

Part 1 General

1.1 SUMMARY

- .1 No grubbing shall occur within the limits of this project without written approval of consultant. In the event that tree removal is required, a close cut clearing method shall be employed.

1.2 RELATED SECTIONS

- .1 Section 02 41 13 – Selective Site Demolition
- .2 Section 32 01 90.33 – Tree and Shrub Preservation.

1.3 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.

1.4 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 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- .5 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.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
 - .1 Submit 1 sample of each material listed below for approval prior to delivery of materials to project site.
 - .2 Tree wound paint: one liter can with manufacturer's label.
- .3 Submit certificates certifying that tree removal is being carried out by a licensed arborist.

1.6 QUALITY ASSURANCE

- .1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements
- .2 Safety Requirements: worker protection.
 - .1 Workers must wear gloves, long sleeved clothing, eye protection, personal protective equipment when removing trees.
 - .2 Workers must not eat, drink or smoke while removing trees.
 - .3 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

1.7 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing structures, existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain.
 - .1 Repair damaged items and replace trees designated to remain, if damaged, as directed by and to the approval of Departmental Representative and Landscape Architect.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.
 - .1 Stockpile adjacent to site in a manner that is safe and does not cause damage to existing areas or objects to remain.
- .3 If arrangements cannot be made to have felled timber removed for the purpose of recycling, the Contractor is responsible to dispose of the material in accordance with all local, provincial and federal regulations, prior to the completion of construction.

Part 2 Products

2.1 MATERIALS

- .1 Bituminous based paint of standard manufacture specially formulated for tree wounds.
- .2 Soil Material for Fill:
 - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
 - .2 Remove and store soil material for reused.

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, according to requirements of authorities having jurisdiction and in compliance with CEPA 1999, c.33 or requirements of authorities having jurisdiction, whichever is more stringent.
- .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 Departmental Representative and Landscape Architect, items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative and Landscape Architect immediately of damage to or when unknown existing utility line[s] are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing
- .4 Keep roads and walks free of dirt and debris.

3.3 APPLICATION

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

3.4 CLOSE CUT CLEARING

- .1 All cutting shall be performed by or under direct supervision of an arborist, licenced in the Province of Manitoba
- .2 Close cut clearing to ground level to within 40 mm of ground surface.
- .3 Perform close cut clearing by hand so that existing surface is not damaged.
- .4 Cut off branches overhanging area cleared as directed by Landscape Architect.
- .5 Cut off unsound branches on trees designated to remain as directed by Landscape Architect.

- .1 Cut limbs and branches to be trimmed close to bole of tree or main branches
- .2 Paint cuts more than 3cm in diameter with approved tree wound paint.

3.5 UNDERBRUSH CLEARING

- .1 Clear underbrush from areas as indicated at ground level including entire root systems.

3.6 GRUBBING

- .1 No grubbing shall take place as part of this project without written approval and direction of the Landscape Architect. In instances where grubbing is deemed absolutely essential
- .2 Remove and dispose of roots larger than 5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .3 Grub out stumps and roots to not less than 300mm below ground surface.
- .4 Grub out visible rock fragments and boulders, greater than 300mm in greatest dimension.
- .5 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground. All material used to fill grubbing excavations should be sourced on site from other excavations. All efforts must be made to balance cut and fill.
- .6 Excavations and subsequent backfilling shall not contribute to erosion or bank destabilization. Material must not be left loose. In areas where slopes exceed 10% or seasonal washouts are prone, a bio-degradable mesh shall be used as a temporary measure to limit erosion.

3.7 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site to disposal area.
- .2 Cut timber greater than 200mm diameter to 3m lengths and stockpile on site. At the Owners discretion, stockpiled timber becomes property of the Owner.
- .3 Remove diseased trees identified by Departmental Representative and Landscape Architect and dispose of this material to approval of local authorities and regulations.

3.8 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate grading operations and/or stripping of topsoil.

3.9 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 11 00 – Clearing and Grubbing Section
- .2 Section 31 22 13 – Rough Grading
- .3 Section 32 01 90.33 – Tree and Shrub Preservation
- .4 Section 32 16 15 – Concrete Walks and Curbs
- .5 Section 32 93 09 – Planting Bed Preparation
- .6 Section 32 15 40 – Crushed Stone Surfacing

1.2 PROTECTION OF EXISTING FEATURES

- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing excavation work, notify applicable owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Departmental Representative or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
 - .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative and Landscape Architect.
 - .6 Record location of maintained, re-routed and abandoned underground lines.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative and Landscape Architect condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing buildings and surface features from damage while work is in progress. In event of damage, immediately make repair to approval of the Departmental Representative.
 - .3 Where required for excavation, cut roots or branches in accordance with Section 32 01 90.33 – Tree and Shrub Preservation.

Part 2 Products

2.1 MATERIALS

- .1 As shown on the drawings.

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 STOCKPILING

- .1 Stockpile materials in areas designated by the Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.3 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as shown on the drawings.
- .2 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw if directed by certified arborist.
- .3 Dispose of surplus and unsuitable excavated material off site.
- .4 Do not obstruct flow of surface drainage or natural watercourses.
- .5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .6 Obtain the Landscape Architect's approval of completed excavation.
- .7 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.4 BACKFILLING

- .1 Do not proceed with backfilling operations until the Landscape Architect has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfill around installations.
- .6 Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.

- .1 Place bedding and surround material as specified elsewhere.
- .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

3.5 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by the Landscape Architect.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit manufacturer's printed product literature, specifications and datasheet.
- .3 Sub-surface investigation report: when site conditions differ from those indicated, submit written notification to Departmental Representative and await further instructions.
- .4 Submit schedule of planned sequence of installation to Departmental Representative for review, as specified.
- .5 Equipment:
 - .1 Submit prior to pile installation for review by Departmental Representative, list and details of equipment for use in installation of piles.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's instructions and Section 01 61 00 - Common Product Requirements.
- .2 Replace damaged piles as directed by Departmental Representative.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Divert unused, or cut off concrete materials from landfill to local facility as approved by Departmental Representative.

1.4 EXISTING CONDITIONS

- .1 Sub-surface investigation report is attached to the specifications.

1.5 SCHEDULING

- .1 Install piles in accordance with sequence and schedule presented and approved by Departmental Representative.
- .2 Provide schedule of planned sequence of installation to Departmental Representative for review, not less than two weeks prior to commencement of pile driving.

Part 2 Products

2.1 MATERIALS

- .1 Material requirements for piles are specified in Section 03 20 00 Concrete Reinforcing and 03 33 00 Cast-in-Place Concrete.

2.2 EQUIPMENT

- .1 Pile installation equipment to consist of a track mounted skid steer with auger attachments or equivalent. All pile equipment shall be chosen to minimize the disturbance and damage to the riparian forest. Obtain Departmental Representative approval prior to using any other type of pile installation equipment on the riverbank.

Part 3 Execution

3.1 PREPARATION

- .1 Protection:
 - .1 Protect adjacent structures, services and work of other sections from hazards due to pile installation operations.
 - .2 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures.
 - .3 Protect riparian forest during all piling operations.
 - .4 When damages occur, remedy damaged items to restore to original or better condition at own expense.
- .2 Ensure that ground conditions at pile locations are adequate to support pile installation operations.
 - .1 Make provision for access and support of piling equipment during performance of Work.

3.2 INSTALLATION

- .1 Average factored skin friction values for cast-in-place piles under compressive loading:

Depth Below Grade (m)	SLS Skin Friction Value (kPa)	ULS Skin Friction Value (kPa)
0 to 2.5	0	0
Below 2.5	4.5	6

- .1 Average factored end bearing values for cast-in-place piles under compressive loading:

Depth Below Grade (m)	SLS Bearing Capacity Value (kPa)	ULS Bearing Capacity Value (kPa)
End bearing on competent till	150	185

- .2 Installation of each pile will be subject to review of Departmental Representative.
 - .1 Departmental Representative will be sole judge of acceptability of each pile with respect to final installation depth or other criteria used to determine load capacity.

- .2 Departmental Representative shall review final installation of all piles prior to removal of pile driving rig from site.

3.3 OBSTRUCTIONS

- .1 Where obstruction is encountered that causes unexpected change in pile installation, proceed as directed by Departmental Representative.
- .2 Coordinate the exact pile locations on site with Departmental Representative.
- .3 Coordinate the removal or trimming of trees with the project arborist.

3.4 REPAIR AND RESTORATION

- .1 Leave rejected pile in place and cut off as directed by Departmental Representative.
- .2 Leave rejected pile in place, place adjacent pile and modify pile cap as directed by Departmental Representative.
- .3 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

3.5 FIELD QUALITY CONTROL

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A36/A36M-05, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A53/A53M-05, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - .3 ASTM A252-98e(2002), Standard Specification for Welded and Seamless Steel Pipe Piles.
 - .4 ASTM A283/A283M-03, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - .5 ASTM A615/A615M-05a, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - .6 ASTM A706/A706M-05a, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - .7 ASTM A775/A775M-04a, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - .8 ASTM A929/A929M-01, Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe.
 - .9 ASTM A996/A996M-05a, Standard Specification for Rail-Steel and Axle-Steel Deformed Bars or Concrete Reinforcement.
 - .10 ASTM A1008/A1008M-05b, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- .2 American Welding Society (AWS)
 - .1 AWS D1.4/D1.4M-05, Structural Welding Code - Reinforcing Steel.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04(July 2005), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-G30.18-M92(2002), Billet Steel Bars for Concrete Reinforcement.
 - .3 CSA-G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .4 CAN/CSA S16-01, Consolidated (This is a consolidated reprint, incorporating Update No. 1 - June 2003, Update No. 2 - December 2003 and Supplement No. 1 - January 2005).
 - .1 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
 - .5 CSA W48-01(R2006), Filler Metals and Allied Materials for Metal Arc Welding.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Product data: submit manufacturer's printed product literature, specifications and datasheet.
- .3 Shop Drawings:
 - .1 Reinforcing steel: Indicate reinforcing for pile and pile cap including bar sizes, length, bends, hooks, splices, spacing and spacer details.
- .4 Quality assurance submittals:
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .3 Records and reports: submit Mill report and concrete tests as described in PART 2 - SOURCE QUALITY CONTROL.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .3 Divert unused concrete materials from landfill to local facility as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: to CAN/CSA-G30.18 and in accordance with Section 03 20 00 - Concrete Reinforcing.

2.2 SOURCE QUALITY CONTROL

- .1 Mill report to CAN/CSA-S16.
- .2 Concrete tests: to CSA-A23.1/A23.2.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Bore holes to diameters and depths as indicated.

- .2 Dispose of excavated materials off site.
- .3 Departmental Representative shall inspect pile excavation prior to placing of concrete.
 - .1 Remove loose material, foreign matter and water as directed by Departmental Representative.
- .4 Given the potential for sloughing and squeezing of the borehole due to groundwater, full-length steel sleeves may be required during pile installation in an effort to maintain the drill shaft in a clean and dry state. Sleeving of the piles is required and shall occur simultaneously with the excavation.
- .5 Install steel reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing and as indicated.
- .6 Fill pile excavations with concrete to elevations as indicated.
 - .1 Place concrete in one continuous pour in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .7 Steel protective casing to be removed unless otherwise specified.
- .8 Where steel protective casing is to be removed, provide concrete with minimum slump of 125 mm and with retarder to prevent arching or setting of concrete.
 - .1 Withdraw casing in conjunction with concrete placing, keeping bottom of casing 600 mm below level of concrete.
 - .2 Do not vibrate concrete internally.
- .9 Groundwater inflows are anticipated in the pile excavations. The excavations must be dewatered prior to concrete placement or concrete shall be placed using tremie or pump-in techniques.
- .10 An archeologist is required to be on site at all times during excavation for the pile foundations and shall be the responsibility of the contractor.
- .11 In conjunction with the archeological requirements, a Research and Collection Permit must be obtained from Parks Canada Agency prior to any excavation work.
- .12 The proposed work is located within 107 m of the Normal Summer River Level (NSRL) and a City of Winnipeg Waterway Construction Permit must be obtained at the responsibility of the Contractor prior to any work. The corresponding KGS Group letter report "The Forks National Historic Site – Infrastructure Upgrades: Geotechnical Investigation and Foundation Assessment for Riverbank Lighting", dated April 2015, is suitable for submission with a Waterway Construction Permit Application.

3.3 DEFECTIVE PILES

- .1 Cased concrete shaft piles rejected where:
 - .1 Soil has entered casing.
 - .2 Water has entered casing.
 - .3 Casing is damaged, out of tolerance or alignment.
- .2 Defective pile, as directed by Departmental Representative, may be left in place and to be cut off at elevation specified by Departmental Representative and backfilled.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION