BNP for detailed measures and information. *Please note, these mitigations are for the Johnson Lake Whirling Disease Eradication project as a whole, all mitigations that relate directly to the fish removal project will not affect the dock and beach rehabilitation project, but should be followed if found in those situations.*

7.1.2 Mitigation Measures – Landforms and Soils

- Project personnel will use the existing maintained trail network surrounding Johnson Lake, the inflow channel and the upstream wetland.
- Where formal trails are not present (e.g., wetland shoreline), informal trails clearly marked with flagging will be used. Use of these trails will be monitored and if ruts are being formed use will stop, and low impact matting will be deployed along impacted areas.
- Where no formal or informal trails are present (the north side of the upstream wetland), rocky areas will be used for access where possible. Access to the north and east side of the upstream wetland can be accessed by crossing the wetland in chest waders or floating across on a small boat. Low impact matting may also be used to access the centre of the wetland complex to avoid wading through deep flocculent substrate.
- Trucks, ATVs, and large equipment (e.g. bobcat excavator for delivering materials for the construction of downstream fish barrier) will be restricted to using existing formal trails, access roads, and staging areas. No equipment access will be permitted in riparian, shoreline and wetland areas.
- Each contractor will be required to prepare an Environmental Protection Plan (EPP) that includes an Erosion and Sediment Control (ESC) plan for their portion of the work, to be submitted to the Environmental Assessment Office for review a minimum of one week in advance of commencing work.
- The saturated area downstream of the eastern outlet will be closed to prevent any human disturbance to the susceptible saturated soils during the pumping process.
- The effects of the increased discharge out the eastern outlet will be mitigated by placing a 90°elbow at the end of the pumping hose to dissipate the water into the forest and eliminate the erosive power of a direct stream of water.
- Parks Canada is committed to overall site restoration as required (e.g. soil compaction and/or scarification, seeding and/or planting with native species where warranted as a result of disturbance during the project). A Restoration Plan will be completed by the Banff Field Unit Fire/Vegetation specialists upon demobilization (2018 growing season) and restoration activities will be conducted until successful restoration has occurred.

7.2.2 Mitigation Measures - Vegetation

- Equipment access will be kept to existing formal trails and roads, minimizing disturbance footprint and avoiding sensitive riparian, shoreline and wetland areas to minimizing damage and loss of native vegetation.
- By lengthening the outlet hose to the eastern outlet channel during dewatering, the wetland will be bypassed and water can be discharged directed into the rocky relic channel.

- All equipment must arrive on-site clean and free of soil or vegetative matter that could contain weed seeds.
- During the summer of 2017, prior to work beginning, staff from Parks Canada Fire and Vegetation staff will survey the project area (access route) and aggressively control species as found. All individual non-native plants within 10m of the edge of disturbance (staging area) should be cut at ground level, bagged and removed from the site as per the Parks Canada Non-native Vegetation Control Guide.
- Construction non-native vegetation spread mitigations still need to be followed. Any staging that occurs directly on infestations should be matted to ensure vectors (soil, seeds, and debris) do not get transmitted to other areas.
- A Rare Vegetation Survey will be completed along the southern shore of the upstream wetland to identify any rare species that may be affected by project activities for the upstream wetland. This survey will be completed during the growing season to provide the optimal opportunity to identify rare species.
- Parks Canada is committed to overall site restoration as required (e.g. soil compaction and/or scarification, seeding and/or planting with native species where warranted as a result of disturbance during the project).
- If rare plant species are found, they will be flagged so that these areas will be avoided by on-site operations. If rare plant species cannot be avoided by active operations, transplant measures will be taken if appropriate unaffected habitat is identified in the surrounding area. If alternative habitat is unavailable, disturbed rare plant species will be replanted following completion of the project.

7.3.2 Mitigation Measures – Waterfowl/Piscivorous Birds

- To prevent any waterfowl entrapment in the gill-nets, crews will only have nets deployed when they are present on the lake. The simple presence of people on the lake may help deter waterfowl. If not, they will be immediately hazed from the area.
- Considering that most potential bycatch species are visual feeders, a different strategy may be to deploy nets overnight. Crews would set the nets in the evening and retrieve them in the morning. Both daytime and nighttime netting will be attempted to determine which technique demonstrates the least potential to cause bycatch.
- A known loon nesting site will be removed early in the spring of 2017, to encourage the female loon to nest elsewhere and a man-made nesting platform will be installed on the shore of nearby Two Jack Lake to further increase her chances relocating. Because the lake will be fishless in the foreseeable future and the nets present a mortality risk to her and her chicks, this is the most humane approach. This man-made nest will remain on Two Jack Lake for the loon to utilize again in the spring of 2018-2021. This prolonged mitigation effort will encourage the loon from nesting on Johnson Lake and thus reducing the potential for capture within the gill-nets and also acting as an avain vector of whirling disease to adjacent waterbodies.
- Failing the success of one of the mitigations above, mechanical methods for deterring waterfowl will be used (e.g. sonic deterrents, laser deterrents). However, previous experience with fish removal projects resulted in a low bycatch, therefore, we are not anticipating bycatch will be a problem.

- Some amount of netting may be performed during the winter of 2017/2018, under the ice. There are no anticipated concerns with bycatch. Furthermore, by conducting gill-netting in the winter, much of the food source, and thus attractant for waterfowl, will be removed by ice-off in the spring. Gill netting under the ice is much more time-consuming and therefore will not be used as the main mitigation.
- When not in use, gill-nets will be stored in locked, bear proof containers overnight to contain any fish odor and prevent wildlife from entangling themselves in the nets.

7.4.2 Mitigation Measures – Upland Song Birds

- No mitigation measures are planned.
- The equipment access and pumping operations are proposed to occur between September and December 2017, outside of the breeding bird season (April through August).

7.5.2 Mitigation Measures – Aquatic Mammals

- To prevent any aquatic mammals getting entrapped in gill nets, crews will deploy nets when they are present on the lakes. The simple presence of people on the lake will deter aquatic mammals. If not, aquatic mammals will be immediately hazed from the area.
- Considering that most aquatic mammal species are visual feeders, an alternate strategy may be to deploy gill-nets during the night. Crews would set the nets in the evening and retrieve them in the morning. Crews will test both daytime and nighttime netting to determine which technique demonstrates the least potential to cause bycatch.
- When not in use, gill-nets will be stored in locked, bear proof containers to contain any fish odor and prevent wildlife from entangling themselves in the nets.
- Any muskrats that may be displaced due to the dewatering of Johnson Lake will be quickly replaced by others from surrounding populations. The breeding season extends from March to August. The gestation period is ~28 days. Females bear 1-4 litters/year and each litter can contain on average 6-7 young (Saunders 1988).

7.6.2 Mitigation Measures – Ungulates

- No mitigation measures are proposed.

7.7.2 Mitigation Effects – Carnivores/Bears

- At the end of the work day, the gill nets will be removed from the lake and stored in locked, bear-proof containers.
- All fish that are captured will be securely packaged to prevent potential spread of WD, and transported back to the Parks Canada Warden Office and frozen in a walk-in freezer.
- All crew members and contractors will be fully briefed on keeping all personal food and food waste securely stored and removed from site daily.
- All large carnivore observations (wolves, cougars and bears) will be reported immediately to Banff Dispatch via radio or phone (403 762-1470).

7.8.2 Mitigation Measures – Small Mammals

- By lengthening the dewatering outlet hose to the eastern outlet channel, discharge can be directed away from any flat forested areas potentially containing squirrel middens or vole burrows.

7.9.2 Mitigation Measures – Amphibians and Reptiles

7.9.2.1 Columbia Spotted Frog

- Dewatering will not occur during the spring. This timing was chosen to avoid interfering with amphibian reproduction.
- Despite not interfering with Columbia spotted frog reproduction, dewatering may reduce the available over-wintering sites. An occupancy survey for all amphibians at Johnson Lake and the upstream wetland was carried out in the spring of 2016. A second survey will be carried out in the spring of 2017 providing two years of pre-dewatering amphibian surveys. An occupancy survey in 2018 will then provide information about possible population losses due to the lake draining.
- If necessary, amphibians or tadpoles can be taken from nearby sources in the Minnewanka Loop area (e.g.: Quiet Pond, Vernal Pond, Osprey Pond, Amphibian World) and restocked into Johnson Lake and the upstream wetland to replenish populations (Figure 7). A more detailed reintroduction plan will be developed in 2018 if the need arises.

7.9.2.2 Long-toed salamanders

- Given the timing of the dewatering and the life history of the Long-toed salamander, no additional mitigation measures are needed.

7.9.2.3 Western Toad

- Given the timing of the dewatering and the life history of the Western Toad, no additional mitigation measures are needed.

7.9.1.4 Wood Frogs

- Given the timing of the dewatering and the life history of the Wood Frog, no additional mitigation measures are needed.

7.9.1.5 Terrestrial Garter Snake

- Given the timing of the dewatering and the life history of the Terrestrial Garter Snake, no additional mitigation measures are needed.

7.10.2 Mitigation Measures – Aquatic Resources

- Whirling disease decontamination procedures will be applied to all equipment used throughout the course of this project from rubber boots through to excavators and pumps. All personnel will be fully briefed and frequently reminded of these procedures throughout the course of the project.

- There are no mitigations needed to prevent the indirect changes to plankton species. Because salmonids did not inhabit Johnson Lake historically, it is likely that the plankton community will become more similar to historic conditions (Parker and Schindler 2006).
- Each contractor will be required to prepare an Environmental Protection Plan (EPP) that includes an Erosion and Sediment Control Plan (ESC) for their portion of the work, to be submitted to the Environmental Assessment Office for review a minimum of one week in advance of commencing work.
- A comprehensive turbidity monitoring program will be implemented in the western outlet throughout the pumping operations, temporary bridge installation/removal and fish barrier installation and commissioning.
- Channel bed preparation during barrier installation in the western outlet stream will be conducted after dewatering Johnson Lake so construction will take place in a dry stream bed.
- The EPP and ESC plan prepared by the contractor that will be installing the fish barrier must include measures to minimize removal and damage to the stream banks and riparian vegetation and specifications for only clean, washed rock to be used for lining the channel during finishing work.
- Re-introduction of flows into the western outlet channel following installation of the fish barrier will be conducted in a slow and controlled manner with downstream monitoring of turbidity throughout.
- During the pumping process, as the pump intake approaches the sediment, the pumps will be shut off and electrofishing crews will remove any remaining fish from the basin.
- Due to the potential for electrofishing crews to stir up sediment as they work, pumping operations and electrofishing crews will be kept as separated as possible. Sediment curtains may also be used to separate crews from pumping equipment.
- Contingency planning will be in place in case of turbid waters entering the pumps, such as pump shut-offs and re-directing pump outflows into stable vegetated areas where overland flow will not reach surface waters.
- The intake of the pumps will be fitted with an appropriate sized screen based on direction from the Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guideline manual (1995).
- Live fish removed from nets or electrofished will be humanely euthanized. Different options, all consistent with Canadian Animal Care Guidelines and McLean et al (2008) (Attachment 3) exist depending on the size of fish.
- Once the project is complete and all the non-native salmonids are removed from Johnson Lake, native longnose suckers from near-by Lake Minnewanka will be restocked back into Johnson Lake once it has been confirmed that the tubifex worm population has died off (approximately 3 years).
- Longnose sucker populations/biomass will be monitored for success once the restocking is complete. A series of transects will be established on Johnson Lake and a Biosonics DT-X hydroacoustic echosounder will be used to measure longnose sucker abundance.
- Extend closure of the area until water levels return to normal in 2018 – to avoid trampling of exposed littoral areas.
- The area which the gravel will be placed below the high water line has already been disturbed through the migration of sand from the existing beach into Johnson Lake over many years.

- Parks Canada will provide Fisheries and Oceans Canada with required reporting as per Section 5.2 of the Authorization for this project (Attachment 2).

7.11.2 Mitigation Measures – Cultural Resources

- Construction access should be confined to existing roads and pathways
- All construction related activities around the main beach should remain confined to existing access road disturbance and exposed beach, where the new sand is proposed to be added.
- There may be cultural resources present in the project area that have not yet been discovered (even after an archaeological assessment has been carried out or no assessment was deemed necessary for the project). If staff observe any significant cultural resources while working, they should stop work in the immediate area, and contact the Department Representative, ESO or a Parks Canada archaeologist or cultural resource advisor, to discuss any protective measures that might be needed. Significant resources that could be considered grounds for work stoppage include, but are not limited to, human remains, unique or diagnostic artifacts, and/or artifacts directly associated with known sites and/or unidentified sites in the area. In all cases, cultural managers must be made aware of the finds, and these finds must be communicated back to Parks Canada Archaeologists.
- Any additional scope and/or project footprint changes should be reviewed by Parks Canada Archaeology as they may affect project requirements.

Parks Canada Parcs Canada




Parks Canada
Treated Wood Management Standard

December 2015

Canada

NAME: Parks Canada Treated Wood Management Standard

APPROVAL DATE:

EFFECTIVE DATE:

RESCINDED DOCUMENT(S):
Guidelines for the Use, Handling and Disposal of Treated Wood, 2009

CONTACT:

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REVIEW: This standard will be reviewed by the Chief, Environmental Management every 5 years, and updated as necessary.

AMENDMENTS:

CHANGE	DATE	APPROVAL

Table of Contents

1 Context

Wood preservation with duly registered pesticides is meant to protect the wood against insects, fungi, marine borers, mold and early decay. Such wood is commonly referred to as "treated wood" and is used in a variety of operational applications on Parks Canada lands and waters such as building construction, decking, retaining walls, outdoor furniture, playground equipment, bulkheads, piers, pilings, utility poles and many other uses.

While the wood preservatives are legislated under *Pest Control Products Act (2006)* (PCPA 2006), the industrial process for wood preservation is legislated under *Canadian Environmental Protection Act (1999)* (CEPA 1999). The Canadian Standards Association has also issued industrial standards (CSA 080 Series of standards) aimed at certifying that treatments were performed in compliance with applicable regulations and standardizing product groups and use categories.

Nine wood preservatives are currently registered in Canada: (i) ACQ, (ii) ACZA, (iii) CA (CA-B), (iv) Copper Naphthenate, (v) Creosote, (vi) Chromated Copper Arsenate (CCA), (vii) Pentachlorophenol (PCP), (viii) Borate, and (ix) Zinc Naphthenate. The Canadian Ammoniacal Copper Arsenate (ACA) registration was discontinued in 2004. The active ingredients of four of these wood preservatives are also listed as toxic substances under Schedule 1 of CEPA 1999[1]: CCA, ACZA, Creosote (PAH) and Pentachlorophenol (PCP).

This *Parks Canada Treated Wood Management Standard* is meant to be used in conjunction with the *Parks Canada Treated Wood Management Guide* and will help increase awareness, compliance with applicable legislation and code of practice, and consistency across the Agency. It builds both on the Agency's mandated responsibilities of protection of natural and cultural heritage resources, public education and provision of quality visitor experience for present and future generations, and on current science, technology and regulatory status for wood preservatives in Canada.

2 Definitions

Pesticide: Generic term referring to any chemical substance or product capable of destroying or limiting the growth of living organisms (micro-organisms, animals or plants) that are considered harmful, including herbicides, insecticides, fungicides, bactericides, rodenticides, etc.

Treated Wood: Wood that is impregnated with a pesticide that is a wood preservative duly registered in Canada, as required under the *Pest Control Products Act 2006* (PCPA 2006). The preservation process requires (i) a pesticide (the active ingredient), (ii) a carrier (water or oil) and a treatment method (heat, manual application or pressure).

[1] Note that treated wood from contaminated sites is also listed on Schedule 1 of CEPA 1999 and should be considered as contaminated.

3 Purpose

This standard provides direction and promotes awareness to operators on Parks Canada lands and waters on the management of treated wood to reduce risk to human health and the environment.

4 Scope

This Standard and related Management Guide apply to the use of treated wood in new construction and renovations on lands and waters administered by Parks Canada.

Existing treated wood structures and facilities are exempt from this Standard.

This Standard does not apply to wood treated for the sole purpose of meeting phytosanitary requirements under *Plant Protection Act (1990)* (PPA 1999) or fire retardation requirements under the *National Fire Code of Canada (2010)* (NFCC 2010).

5 Expected Results

Adherence to and application of this Standard will ensure consistency across the Agency, and: (i) increase awareness and stewardship; (ii) compliance with applicable legislation and codes of practice; (iii) increase employee, visitor and public safety; and (iv) reduce risk to human health and the environment.

6 Related Authorities

- *Pest Control Products Act* (PCPA 2006) and regulations made under this act
- *National Building Code of Canada* (NBCC 2010)
- *Canadian Environmental Protection Act (*CEPA 1999*)*
- *Hazardous Products Act* (1985)
- *Canada Labour Code Act* (1985) and regulations:
  - *Occupational Health and Safety* (Part II of Canada Labour Code)
  - *Canadian Occupational Health and Safety (OSH) Regulations(1986) (Part X), Hazardous Substances*
  - *Parks Canada Policy and Procedures on Hazardous Occurrence Reporting and Recording*
- *Canadian National Parks Act* (CNPA 2000) and regulations made under this act
- Parks Canada *Cultural Resource Management Policy* (2013)
- *Federal Sustainable Development Act* (2008)
  - PWGSC *Policy on Green Procurement* (2006)

7 Roles and Responsibilities

7.1 Field Unit Superintendent/ Director (or delegate)

1. Ensure that the direction set out in this Standard is followed;
2. Notify the Chief, Environmental Management of any law enforcement actions and notifications pertaining to treated wood within the Field Unit.

7.2 Chief, Environmental Management (Strategy and Plans)

1. Provide functional leadership in the development and dissemination of policy instruments and tools pertaining to the management of treated wood;
2. Identify and disseminate best practices and training opportunities on the management of treated wood through an ongoing liaison with central agencies, other government departments and industry, and in collaboration with the Asset Management and Occupational Health and Safety functions;

7.3 Director, Asset Management Services (Strategy and Plans)

1. Provide functional leadership and engineering support for consistent implementation of this Standard across Field Units;
2. Monitor compliance with this Standard using existing asset management processes and systems.

7.4 Manager, Occupational Health and Safety (Human Resources)

1. Provide functional leadership and guidance on occupational health and safety matters pertaining to treated wood;
2. Monitor employee training and hazardous occurrence records pertaining to treated wood through existing human resource management processes and systems.

7.5 Manager, Cultural Resource Conservation (Heritage Conservation and Commemoration)

1. Provide functional leadership and guidance on the management of treated wood for heritage buildings and sites.

7.6 Director, Procurement, Contracting and Contributions (Chief Financial Officer)

1. Provide functional leadership and guidance on procurement and contracting that involves the management of treated wood.
2. Reference this Standard and related Management Guide in all procurement and contracting documents that involve the use or management of treated wood.

8 Requirements

1) Permitted products (non-aquatic): Wood treated with ACQ, Borate, CA-B, Copper Naphthenate and/or Zinc Naphthenate is permitted under the following conditions:
   a. documented rationale that there are no viable alternatives to the use of treated wood;
      - See Appendix 2 in the Treated Wood Management Guide for a template
   b. the use is permissible under the Pest Control Product Act 2006 (i.e. full compliance with the current relevant pesticide labels issued under the act);
   c. the treatment and use are compliant with the CSA O80 series of standards;
      - Refer to section 5.3 of the Treated Wood Management Guide for example certification end tags and CSA O80 use categories.
   d. risk mitigation measures to minimize the leaching of the preservative are implemented.
      - Section 5.5 of the Treated Wood Management Guide provides guidance on this subject.

2) Aquatic Environments: Use no treated wood that will, once installed, may be permanently or seasonally in direct contact with any body of water. While the aquatic use of treated wood that is based on these preservatives may be legally permitted, they are known or suspected to be toxic to certain forms of aquatic life.

3) Prohibitions: Wood treated with a preservative that is listed as a toxic substance under Schedule 1 of CEPA 1999 such as wood treated with ACZA, CCA, Creosote or PCP-based is prohibited.

4) Minimize Use of Treated Wood: Minimize the use of treated wood by reducing, reusing and recycling treated wood to the extent possible[2], as legally permitted and where economically feasible. Always refer to the relevant MSDS or related wood preservative label to validate legally permitted recycling[3] options.
   - See section 5.1 of the Treated Wood Management Guide for various alternatives to treated wood.

5) Third Party Projects: Review all construction/renovation plans submitted by third parties operating on Parks Canada lands and waters in accordance with this Standard.

[2] Note that treated wood from contaminated sites is listed on Schedule 1 of CEPA 1999 and should be considered as contaminated.
[3] Industrial recycling facilities for treated wood currently exist in Quebec and in Ontario.

6) **Ground and near-ground use in buildings** (NBCC 2010[4] requirement): Use treated wood in near-ground and ground-contact structural residential applications as required under the NBCC 2010.

7) **Safe Use and Storage of Treated Wood** (PCPA 2006 requirement)**:** Follow precautionary measures specified in the MSDS that accompanies any treated wood or the related wood preservative label, including the use of personal protective equipment, for storage[5], handling, sawing, sanding or shaping treated wood.
   - See Section 4.4 of the Treated Wood Management Guide for more information.

8) **Disposal of Treated Wood** (PCPA 2006 requirement): Dispose of treated wood or parts thereof as permitted in the MSDS that accompanies the material or as per wood preservative label. Deliberate burning, composting or mulching of treated wood or parts thereof is not permitted.
   - See Section 4.6 of the Treated Wood Management Guide.

9) **Training and Certification**[6] (PCPA 2006 requirement): When using restricted or commercial class wood preservatives ensure that field-applicators (staff or contracted applicators) of wood preservatives (e.g. treating cut ends) have adequate training and certification or training and permit.
   - See Section 5.5 (#5) of the Treated Wood Management Guide for more information.

10) **Hazardous Incident Reporting** (Canadian OHS Regulations 1986 requirement): Report hazardous incidents involving the use of treated wood and potentially posing risk to human or environmental health (e.g. fire, intoxication or on-site release) and keep related records for a period of thirty (30) years.
   - See Section 5.4 of the Treated Wood Management Guide for more information.

9 Enforcement and Related Notifications

The use of treated wood is subject to regulations made under PCPA 2006, which are enforced by designated Enforcement Officers from Health Canada – PMRA. If notified by an Enforcement Officer for an upcoming inspection or following an inspection, please notify the Chief, Environmental Management.

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[4] The NBCC 2010 requires the use of treated wood where any residential structural element is: (i) in contact with the ground; (ii) within 450 mm of the ground in places known to have termites; (iii) within 150 mm of ground and supported on moisture permeable materials; (iv) subject to prolonged exposure to moisture; (v) used in permanent wood foundations; or (vi) used in retaining walls that contribute to the stability of the foundation or that are greater than 1.2 m in height.

[5] Technical guidelines for safe storage of treated wood vary according to duration (90 days as a threshold) and volume (55 m^3 as a threshold) and are detailed in the Treated Wood Management Guide.

[6] As per PCPA 2006, ensure that field applicators meet the requirements of the "*Standard for Pesticide Education, Training and Certification in Canada*" established by the *Federal/Provincial/Territorial Pesticide Education, Training and Certification Working Group* (WGPETC)).

10 Monitoring, Audit and Evaluation

The Office of Internal Audit and Evaluation may periodically conduct audits or evaluations as deemed appropriate. The Chief, Environmental Management, in collaboration with the Director, Asset Management Services, the Manager, OHS, and the Field Units will also monitor the application of this standard using existing systems, procedures, and practices.

Parks Canada Parcs Canada

Parks Canada
Treated Wood Management Guide

December 2015

Canada

Contents

NAME: Parks Canada Treated Wood Management Guide

APPROVAL DATE:
EFFECTIVE DATE:

CONTACT: Environmental Management, Strategy & Plans

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Parks Canada Intranet Site: http://intranet2/our-work/environmental-and-fleet-management/environmental-management/treated-wood-bois-traité/

RESCINDED DOCUMENT: Guidelines for the Use, Handling and Disposal of Treated Wood, 2009

REVIEW: This Guide will be reviewed on a five year basis, and updated/revised as necessary.

AMENDMENTS:

CHANGE / RATIONALE	DATE	APPROVAL

1 PURPOSE

This Management Guide provides operators on Parks Canada lands and waters with detailed information on, management procedures for, alternatives to and Best Practices for use, storage, handling and disposal of treated wood.

2 INTRODUCTION

This guide is developed to complement the Parks Canada Treated Wood Management Standard, which aims at increasing awareness, compliance with applicable legislation and code of practice, and consistency across the Agency, while reducing potential risk to human health and the environment. While the requirements of the standard are to be complied with, these guidelines are only recommended for consideration when working with treated wood across the Agency. Types of wood preservatives legally registered in Canada (see Appendix 1 for list and explanation) and best practices for managing treated wood, including alternatives to treated wood, are discussed with further references provided. A template to rationalize for use of treated wood within each Field Unit, as required under the Parks Canada Treated Wood Management Standard, is also provided, so as to promote consistency across the Agency and facilitate audit, evaluation and monitoring activities.

3 DEFINITIONS

Borate	Natural water-soluble mineral, harmless to humans and animals, yet effective in protecting wood against rot and insects.
Fixation	Industrial chemical process by which the metals in a waterborne wood preservative solution react with and bond to the wood fiber molecules.
Fungus	Organism (plant-like) that lacks chlorophyll and that must obtain its food by microscopic, root-like filaments that penetrate wood tissue and absorb its energy-rich chemicals.
Marine Borer	Xylophagous bivalve mollusc of the *Teredinidae* family that uses tooted rings on its shell as drills to bore tunnels in submerged wood in marine environments.
On-Site Release	Discharge of a pollutant, from within the boundaries of a facility, to the environment, including (i) emissions to air, (ii) discharges to surface waters, (iii) discharges to land and (iv) deep-well underground injections.
Sealer	Water repellent chemical that is impregnated into the wood along with the preservative optimum appearance and durability.

Toxic Substance	Substance listed under Schedule 1 of the *Canadian Environmental Protection Act 1999* (CEPA 1999).
Treated Wood	Wood that is impregnated with a pesticide that is a wood preservative duly registered in Canada, as required under the *Pest Control Products Act 2006* (PCPA 2006). The preservation process requires (i) a pesticide (the active ingredient), (ii) a carrier (water or oil) and a treatment method (heat, manual application or pressure).

4 LIST OF ACRONYMS

ACA	Ammoniacal copper arsenate
ACQ	Alkaline copper quaternary
ACZA	Ammoniacal copper zinc arsenate
CA	Copper azole
CCA	Chromated copper arsenate
CuN	Copper naphthenate
PAH	Polycyclic aromatic hydrocarbon
PCP	Pentachlorophenol
PE	Polyethylene
ZnN	Zinc naphthenate

5 BEST PRACTICES

5.1 Alternatives to Treated Wood

The use of treated wood should be minimized. The following are some examples of possible alternatives.

5.1.1 Composites (Recycled-Plastic Lumber)

Composites are made of wood fibres and recycled grocery bags/milk jugs. They do not warp, split, chip or rot and do not require sealing or staining. They tend to be durable, stable and weather resistant. Composites are more expensive than treated wood, are not for structural use and can be vulnerable to mold and colour fading (U.S. EPA 2005a).

5.1.2 Virgin Polymer Plastic Lumber

Virgin polymer plastic lumber is the use of virgin polypropylene and/or polystyrene instead of recycled plastics. It has a higher flex modulus and flexural strength than recycled plastic lumber (EPIC & CSR, 2003). It is durable, stable and weather resistant. It also does not warp, split, chip or rot and does not require sealing or staining. It is more expensive than treated wood and is not for structural use.

5.1.3 Rubber Lumber

Rubber lumber is made of 50% plastic and 50% recycled tires (U.S. EPA, 2005a). It is durable, impermeable, and resistant to insects. It is not for structural use and the colour tends to fade.

5.1.4 Native Durable Wood

Some native trees of North America produce wood that is naturally more durable than others. The hardwood of white oak (*Quercus alba*) or burr oak (*Quercus macrocarpa*), and the softwood of Northern white cedar (*Thuja occidentalis*) may naturally resist to decay and pests for 5 to 15 years. The softwood of the Eastern red cedar (*Juniperus virginiana*), the Western red cedar (*Thuja plicata*) and the redwood (*Sequoia spp.*) may exhibit such resistance for 10 to 30 years (Hoffman et al., 2002). Redwood, for instance, on top of being aesthetically pleasant, does not usually need sealing or staining and is easy to nail and saw. However, the worldwide supply of Redwood is depleting, bringing the price even higher and raising sustainability concerns, aside from being vulnerable to scratching and denting (U.S. EPA 2005a).

5.1.5 Exotic Durable Wood

Exotic durable hardwoods include the wood of Mahogany (*Swietenia spp., Entandrophragma spp., Khaya spp.,* etc.) and several Ironwood species (*Tabebuia serratifolia, Krugiodendron ferreum, Diospyros spp.,* etc.). They are naturally durable, resistant to decay and insects, do not usually need sealing or staining and are relatively impermeable to water. Unfortunately their worldwide supplies are depleting, raising sustainability concerns and maintaining high prices.

5.2 Existing Treated Wood Structures and Facilities

Many structures and facilities built with treated wood can be found in sites managed by Parks Canada. These structures and facilities should be handled as follows:

1. If they are in good condition, existing structures and facilities built with any type of treated wood should not be replaced, unless they may be in direct contact with drinking water.

2. The surfaces of all structures and facilities that have been treated with a CCA or ACZA wood preservative and that may be touched regularly by visitors (e.g. handrails, picnic tables, etc.) should be completely covered with a penetrating, oil-based sealer. In addition to waterproofing the wood, the application of such sealers reduces the release of chemicals contained in CCA-treated wood by 80% to 95% (Stilwell and Musante, 2003). Another coat of penetrating oil-based sealer should be applied when the current finish begins to show signs of deterioration.

3. The use of non-penetrating finishes, such as paint or urethane, is not recommended because peeling and flaking can increase exposure to preservatives contained in the wood (U.S.EPA, 2005b).

4. It may not be justifiable to add a coat of preservative to a structure made from old treated wood. This practice would not extend the structure's durability. Instead, the replacement of the existing structure should be considered if it has reached the end of its useful life.

5. For treated wood structures that are in place in aquatic environments polyethylene (PE) wear strips should be used to prevent abrasion (Environment Canada, 2004).

5.3 New Treated Wood Structures and Facilities

In order to use treated wood in accordance with the Parks Canada Treated Wood Management Standards, the following Best Practices should be considered in the design of new structures and facilities.

1. Mixtures of several active ingredients for multipurpose wood preservation contexts are becoming more common and intracellular[1] impregnation of the wood with active ingredients is deemed to significantly reduce leaching and increase durability.

2. A wide array of environmental certification programs exist for treated wood. It is recommended to thoroughly review the scope of the technological and environmental certification claims as part of the rationale for use of treated wood on Parks Canada lands and waters, on a case per case basis. For assistance with this please contact Environmental Management.

3. Treated wood should only be used when it is important that the wood be protected (risk of decay, attack by insects or contact with water or damp soil), in accordance with *the National Building Code of Canada* or where it is necessary to maintain the heritage value of a historic place or asset. Wood treatment should not be a substitute for good construction design.

4. Project proponents should be able to determine the most appropriate products and should be able to justify their use. A template can be found in Appendix 1 as well as on the Parks Canada Intranet to document the rationale for the use of treated wood.

5. No treated wood should be used in the construction of items that may come in direct contact with food/ drinking water or that may introduce chemicals into the food chain: feeders, picnic tables, silos and other feed storage structures, hives, drinking troughs, compost bins and wood chip mulch.

6. Purchased treated wood should be marked with an end tag to show it was produced under the national certification program and that it has been treated to the applicable CSA treatment standard. The end tag should show the preservative used, the use category, the product group and a plant identification number. Below is an example of an end tag.

Figure 1: End tag certification mark (modified from Canadian Wood Council, date NA c)

[1] A copper-based wood preservation technology is currently marketed in Canada and USA.

7. Choose wood that has been treated in accordance to the CSA O80 Standard Product Group and Use Category system that corresponds to the planned use. There are four residential product groups: A (members 25 mm or thinner for use where decay is unlikely), B (members between 25 mm and 40 mm and less than 150 mm wide, where potential for decay is low or that are not used for structural purposes), C (structural lumber thinner than 40 mm used for supports in exterior applications) and D (members used for posts and timbers in ground contact). The Use Categories are as follows:

Table 1: Treated Wood Use Categories (modified from: Wood Preservation Canada, 2012)

Category	Conditions
UC1	Wood that is to be used in interior construction in dry conditions (no ground contact)
UC2	Wood that is to be used in interior construction with potentially damp conditions (no ground contact)
UC3.1	Wood to be used in exterior construction that are coated and exposed to weather but have rapid water run-off (no ground contact)
UC3.2	Wood to be used in exterior construction that are uncoated or have poor water run-off (no ground contact)
UC4.1	Wood to be used in ground contact (non-critical components)
UC4.2	Wood to be used in ground contact (critical structural components or difficult replacement)
UC5A	Wood to be exposed to coastal waters
UCF.1	Fire protection

5.4 Storage and Safe Handling of Treated Wood

1. Treated wood should be visually inspected before and after installation to ensure that it appears clean and its surface is free of preservative residues. Otherwise, the lumber should not be used and should be disposed of in accordance with the manufacturer's guidelines, as specified in the treated wood MSDS.

2. Anyone who handles treated wood should wear gloves and a long-sleeve shirt. When sawing, sanding and shaping treated wood, workers should also wear dust masks and goggles to avoid touching or inhaling sawdust.

3. Workers must always cut and work with treated wood outdoors or in an adequately ventilated area.

4. Anyone who works with treated wood should wash their hands immediately after finishing their work, and especially before eating, drinking or smoking.

5. Hazardous incidents involving treated wood may occur through direct handling of treated wood or during the treatment process (ex. in-field treatment of cut ends). In all cases of hazardous incidents the Policy and Procedures on Hazardous Occurrence Reporting and

Recording should be followed. Any related records should be kept for a period of thirty (30) years. For more information please contact ohs-sst@pc.gc.ca
The contact listed on the MSDS or pesticide label should also be informed in cases of incidents involving treated wood.

6. If treated wood is to be stored on site prior to installation or post use the following table provides recommended instructions:

Table 3: Storage Recommendations (modified from Environment Canada, 2004)

Time Period	Volume of Storage	Factors
90 Days or Less	55 m^3 or less	-Store on flat ground (slope less than 10%) and a minimum of 10 m from environmentally sensitive area -If possible elevate to avoid contact with water runoff -provide absorbent base (ex. wood chips) -minimize on site storage time -inspect wood upon delivery -place tarpaulin or weather resistant material over wood -inspect storage area for evidence of leaching treatment chemicals
	More than 55 m^3	-Store on flat ground (slope less than 10%) and a minimum of 30 m from environmentally sensitive area -If possible elevate to avoid contact with water runoff -provide absorbent base (ex. wood chips) -minimize on site storage time -inspect wood upon delivery -place tarpaulin or weather resistant material over wood -inspect storage area for evidence of leaching treatment chemicals
More than 90 days	55 m^3 or less	-Store on flat ground (slope less than 10%), a minimum of 10 m from environmentally sensitive area and a minimum of 3 m from drainage ditches -If possible store on surfaces with limited permeability (ex. clay or concrete) and elevate to avoid contact with water runoff -Provide absorbent base (ex. wood chips) -Provide emergency response information and fire protection equipment -Limit access to the storage area -Minimize on site storage time - place tarpaulin or weather resistant material over wood -inspect storage area for evidence of leaching treatment chemicals
	More than 55 m^3	-Store on flat ground (slope less than 10%), a minimum of 30 m from environmentally sensitive area and a minimum of 3 m from drainage ditches -store at least 30 m from potable water supply and outside of 100-year flood plain where possible -Store at least 30 m from forested area and clear storage area of combustible ground vegetation. -If possible store on surfaces with limited permeability (ex. clay or concrete) and elevate to avoid contact with water runoff

		-Provide absorbent base (ex. wood chips) and choose a storage area where runoff can be captured/ managed -Provide emergency response information and fire protection equipment -Limit access to the storage area, and provide fencing/ signage around area -Minimize on site storage time -inspect storage area for evidence of leaching treatment chemicals

5.5 Installation, Field Treatment and Maintenance of Treated Wood

1. In order to mitigate risk it is recommended that a sealer be used to reduce leaching potential. Wood treated with borate preservatives should also not be used in locations where it will be subject to heavy rains or ground contact to reduce leaching.

2. The use of cleaning and bleaching products containing sodium hypochlorite, sodium hydroxide, sodium percarbonate or citric or oxalic acid on treated wood should be avoided because these products can cause the wood to release toxic chemicals (PTW-SafetyInfo Website, date NA).

3. In order to minimize the need for in-field treatment it is recommended that framing, sawing, cutting and drilling should be done before treatment to the maximum degree possible. Although it may require more engineering it will insure a more efficient installation.

4. Exposed cut ends and drill holes should be field-treated[2] with a preservative (along with a sealer) in accordance with the manufacturer's and the preservative label instructions, preferably well away from water, in a protected cutting area and prior to the assembly of the wooden structure.

5. If the preservative used for field treatment (i.e. cut ends) is a commercial or restricted class pesticide, training and certification or training and permit may be required for the field applicator. This training is provided provincially to meet the "*Standard for Pesticide Education, Training and Certification in Canada"* established by Health Canada – Pest Management Regulatory Agency (PMRA). The following table provides links for more information on training for each province and territory.

British Columbia	http://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management/pesticide-use/pesticide-certification
Alberta	http://esrd.alberta.ca/lands-forests/land-industrial/programs-and-services/pesticide-management/pesticide-use/applicator-certification/pesticide-applicator-certification-program.aspx
Saskatchewan	http://www.agriculture.gov.sk.ca/Pesticide-Applicator

[2] Ensure that field applicators (using commercial or restricted class pesticides) meet the requirements of the "*Standard for Pesticide Education, Training and Certification in Canada"* established by Health Canada – Pest Management Regulatory Agency (PMRA).

Manitoba	https://www.gov.mb.ca/agriculture/permits-and-licences/pesticide-and-manure/pesticide-applicator-licence.html
Ontario	http://www.ontariopesticide.com/
Quebec	http://www.mddelcc.gouv.qc.ca/pesticides/permis-en/
New Brunswick	http://www2.gnb.ca/content/gnb/en/services/services_renderer.2915.Pesticide_Applicator_Certificate.html
Nova Scotia	http://www.novascotia.ca/nse/pests/applicator.asp
Prince Edward Island	http://www.gov.pe.ca/environment/pesticide-applicator-certificate
Newfoundland and Labrador	http://www.env.gov.nl.ca/env/env_protection/pesticides/business/training.html
Yukon	http://www.env.gov.yk.ca/air-water-waste/pesticides_regs.php
Northwest Territories	http://services.exec.gov.nt.ca/service/208
Nunavut	http://gov.nu.ca/sites/default/files/gnjustice2/justicedocuments/Consolidated%20Law/Original/PESTICIDE%20ACT/633409249303125000-5932574-Reg277.pdf

6. If the chemical solution is accidentally spilled while ends are being field-treated, the spill should be contained with a disposable absorbent substance (soil, sawdust, forest litter or rags) and cleaned up immediately. Dispose of the contaminated absorbent material safely, in accordance with the pesticide (preservative) label.

5.6 Disposal of Treated Wood

1. Never dispose of treated wood by burning.

2. Do not compost scraps, wood chips or sawdust from treated wood.

3. All remaining scraps, cuttings, wood chips and sawdust must be collected efficiently and in a timely matter.

4. Refer to the treated wood MSDS for appropriate disposal of the materials.

5.7 Recommended Hardware for Treated Wood

5.7.1 Connectors

1. Connectors used for ACQ- or CA-treated wood should be manufactured from steel and be either galvanized in accordance with ASTM A653, G185 designation, or be galvanized after manufacture in accordance with ASTM A123.

2. For borate-treated wood used inside buildings, the same connectors can be used as for untreated wood.

5.7.2 Fasteners

1. Fasteners for ACQ-, CA-, treated wood should be galvanized in accordance with ASTM A153. Stainless steel may be used for maximum service life or severe applications. Where appropriate, copper fasteners may also be used.

2. Corrosion-resistant fastenings should be used to minimize moisture damage.

3. Fasteners used in combination with metal connectors must be the same type of metal to avoid galvanic corrosion caused by dissimilar metals.

4. For borate-treated wood used inside buildings, the same fasteners can be used as for untreated wood.

5.7.3 Flashing

1. Flashing used in contact with treated wood must be compatible with the treated wood.

2. Copper and stainless steel are the most durable metals for flashing. Galvanized steel, in accordance with ASTM A653, G185 designation, is also suitable for use as flashing. Fasteners should be compatible to avoid galvanic corrosion.

5.7.4 Other Hardware

1. There may be additional products such as polymer or ceramic coatings, or vinyl or plastic flashings that are suitable for use with treated wood products. Consult the individual fastener, connector or flashing manufacturer for recommendations for use of their products with treated wood.

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Appendix 1: VARIOUS TYPES OF WOOD PRESERVATIVES

Wood preservatives have been used around the world for many years and across Canada for more than a hundred years. During that time, wood preservatives have proven to be an effective treatment against natural wood degradation agents such as fungi and insects. The following section describes the most common types of wood preservatives.

1.0 Waterborne Wood Preservatives

Chromated copper arsenate (CCA), alkaline copper quaternary compounds (ACQ), copper azole (CA), and ammoniacal copper zinc arsenate (ACZA) are common waterborne preservatives. These react with or precipitate in the wood substrate and become "fixed" to prevent leaching. Waterborne preservatives are often used in residential applications because they have a dry paintable surface. These preservatives are primarily used to treat softwood species and are very effective for this application. However, because their cellular structure is different, hardwoods treated with waterborne preservatives may not be adequately protected in some types of exposures or environments (Lebow and Tippie, 2001). Waterborne wood preservatives may increase corrosion of unprotected metal, and so all metal fasteners used with treated wood should be hot-dipped galvanized or stainless steel. Although, not all stainless steel fasteners are acceptable for use with treated wood (Simpson, 2005).

1.1 Alkaline Copper Quaternary (ACQ)

Alkaline copper quaternary (ACQ) prevents decay from fungi and insects and was developed because of environmental and safety concerns with CCA. This preservative contains copper and a quaternary ammonium compound (quat). Multiple variations of ACQ have already been standardized allowing flexibility to work with different wood species and end use applications. Currently there are three types, ACQ-A, ACQ-C and ACQ-D, registered for use in Canada. Type ACQ-A has 50% copper oxide and 50% quat. ACQ-C and-D both have 2:1 ratios of copper oxide to quat but different forms of quat (Environment Canada, 2013). It is not for use in critical infrastructure such as utility poles, railway ties or foundations (Environment Canada, 2013).

1.2 Copper Azole (CA)

Copper azole (CA) is another developed wood preservative that contains copper, boric acid, and tenuconazole. These three active ingredients work together to protect against decay fungi and insects. CA is able to provide good treatment for southern pine and hemlock/fir species groups (Lebow and Tippie, 2001). It can be used in residential, general construction and agricultural uses, but is not to be used as a treatment for utility poles and pilings (Environment Canada, 2013).

1.3 Borate-Based Preservatives

Borate preservatives are salts such as sodium octaborate (disodium octaborate tetrahydrate – DOT), sodium tetraborate and sodium pentaborate that are dissolved in water. Borate preservatives remain water-soluble and readily leach out in soil or rainwater (Lebow and Tippie, 2001).

1.4 Chromated Copper Arsenate (CCA)

Chromated copper arsenate (CCA) is a waterborne preservative containing arsenic, chromium and copper. This type of preservative is used for the long-term protection of wood against attack by fungi, insects and marine borers. CCA-treated wood typically has a light green color but it may also be factory stained or dyed to various shades of brown. A water-repellent treatment is sometimes applied to help prevent checking and splitting when the wood is used on a flat surface, such as decking. CCA-treated wood has little or no odour associate to it (Lebow and Tippie, 2001).

Until January 2004, CCA was the most widely used wood preservative in North America (Health Canada, 2005), however it was voluntarily phased out from use in residential applications in 2003 and now is only allowed for industrial use (Environment Canada, 2013). In Canada type C oxide is the only formulation currently used. Use of CCA treated wood is prohibited in Parks Canada operations due to the presence of inorganic arsenic and chromium VI, which are listed as toxic substances under CEPA 1999.

1.5 Ammoniacal Copper Zinc Arsenate (ACZA)

Ammoniacal copper zinc arsenate (ACZA) contains copper, zinc, and arsenic. It protects against attack by decay fungi, insects and most types of marine borers. Its uses are very similar to those of CCA and include treatment of poles, pilings and timbers. Because of its ability to penetrate Douglas fir and other difficult–to-treat wood species, it is most widely used on the west coast. The colour tends to be dark brown to bluish green. The wood initially has a slight ammonia odour, but soon dissipates after treatment as the wood dries (Lebow and Tippie, 2001). The Pest Management Regulatory Agency updated the label to prohibit use in residential applications in 2011. Use of ACZA treated wood is prohibited in Parks Canada operations due to the presence of inorganic arsenic which is listed as a toxic substance under CEPA 1999.

2.0 Oilborne Wood Preservatives

Creosote, pentachlorophenol (PCP), copper naphthenate and zinc naphthenate are common oilborne preservatives that are used for applications such as utility poles, bridge timbers, railroad ties, pilings and laminated means. They tend to have a strong odour and can be oily, they therefore are generally not used for purposes that may have frequent human skin contact or inside dwellings. These preservatives also act as water repellants because of their oily nature, and can help to prevent the checking and splitting of wood (Lebow and Tippie, 2001).

2.1 Creosote

Although Creosote differs from other oilborne preservatives because it is not usually dissolved in oil it still maintains properties that make it look and feel oily. It is a distillate of coal tar (a byproduct of the carbonization of coal during coke production) (Lebow and Tippie, 2001). Creosote contains a chemically complex mixture of organic molecules, up to 80% of which are polycyclic aromatic hydrocarbons (PAHs) (Brooks, 2004). Use of Creosote treated wood is prohibited in Parks Canada operations because Polycyclic Aromatic Hydrocarbons (PAHs) and creosote-impregnated waste materials are listed as toxic substances under CEPA 1999.

2.2 Pentachlorophenol (PCP)

Pentachlorophenol (PCP) is a crystalline solid that can be dissolved in various types of oils. Petroleum oils are generally used as carriers of PCP (NEIA, 1993). Although this type of

preservative does not protect well against ocean marine borers, it is commonly used due to its effectiveness against fungi and insects. The type of oil used as a carrier solvent determines that appearance of wood treated with PCP: a very light brown color and dry surface if a light oil is used or a dark brown color and somewhat oily surface if a heavy oil is used (Lebow and Tippie, 2001). PCP itself is odourless, but the carrier solvent may have a distinct odour that can be noticed when approaching this type of treated wood. There are two types of PCP treatments; Pressure Pentachlorophenol (PCPP) and Thermal Pentachlorophenol (PCPT).
Use of PCP treated wood is prohibited in Parks Canada operations due to the presence of dioxins, furans and hexachlorobenzene, which are listed as toxic substances under CEPA 1999.

2.3 Copper Naphthenate (CuN)

Copper naphthenate (CuN) is the reaction product of naphthenic acids and copper salts dissolved in oil. CuN is used for the treatment of utility poles, highway construction (Lebow and Tippie, 2001) bridges and is commonly available in retail lumberyards for use in fencing and decking (Hutton and Samis, 2000). Like PCP, the properties of CuN are dependent on the type of oil used as the carrier. The oils that are most commonly used as carrier solvents are fuel oil and mineral spirits. The color of the CuN-treated wood varies from light brown to dark green, depending on the type of carrier solvent and the applied treating process. The carrier solvents for CuN-treated wood give it a distinct odour. Wood that is treated using CuN in light oil is easier to paint or stain than wood treated with CuN in dark oil. CuN is widely applied for hand dressing on end cuts or holes bored into treated wood during construction (Lebow and Tippie, 2001).

2.4 Zinc Naphthenate

Zinc Naphthenate is used to protect cut ends of treated wood. It can be applied with a brush as a component of a ready-to-use product. It is only for exterior above ground use. It can be colourless or matched to the colour of treated wood with a greenish tint (Canadian Wood Council, date NA b.)

APPENDIX 2 Rationale for Use of Treated Wood in Parks Canada Operations

Field Unit:
Project and Location:
Quantity (m^3):

Part 1: Are there applicable alternatives to treated wood?

	YES	NO	Explanation
Untreated Wood	☐	☐	
Composites	☐	☐	
Plastic	☐	☐	
Metal	☐	☐	
Concrete	☐	☐	

Part 2: Treatment / Use Compliance

	YES	NO
CSA Stamped:	☐	☐
Intended use consistent with preservative label:	☐	☐
MSDS obtained and reviewed:	☐	☐

Please Select Preservative Type:

ACQ	☐	
Borate	☐	
CA-B	☐	
Copper Naphthenate	☐	
Zinc Naphthenate	☐	
Other	☐	Explain:

Part 3: Best Practices

	YES	NO	
Recommended hardware will be used:	☐	☐	
Other Best Practices Followed:	☐	☐	Explain:

Part 4: Conclusion[3][4]

The use of treated wood is acceptable based on the above rationale: YES ☐ NO ☐	Project Manager:
	Signature:
	Date:

[3] Only use treated wood when all boxes in Part 1 are checked "NO" and all boxes in Part 2 are checked "YES"; It is also preferable that "YES" be chosen for Part 3 statements.

[4] Keep the signed copy of this rationale with project file