

PART 1 - GENERAL

- 1.1 REFERENCES** .1 ASTM International
- .1 ASTM D 698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600kN-m/m³).
 - .2 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1004-13, Material Specification for Aggregates-Miscellaneous.
 - .2 OPSS 1010-13, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS** .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 – PRODUCTS

- 2.1 MATERIALS** .1 Granular A, B Type II and Select Subgrade to OPSS 1010. Sand to OPSS 1004.
- .2 Unshrinkable fill: concrete to CSA A23.1/A23.2.

PART 3 - EXECUTION

- 3.1 EXAMINATION** .1 Verification of Conditions:
- .1 Examine soil report.
 - .2 Before commencing work establish locations of buried services on and adjacent to site.
- .2 Evaluation and Assessment:
- .1 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.
 - .2 Testing of materials and compaction of backfill, fill and unshrinkable fill will be carried out by testing laboratory designated by Departmental Representative.
 - .3 Not later than 1 week before backfilling or filling, provide to designated testing agency, 23 kg sample of backfill and fill materials proposed for use.
 - .4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative so that compaction tests can be carried out by designated testing agency.
 - .5 Before commencing work, conduct, with Departmental Representative, condition survey of existing structures, trees and plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Use 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, in accordance with requirements of authorities having jurisdiction.
 - .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.
- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .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's 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 to remain undisturbed.
- .3 Removal:
 - .1 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.
 - .2 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
 - .3 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.
 - .4 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
 - .5 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.

3.3 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial and Municipal regulations.
- .2 Do blasting in accordance with Provincial and Municipal regulations. Repair damage to approval of Departmental Representative. No blasting will be permitted within 3 m of any building and where damage would result.
- .3 Topsoil stripping:
 - .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .2 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
 - .3 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
 - .4 Dispose of topsoil off site.
- .4 Excavate as required to carry out work, in all materials met.
 - .1 Do not disturb soil or rock below bearing surfaces. Notify Departmental Representative when excavations are complete.
 - .2 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
 - .3 Fill excavation taken below depths shown without Departmental Representative's written authorization with concrete of same strength as for footings.

<u>3.3 EXCAVATION (Cont'd)</u>	.5	Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.
	.6	Excavate for slabs and paving to subgrade levels.
	.1	Remove topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.
<u>3.4 SITE QUALITY CONTROL</u>	.1	Fill material and spaces to be filled to be inspected and approved by Departmental Representative.
<u>3.5 BACKFILLING</u>	.1	Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from Departmental Representative.
	.2	Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
	.3	Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
	.4	Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as specified for fill. Fill excavated areas with selected subgrade material compacted as specified for fill.
	.5	Placing:
	.1	Place backfill, fill and base course material in 150 mm lifts. Add water as required to achieve specified density.
	.2	Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.
	.6	Compaction: compact each layer of material to following densities for material to ASTM D 698:
	.1	To underside of base courses: 95%.
	.2	Base courses: 100%.
	.3	Elsewhere: 90%.
	.7	Under slabs and paving:
	.1	Use Granular B Type II up to bottom of granular base courses.
	.2	Use Granular A for base courses.
	.8	In trenches:
	.1	Up to 300 mm above pipe or conduit: sand placed by hand.
	.2	Over 300 mm above pipe or conduit: native material approved by Departmental Representative.
	.9	Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.
	.10	Blown rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.
	.11	Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

3.6 GRADING .1 Grade to ensure that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by Departmental Representative. Grade to be gradual between finished spot elevations as indicated.

3.7 CLEANING .1 Progress Cleaning:
.1 Dispose of cleared and grubbed material off site daily.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
.3 Waste Management: separate waste materials for reuse and recycling.

PART 1 - GENERAL

- 1.1 REFERENCES** .1 ASTM International
.1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS** .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.
.3 Samples:
.1 Provide Departmental Representative with access to source and processed material for sampling.
.2 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- 1.3 DELIVERY, STORAGE AND HANDLING** .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
.2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.
.3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

PART 2 - PRODUCTS

- 2.1 MATERIALS** .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
.2 Flat and elongated particles of coarse aggregate: to ASTM D 4791.
.1 Greatest dimension to exceed 5 times least dimension.
.3 Fine aggregates satisfying requirements of applicable section to be:
.1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
.1 Crushed rock.
.2 Gravel and crushed gravel composed of naturally formed particles of stone.
.3 Light weight aggregate, including slag and expanded shale.

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- 2.2 SOURCE QUALITY CONTROL** .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 4 weeks minimum before starting production.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise Departmental Representative 4 weeks minimum in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 - EXECUTION

- 3.1 EXAMINATION** .1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with topsoil stripping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 PREPARATION** .1 Topsoil stripping:
- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
- .2 Begin topsoil stripping of areas as indicated after area has been cleared of brush, weeds, and grasses and removed from site.
- .3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
- .4 Dispose of topsoil off site.
- .2 Processing:
- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
- .1 Use methods and equipment approved in writing by Departmental Representative.
- .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
- .5 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
- .1 Use only equipment approved in writing by Departmental Representative.
- .6 Stockpiling:
- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
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3.2 PREPARATION(Cont'd)

- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base course materials.
 - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
 - .3 Maximum 1.5 m for other materials.
- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.