

PART 1 - GENERAL**1.1 Related Sections**

- .1 Section 32 93 43.01 - Tree Pruning
- .2 Section 32 01 90.33 - Tree and Shrub Preservation

1.2 Definitions

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than a 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 all 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 a specified depth below existing ground surface.

1.3 Storage and Protection

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

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION**3.1 Preparation**

- .1 Inspect site and verify with Departmental Representative, items designated to remain.
- .2 Locate and protect any active utility lines that are to remain.
- .3 Notify utility authorities before starting clearing and grubbing.

3.2 Clearing

- .1 Clear isolated trees as indicated and directed by Departmental Representative, by cutting at a height of not more than 300 mm above ground.
- .2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative. Refer to Section 32 93 43.01 - Tree Pruning.

- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative. Refer to Section 32 93 43.01 - Tree Pruning.

3.3 Grubbing

- .1 Grub out stumps and roots to not less than 500 mm below ground surface.

3.4 Removal and Disposal

- .1 Remove cleared and grubbed materials off site.

3.5 Finished Surface

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

END OF SECTION

PART 1 - GENERAL**1.1 RELATED SECTIONS**

- .1 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).

1.3 PROTECTION

- .1 Protect existing trees, landscaping, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.

PART 2 - PRODUCTS**2.1 MATERIALS**

- .1 Fill material: per Section 31 23 33.01 - Excavating, Trenching and Backfilling for Select Earth Fill in accordance with OPSS 1010 2004. Fill material shall be earth and/or building sand mixture but shall not be manufactured from crushed limestone.
- .2 Earth material existing on site may be suitable to use as fill for grading work if approved by Departmental Representative.

PART 3 - EXECUTION**3.1 GRADING**

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 100 mm for landscape areas to have topsoil installed.
- .3 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .4 Compact filled and disturbed areas to corrected maximum dry density to ASTM D 698, as follows: 85% under landscaped areas.
- .5 Do not disturb soil within branch spread of trees or shrubs to remain.
- .6 Grade subgrade to elevation tolerances of ± 25 mm and to follow slopes required for final grading.

3.2 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping off site.

END OF SECTION

PART 1 - GENERAL1.1 RELATED REQUIREMENTS

- .1 Section 02 41 13 - Selective Site Demolition.
- .2 Section 31 23 13 - Site Grading.
- .3 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D 422-63-07, Standard Test Method for Particle-Size Analysis of Soils.
 - .2 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .3 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .3 Ontario Provincial Standard Specification (OPSS)
 - .1 OPSS 1010, November 2003, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

1.3 DEFINITIONS

- .1 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422: Sieve sizes to CAN/CGSB-8.1.
 - .2 Table:

Sieve Designation mm	% Passing
2.00	100
0.10	45-100
0.02	10-80
0.005	0-45
 - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
 - .2 Submit to Departmental Representative written notice when bottom of excavation is reached.
 - .3 Submit to Departmental Representative testing and inspection results and report as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

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| | .2 | Submit records of underground utility locates, indicating: location plan of existing utilities as found and location plan of relocated and abandoned services. |
| | .4 | Samples: |
| | .1 | Submit samples in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Inform Departmental Representative, at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling. |
| | .3 | Submit 70 kg samples of type of fill specified including representative samples of excavated material. |
| | .4 | Ship samples prepaid to Departmental Representative in tightly closed containers to prevent contamination and exposure to elements. |
| <u>1.5</u> | <u>QUALITY ASSURANCE</u> | |
| | .1 | Submit design and supporting data at least 2 weeks prior to beginning Work. |
| | .2 | Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada. |
| | .3 | Keep design and supporting data on site. |
| | .4 | Engage services of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work. |
| | .5 | Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative. |
| <u>1.6</u> | <u>WASTE MANAGEMENT AND DISPOSAL</u> | |
| | .1 | Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. |
| | .2 | Divert excess materials from landfill to local quarry or recycling facility for reuse. |
| | .3 | Process demolition waste including cast-in-place concrete, precast concrete, concrete block, stone cladding, ceramic material, glass, asphalt pavement for use as Type 1 Fill to divert waste from landfill. |
| <u>1.7</u> | <u>EXISTING CONDITIONS</u> | |
| | .1 | Examine soil report from Original Construction Documents: Specification Appendix - Sub-Soil Investigation Report and Bore Hole Information. |
| | .2 | Buried services: |
| | .1 | Before commencing work verify and establish location of buried services on and adjacent to Limit of Contract Area. |
| | .2 | Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services. |
| | .3 | Remove obsolete buried services within 2 m of foundations: cap cut-offs. |
| | .4 | Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed. |
| | .5 | Prior to beginning excavation Work, notify Departmental Representative of the established location and state of use of buried utilities and structures. |
| | .6 | Confirm locations of buried utilities by careful test excavations or soil hydrovac methods. |
| | .7 | Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered and as indicated. |

- .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.
- .9 Record location of maintained, re-routed and abandoned underground lines.
- .10 Confirm locations of recent excavations adjacent to area of excavation.
- .3 Existing buildings and surface features:
 - .1 Conduct 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 as directed by Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as directed by Departmental Representative and in accordance with Section 32 01 90.33 - Tree and Shrub Preservation.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 Fill: to OPSS 1010, Granular B, Type 1.
- .2 Type 2 Fill: to OPSS 1010, Granular B, Type 2.
- .3 Type 3 Fill: to OPSS 1010, Select Subgrade Material of earth and/or building sand mixture, but without limestone.
- .4 Gradations to be within limits specified when tested to MTO Test Number LS-602 as follows:

	Type 1 Fill % passing	Type 2 Fill % passing	Type 3 Fill % passing
150	100	n/a	100
106	n/a	100	n/a
37.5	n/a	n/a	n/a
26.5	50-100	50-100	50-100
4.75	20-100	20-55	20-100
1.18	10-100	10-40	10-100
0.3	2-65	5-22	5-95
0.15	n/a	n/a	2-65
0.075	0-8	0-10	0-25

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 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 in accordance with Section 02 41 13 - Selective Site Demolition.
<u>3.3 PREPARATION/PROTECTION</u>	.1	Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
	.2	Keep excavations clean, free of standing water, and loose soil.
	.3	Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
	.4	Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
	.5	Protect buried services that are required to remain undisturbed.
<u>3.4 STRIPPING OF TOPSOIL</u>	.1	Begin topsoil stripping of areas after area has been cleared of brush weeds and grasses and removed from site.
	.2	Do not mix topsoil with subsoil.
	.3	Stockpile height not to exceed 2 m and should be protected from erosion.
	.4	Dispose of unused topsoil off site.
<u>3.5 STOCKPILING</u>	.1	Stockpile granular materials in manner to prevent segregation.
	.2	Protect fill materials from contamination.
	.3	Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.
<u>3.6 COFFERDAMS, SHORING, BRACING AND UNDERPINNING</u>	.1	Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and Health and Safety Act for the Province of Ontario.
	.2	During backfill operation: <ul style="list-style-type: none">.1 Unless otherwise indicated or directed by Departmental Representative remove sheeting and shoring from excavations..2 Do not remove bracing until backfilling has reached respective levels of such bracing..3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
	.3	When sheeting is required to remain in place, cut off tops at elevations as indicated.
	.4	Upon completion of substructure construction: <ul style="list-style-type: none">.1 Remove cofferdams, shoring and bracing..2 Remove excess materials from site and restore watercourses as indicated and as directed by Departmental Representative.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved collection or runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.8 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 For trench excavation do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material off site.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Departmental Representative when bottom of excavation is reached.
- .12 Obtain Departmental Representative approval of completed excavation.
- .13 Remove Unsuitable Material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .14 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 Fill. Compact to 100% of corrected maximum dry density in accordance with ASTM D 698.

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- .2 Fill under other areas with Type 2 Fill. Compact to 95% of corrected maximum dry density in accordance with ASTM D 698.
 - .15 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- 3.9 FILL TYPES AND COMPACTION
- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698.
 - .2 Within area of removed parking areas, roadways, sidewalks and hard landscaped areas, use the following fill types, depths and compaction densities:
 - .1 Under sod - 100 mm of topsoil in accordance with Section 32 91 19.13 - Topsoil Placement and Grading.
 - .2 Under topsoil layer - existing granular fill material may remain in place - where existing fill material has been disturbed or removed replace it with Fill Type 2, minimum 200 mm deep, compacted to 85% of corrected maximum dry density
 - .3 Within area of removed buildings and within trenches at removed services use the following fill types, depths and compaction densities:
 - .1 Under sod - 100 mm of topsoil in accordance with Section 32 91 91.13 - Topsoil Placement and Grading.
 - .2 Under topsoil layer - Fill Type 3, minimum 900 mm deep, compacted to 85% of corrected maximum dry density.
 - .3 Under Fill Type 3 - Fill Type 1 or Fill Type 2, depth to achieve required finished grade, compacted to 95% of corrected maximum dry density.
- 3.10 BEDDING AND SURROUND OF UNDERGROUND SERVICES
- .1 Place and compact granular material for bedding and surround of underground services.
 - .2 Place bedding and surround material in unfrozen condition.
- 3.11 BACKFILLING
- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Departmental Representative has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
 - .4 Removal of concrete formwork.
 - .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
 - .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 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after

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- .3 placing of concrete.
Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 1 m.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative.

3.12 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Reinstall lawns to elevation which existed before excavation.
- .3 Reinstall pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .4 Clean and reinstall areas affected by Work.
- .5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION