

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 23 11 – Excavating and Backfilling for Structures
- .2 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698-91(1998), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m).

1.3 EXISTING CONDITIONS

- .1 Known underground and surface utility lines and buried objects are as indicated on site plan.

1.4 PROTECTION

- .1 Protect and/or transplant existing trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Contract Administrator. If damaged, restore to original or better condition unless directed otherwise.
- .2 At completion of building construction, repair all damaged sodded and landscaped areas to match adjacent finishes. Provide all required topsoil and sod.
- .3 Maintain access roads to prevent accumulation of construction related debris on roads.

1.5 Measurement and Payment

- .1 Site Grading
 - .1 Site Grading will be measured on an area basis. The area measured and price paid shall be the total number of square metres of landscaped area acceptably prepared and graded in accordance to this specification.
- .2 Excavation
 - .1 Excavation will not be measured for payment. It will be considered incidental to Sections 31 23 11 and 31 23 33.01.
- .3 Placement of Fill Materials
 - .1 Placement of fill materials will not be measured for payment. It shall be considered incidental to disposal of excavated materials.

Part 2 Products

2.1 MATERIALS

- .1 Not Used

Part 3 Execution

3.1 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Slope rough grade away from building as directed.
- .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 Trim excavations to a minimum depth of 100mm below finished sod elevation.
- .5 Compact filled and disturbed areas to ASTM D698, as follows:
 - .1 90% under landscaped areas.
 - .2 95 % under paved and walk areas.
- .6 Do not disturb soil within branch spread of trees or shrubs to remain.

3.2 TESTING

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by Contract Administrator.

3.3 SURPLUS MATERIAL

- .1 Surplus material except rubble, concrete debris and construction waste, may be disposed of on site.

END OF SECTION

Part 1 General

1.1 Description

- .1 Work includes, but is not necessarily limited to the following items:
 - .1 Excavating for work required for the Valve Chamber.
 - .2 Supply, placing and compaction of backfill and fill materials to attain indicated grades and profiles.
 - .3 Stockpiling of surplus excavated material.
 - .4 Dewatering, shoring and bracing of excavations.
 - .5 Frost protection of subsoil under footings and slabs before and after concrete placement.

1.2 Job Conditions

- .1 Examination:
 - .1 Visit the Site and note all characteristics and irregularities affecting the Work of this Section.
 - .2 To proceed with the Work will mean acceptance of the conditions, and failure to comply with the above will in no way form the basis for any claim.
- .2 Protection:
 - .1 Use all means necessary to protect all materials of this Section before, during and after installation, and to protect all objects designated to remain.
 - .2 In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Contract Administrator at no additional cost.
 - .3 Protect bench marks and structures against damage from equipment and vehicular traffic.

1.3 Reference Standards

- .1 Conform to requirements of the NBCC and the Canadian Construction Safety Code.
- .2 Comply with excavation and trenching regulations of provincial authorities.

1.4 Measurement Procedures

- .1 Excavation, backfill and shoring for valve chambers will not be measured for payment. Costs for excavation, backfill and shoring shall be included in the price for "Construction of Valve Chamber".

1.5 Submittals

- .1 Submit an excavation plan sealed and signed by a qualified Professional Engineer registered in the Province of Manitoba in accordance with CW 1110. The qualified Professional Engineer will have a minimum of ten (10) years experience in geotechnical analysis including, but not limited to, slope stability. Submit proof of qualifications, as requested by Contract Administrator.
- .2 Submit plans for shoring, bracing, sheet piling and related structural work, sealed and signed by a qualified Professional Engineer registered in the Province of Manitoba in

accordance with CW 1110. The Professional Engineer retained by the Contractor for sealing of the plans shall review the shoring at critical stages and certify in writing to the Contract Administrator that the related construction meets the requirements of his or her design.

1.6 Samples

- .1 If requested by the Contract Administer, submit 75 kg sample of each type of fill material specified for analysis by testing laboratory.
- .2 Ship samples prepaid or deliver in tightly closed containers to testing laboratory designated by the Contract Administrator.
- .3 Costs for analysis will be paid by the Contract Administrator.

1.7 Compaction Testing

- .1 Testing of compacted fill materials will be performed by an independent inspection and testing firm appointed and paid by the Contract Administrator. Testing will be performed so as to least encumber the performance of the Work.
- .2 Pay costs for required testing due to results indicating defective materials or workmanship regardless of the results of retesting.
- .3 Tests are to be performed in accordance with ASTM D698 for Standard Proctor Density.
- .4 Notify the Contract Administrator when Work of this Section or portions of Work are completed to own satisfaction. Do not proceed with additional portions of Work until test results have been verified and reviewed.
- .5 If tests indicate that compacted materials do not meet specified required materials, remove defective Work, replace and re-test at own expense as directed by the Contract Administrator.
- .6 Ensure compacted fills are tested and accepted before proceeding with placement of surface materials.

Part 2 PRODUCTS

2.1 General

- .1 All materials to be subject to review and acceptance by the Contract Administrator.
- .2 Granular materials to be composed of sound, hard, uncoated particles, free from injurious quantities of clay, flaky particles, soft shale, friable materials, roots, vegetable matter and frozen lumps.
- .3 Grading of granular materials to show no marked fluctuations between opposite ends of extreme limits. Materials shall be as follows:
 - .1 Type 1: well graded pit run gravel graded in accordance with Type 1 in Table CW 2030.1 - Grading Requirements for Imported Backfill.
 - .2 Type 2: base course consisting of well graded granular or crushed limestone material in accordance with Table CW 2030.1 - Type 2 Requirements.
 - .3 Type 4: sand, free from silt, clay, loam, friable or soluble material and vegetable matter, graded in accordance with Sand in Table CW 2030.1 – Grading Requirements for Imported Backfill.

- .4 Granular drain material shall conform to CW 3120 Clause 2.6 and Table CW 3120.2.
- .4 Suitable excavated material from the Site shall be free from organic material and rocks larger than 150 mm in size and building debris and is not to be frozen. Fill under landscaped areas to be free from alkali, salt, petroleum products, and other materials detrimental to plant growth and is not to be frozen.
- .5 Suitable excavated clay material from the Site shall be free from organic material and rocks larger than 150 mm in size and building debris and is not to be frozen. Provide at areas where clay cap is indicated in the Drawings.
- .6 Drain Tile to be 150 mm nominal inside diameter as per CW 3120 Clause 2.7
- .7 Drainage Fabric as per CW 3120 Clause 2.5 and Table CW 3120.1.

Part 3 EXECUTION

3.1 General

- .1 Familiarization:
 - .1 Prior to all Work of this Section, become thoroughly familiar with the Site, the site conditions, and all portions of the Work falling within this Section.
 - .2 Review and understand the Geotechnical Report, refer to Appendix A.
- .2 Protection:
 - .1 Before starting work, locate all utilities serving the Site. Notify all agencies or companies having jurisdiction over the specific utilities and protect, relocate, remove, or discontinue service according to their requirements. Any damages shall be repaired at the Contractor's expense.
 - .2 Protect and restore pavements, boulevards, grassed areas, etc., that may be opened or damaged in the performance of the Work.
 - .3 During construction, and at the completion of the Contract, all roads used to haul materials shall be cleaned of materials dropped on them.
 - .4 To reduce surface runoff from exposed work areas wet weather restriction will apply to construction.
 - .5 Implement and maintain erosion and sediment control measures.
 - .6 Avoid excavation and construction activities with the potential to release airborne particulates during dry and windy periods.
 - .7 Maintain access to existing City facilities at all times.

3.2 Finish Elevations and Lines

- .1 For setting and establishing finish elevations and lines, secure the services of a registered surveyor or experienced instrument man acceptable to the Contract Administrator.
- .2 Carefully preserve all data and all monuments. If displaced or lost, immediately replace to the acceptance of the Contract Administrator, at no additional cost to the City.

3.3 Excavation

- .1 Three (3) weeks prior to commencement of the Work, submit an excavation plan. No excavation work shall proceed and no claim for delay will be allowed, until the excavation plan has been reviewed and accepted by the Contract Administrator.
- .2 Excavate as required for walls and foundations. Stockpile material to be used for backfilling on site as directed by the Contract Administrator. Excess material to be disposed of immediately as per clause titled "Disposal" below.
- .3 Perform excavation in strict compliance to Workplace Safety and Health and authorities having jurisdiction.
- .4 When complete, request Contract Administrator to review excavations.
- .5 Local pockets of material that in the opinion of the Contract Administrator are unsuitable, shall be removed to such depths as required by the Contract Administrator.
- .6 The completed excavation shall provide clean, level, solid and water-free and non-frozen surfaces at the required elevations, ready to receive construction.
- .7 Excavation slopes shall be designed in reference to the Geotechnical Report and shall be indicated on the excavation plan. Excavations are not to encroach on normal 45° bearing support under any foundation.
- .8 Make good all damage occurring as a result of inadequate, unauthorized or defective methods of protection.
- .9 Areas used for temporary stockpiling shall be restored to existing condition or better.
- .10 Cover and stabilize stockpiles of soil with erosion control material.
- .11 Contaminated soil must be disposed of in accordance with provincial requirements.

3.4 Dewatering

- .1 Excavation, pits and the entire sub-grade in the vicinity of the work shall be kept free of water. Positive surface drainage and subsurface water shall be maintained away from the excavation at all times. Provide and operate pumps or other suitable equipment, and provide and maintain a temporary drainage system for the excavation. Discharge from pumps or other dewatering equipment shall be located and controlled such that loss, damage, nuisance, or injury to the work does not result. Additional excavation made necessary by water in the excavation shall be at no additional cost to the City.

3.5 Shoring, Bracing and Sheet Piling

- .1 Provide shoring, bracing, sheet piling and related structural work as required to prevent damage or undermining of the existing and new structures, excavations, and injury to personnel. Submit drawings and calculations sealed and signed by a qualified Professional Engineer registered in the Province of Manitoba for all shoring, bracing, sheet piling and related structural work used for the construction of this project.
- .2 Comply with all applicable rules and regulations of governmental authorities.
- .3 Erect shoring, bracing and sheet piling as required, independent of utilities and structures.
- .4 Prefabricated cages or shields may be used to supplement or replace conventional shoring, provided they comply with all applicable safety regulations and permit placing and tamping of bedding material under and around new construction.

- .5 Maintain shoring, bracing and sheet piling if used during backfilling and remove in stages as backfilling progresses.
- .6 Remove shoring, bracing and sheet piling if used unless otherwise permitted by Contract Administrator.
- .7 If shoring, bracing and sheet piling are allowed to remain, cut off to an elevation at least 1000 mm below finish grade and structures.
- .8 Assume full responsibility for any slope or structure failure, collapse or movement of existing structures, shoring, bracing, sheet piling, earth banks, trenches and other excavations.

3.6 Backfilling, Fill and Compaction

- .1 Preparation:
 - .1 Ensure areas to be backfilled are free from debris, snow, ice and water and that ground surfaces are not in a frozen condition.
 - .2 Perform all necessary compaction of existing sub-grade surfaces under structures and slabs on grade if densities are not equal to that required for fill materials. Proof roll excavated surface if and as directed by the Contract Administrator.
 - .3 Cut out soft areas of existing sub-grade, backfill with suitable Type 1 fill and compact to density specified for fill.
 - .4 Place lean mix working slab (refer to Section 03 30 00 – Cast-In-Place Concrete) as soon as possible after subgrade preparation.
- .2 Backfilling and Filling:
 - .1 Backfill and fill to grades, contours, levels and elevations indicated on Drawings.
 - .2 Place Drainage Material to avoid damage to drain tile. Hand level the material to ensure uniform placement.
 - .3 Where temporary unbalanced pressures are liable to develop on walls, erect necessary shoring to counteract imbalance.
 - .4 Backfill simultaneously on all sides of structures to equalize soil pressures with maximum differential of 1 m.
 - .5 Do not backfill against foundation walls until the roof and floor slabs have been completed and foundation coating has been applied and without the prior permission of the Contract Administrator.
 - .6 After sub-grade has been accepted by the Contract Administrator, spread accepted fill material in layers, not exceeding 200 mm in uncompacted thickness, and then compact to required density prior to the addition of the next layer.
 - .7 Maintain optimum moisture content of materials to permit compaction to specified densities.

.3 **Compaction and Fill Types:**

- .1 Compact each soil layer to at least the specified minimum degree; repeat compaction process until plan grade is attained. Compaction densities indicated herein are based on ASTM D698 for Standard Proctor Density.
- .2 The excavated subgrade under structures shall be disturbed as little as possible. The subgrade shall be compacted to a uniform density of at least 100% Standard Proctor.
- .3 Granular Drainage Material, first lift to be placed to a depth of 300 mm above the crown of the drain tile, subsequent lifts to be placed in lifts not greater than 150 mm in thickness and compacted to a density of at least 95 percent Standard Proctor to ASTM D698. Surround the perforated pipes as shown on the Drawings.
- .4 Type 1 Pit Run granular to be placed around structure minimum 1 meter width in lifts not greater than 200 mm in thickness and shall be compacted to a density of at least 95 percent Standard Proctor.
- .5 Suitable excavated material to be placed in lifts not greater than 200 mm in thickness around the structures and shall be compacted to a density of at least 95 percent Standard Proctor.
- .6 Suitable excavated clay to be placed in lifts not greater than 200 mm in thickness where clay cap is indicated around the structures and shall be compacted to a density of at least 95 percent Standard Proctor.

3.7 Disposal

- .1 Surplus material not required for backfill and fill purposes shall be incorporated into the Work or disposed of on site as directed by the Contract Administrator.

3.8 Clean-Up

- .1 As excavation proceeds, keep roads, streets and sidewalks clean of dirt and excavated material.
- .2 Remove and dispose of all snow within the work area as required to complete the work.
- .3 Clean-up and wash down to remove all dirt and excavated materials caused by work of this Section.
- .4 Clean at the end of each working day to the satisfaction of the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 33 11 16 – Supply and Installation of Feedermain.

1.2 MEASUREMENT PROCEDURES

- .1 Excavation, backfill and shoring for pipe installation and valve chambers will not be measured for payment. Costs for excavation, backfill and shoring shall be included in the price for Supply and Installation of Feedermain
- .2 Backfill of unsuitable foundation areas with CW 2030 Type 2 Foundation Backfill shall be measured and paid on a weight basis. The units measures and paid will be the total tonnes of Type 2 Foundation Backfill placed, in accordance to this specification, as measured on a government certified weigh scale.

1.3 REFERENCES

- .1 City of Winnipeg Standard Construction Specifications
 - .1 CW 1110, General Instructions.
 - .2 CW 2030, Excavation Bedding and Backfill.

1.4 SUBMITTALS

- .1 Make submittals in accordance with CW 1110 - Submittal Procedures.
- .2 Samples:
 - .1 Submit samples granular backfill samples in accordance with CW 1110 - Submittal Procedures.
- .3 Shop Drawings prepared and submitted for excavation shoring. All shop drawings shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experience in the design of excavation shoring systems.

1.5 EXISTING CONDITIONS

- .1 Examine soil report included in Appendix A, appended to this Specification.
- .2 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .3 Prior to beginning excavation Work, notify applicable authorities having jurisdiction to establish location and state of use of buried utilities and structures.
 - .4 Confirm locations of buried utilities by careful soil hydrovac methods.

- .5 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
- .3 Existing buildings and surface features:
 - .1 Conduct, with Consultant, 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 Consultant
- .4 The Contractor is responsible for all dewatering required to facilitate the Works.

Part 2 Products

2.1 MATERIALS

- .1 As per City of Winnipeg CW 2030.
- .2 Safety Fence
 - .1 Heavy Duty polyethylene safety fence, 1.22 m height, safety orange in color
 - .2 Nilex Diamond Mesh Safety fence or approved equal.
 - .3 2.5 metre long Steel T posts at 3m on centre.

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 Where indicated on the Drawings, remove existing chain link fencing. Upon completion of Construction, replace chain link fencing consistent with existing chain link fencing in accordance to City of Winnipeg Specification CW 3550.

3.2 SHORING AND BRACING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with the Workplace Health and Safety Act for the Province of Manitoba.
- .2 Use shoring, bracing or approved trench shields when working adjacent to existing buildings and structures.
- .3 All excavation shoring shall be designed by a Professional Engineer, experience in the design of excavation shoring systems.
- .4 During backfill operation:

- .1 Unless otherwise indicated or directed by the Consultant, 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 500mm above toe of sheeting.
- .5 When sheeting is required to remain in place, cut off tops at elevations as directed.

3.3 EXCAVATION

- .1 Excavation to be completed in accordance to City of Winnipeg CW 2030
- .2 Excavation must not interfere with bearing capacity of adjacent foundations.
- .3 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.
- .4 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .5 Restrict vehicle operations directly adjacent to open trenches.
- .6 Dispose of surplus and unsuitable excavated material off site.
- .7 Do not obstruct flow of surface drainage or natural watercourses.
- .8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

3.4 FILL TYPES AND COMPACTION

3.5 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services in Section 33 11 16 – Supply and Install of Feedermain. Place bedding and surround material in unfrozen condition.

3.6 BACKFILLING

- .1 Backfill under paved areas to City of Winnipeg CW 2030 Class 2 Backfill standards as indicated on the Drawings.
- .2 Backfill boulevard and other areas to City of Winnipeg CW 2030 Class 4 Backfill standards.
- .3 Backfill over-excavated trench areas where unsuitable pipe foundation material is encountered, or areas behind thrust blocks, as indicated on the Drawings, with well-graded crushed limestone material, having a maximum aggregate size of 20mm, conforming to CW 2030 Type 2 granular material. Place material in maximum 200 mm thick lifts and compact to 100 % SPMDD.

- .4 Backfill within 1 metre of existing and new concrete structures shall be completed with free draining pit run granular material to CW 2030, Class 3 standards. The top 600 millimetres of the backfill adjacent to concrete structures shall be insitu clay material completed to CW 2030, Class 4 standards unless under pavement or roadways.
- .5 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .6 Do not use backfill material which is frozen or contains ice, snow or debris.

END OF SECTION