CITY OF FARGO SPECIFICATIONS
FLOOD CONTROL LEVEES

PART 1
DESCRIPTION OF WORK

The work to be done under this section of the Specifications and the accompanying plans consists of furnishing all labor, material, accessories and equipment necessary to construct flood control levees in the City of Fargo. The work includes excavation, filling, compacting, grading and other work as may be necessary in order that the work may be completed in accordance with these Specifications and the accompanying plans.

PART 2
MATERIAL

2.1. SOIL MATERIALS

2.1.1. IMPERVIOUS FILL

Impervious fill shall be per Section 2000 of these Specifications.

2.1.2. TOPSOIL

Topsoil obtained from offsite sources shall be similar to the existing topsoil on site, and shall meet the requirements for TOPSOIL – IMPORT set forth in Section 2000 of these Specifications.

2.2. BORROW MATERIAL

Borrow material shall be per Section 2000 of these Specifications.

PART 3
CONSTRUCTION

3.1. GENERAL

The latest editions of the standards listed below, referred to hereinafter by basic designation only, form a part of this section of the Specifications.

A. American Society of Testing Materials (ASTM)

1. D-1556 “Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method”

2. D-698 “Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu.m))”

3. D-2487 “Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)”

4. D-6938 “Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)”

5. D-2167 “Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method”

6. D-2937 “Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method”

3.2. SUBMITTALS

Material test reports shall be acquired for each on-site and borrow soil material proposed for fill. The Contractor shall notify the Engineer one (1) week prior to importing fill to obtain a proctor. If the Contractor does not abide by this timeframe and imports fill that does not meet the requirements of this specification he shall remove the nonconforming fill at his own cost.

3.3. TOPSOIL STRIPPING AND RESPREADING

The Contractor will be required to strip the topsoil in the permanent levee footprint and also from all excavation areas specifically designated on the plans. Topsoil shall be stockpiled within the construction limits at a location approved by the Engineer. All topsoil stripping and respreading shall be in accordance with Section 1000 of these Specifications.

3.4. TEMPORARY CLAY STOCKPILES

Should the Contractor choose to temporarily stockpile clay, all stockpile locations shall be approved by the Engineer. The Contractor shall strip topsoil from the stockpile location prior to stockpiling. Stockpiled material not used during embankment construction shall be incorporated into the site or removed from the site prior to project completion. The Contractor shall restore all stockpile locations to preconstruction conditions by grading, replacing topsoil and seeding/hydro-mulching. All costs for this work shall be incidental to the contract.

3.5. INSPECTION TRENCH

Prior to starting the construction of the levee in its permanent location, the Contractor shall excavate an inspection trench along the total length of the proposed levee centerline per the detail shown in the plans. Any pipes, tiles, conduits, buried debris, or other unsatisfactory foundation materials encountered shall be removed from within the footprint of the embankment. The Contractor shall notify the Engineer 48 hours prior to the start of this work.

The inspection trench shall be excavated and maintained free of standing water to the dimensions and locations shown on the plans.

The inspection trench shall be backfilled with material meeting the requirements for Impervious Fill. The excavated material may be used for backfill only if it meets the requirements for Impervious Fill. All backfill shall be placed and compacted as specified below.

3.6. UNSUITABLE MATERIAL

The Contractor will be required to remove and dispose of any excavated material determined by the Engineer to be unsuitable for the construction of the embankment or backfilling the inspection trench. Unsuitable materials include, but are not limited to, boulders, timbers, buried building materials, etc.

3.7. TREE REMOVAL

Tree removal and clearing/grubbing shall be in accordance with Section 1050 of these Specifications.

3.8. EMBANKMENT

Material shall not be placed on surfaces that are muddy, frozen, contain frost, or where unsatisfactory material remains in or under the fill. All soft or yielding material and other portions of the subgrade which will not readily compact shall be removed and replaced with suitable material. The entire subgrade shall then be brought to a line and grade and foundation of uniform compaction which will provide uniform support for fill embankments to be subsequently placed.

The subgrade shall be scarified to a depth of six (6") inches for the full width of the subgrade. The loose materials shall then be spread and manipulated so as to bring all the material to a uniform density.

3.9. PLACEMENT, MOISTURE CONTENT AND COMPACTION

Moisture content of the fill at the time of placement shall be maintained within minus 1% and plus 3% of the optimum moisture as defined by ASTM D-698. Application of water to the fill materials may be applied by sprinkling the materials after placement if necessary. Uniform moisture distribution shall be obtained by disking.

Material that is above the optimum moisture content shall either be removed or dried to the specified moisture content prior to compaction. If the top layer of the preceding lift of compacted fill becomes too dry to permit a suitable bond it shall be scarified and moistened by the addition of water to an acceptable moisture content prior to placement of the next lift.

The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

Fill shall be placed in uniform uncompacted lifts not to exceed twelve (12") inches in thickness, and thoroughly mixed by disking or other approved methods to obtain uniformity of material.

Impervious Fill shall be compacted to a minimum density of 95% of the maximum density per ASTM D-698.

Where density and/or moisture content tests do not meet the minimum requirements as set forth above, the Contractor shall remove, replace and compact the embankment material at no additional compensation. A retest shall be required for every test that does not meet the minimum requirements for moisture and/or density. The cost of all retests will be deducted from the Contractor's payment.

If the operation is discontinued, the surface of the previous lift shall be scarified to a minimum depth of 4" prior to placing additional lifts. Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping, or manually directed power tampers or plate vibrators. Heavy equipment and/or vibrating equipment shall be kept a sufficient distance away from structures to avoid damage to the structure. The Contractor shall employ a non-destructive compaction effort to compact soil adjacent to structures. The Contractor is responsible for any/all damage caused by his equipment and/or forces. Compaction by means of drop weights operating from a crane hoist will not be permitted.

Embankment shall not be constructed during periods when the embankment material freezes while being placed and compacted, nor shall any embankment material be placed on soil that is frozen. Where the foundation soil is frozen at a time when weather conditions are such that embankment construction could be continued without the material freezing as it is being placed and compacted, the Contractor may be permitted to excavate the frozen foundation soil and proceed with the embankment construction for so long as the weather will permit, but only if and to the extent approved by the Engineer, and with the understanding that the additional costs involved shall be at the expense of the Contractor. The frozen soil shall be removed and replaced with other suitable soil as may be necessary to construct the embankment specified.

3.10. TERRACING/BENCHING

The Contractor will be required to bench into existing embankments on any slopes greater than 5:1 prior to placement of any additional fill. The benching shall be completed in such a manner to ensure that a minimum vertical face of 18-inches is exposed for the compaction of the new horizontal layer. The vertical face shall not exceed 30-inches in height.

3.11. TESTING/QUALITY CONTROL

During the course of the work, the Engineer will perform such quality assurance tests as are required to identify materials; determine compaction characteristics; determine moisture content; and determine density of fill in place. Tests performed by the Engineer are intended to verify conformance with the contract requirements, not to be a replacement for the Contractor's quality control program.

Densities of fill requiring compaction will be determined in accordance with the appropriate ASTM methods which may include ASTM D-1556 (Sand Cone Method), D-2167 (Balloon Method), D-6938 (Nuclear Methods), D-2937 (Drive Cylinder Method) and other methods approved by the Engineer. The Engineer will determine the density test which is appropriate for the conditions and materials encountered.

PART 4
GUARANTEE, MEASUREMENT & PAYMENT

4.1. GUARANTEE

The guarantee shall be per the contract.

4.2. MEASUREMENT AND PAYMENT

4.2.1. IMPORTED FILL

Measurement and payment will be per the contract unit price based on the in place compacted cubic yardage quantity. The quantity will be determined by surveying the levee and subtracting the in place fill from existing ground elevations.

4.2.2. INSPECTION TRENCH

Measurement and payment will be per the contract unit price per CY, which shall be compensation in full for all equipment, materials, and labor necessary to complete the work as specified. The inspection trench shall be measured in the field for material excavated and replaced.

4.2.3. STRIP TOPSOIL

Measurement and payment will be per Section 1050 of these Specifications.

4.2.4. REMOVE TREE

Measurement and payment shall be as per section 1050 of these Specifications.

4.2.5. STOCKPILING

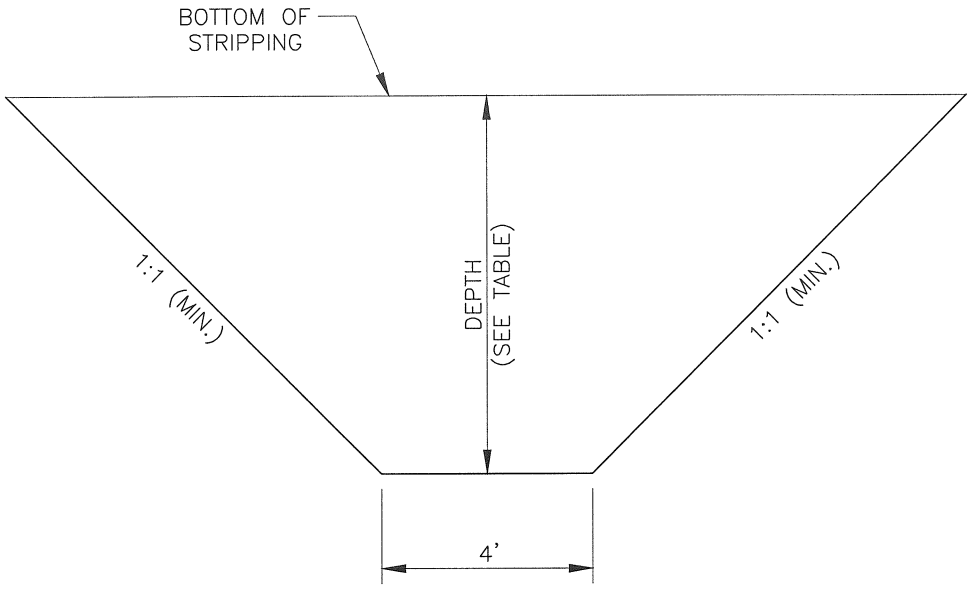
All work associated with stockpiling shall not be measured for separate payment, but shall be considered incidental to the contract.

4.2.6. UNSUITABLE MATERIAL

Payment for disposal of unsuitable material shall be addressed as “Extra Work” in accordance with Section 9000 of these Specifications.

4.2.7. OTHER COSTS

All costs for work necessary to properly complete the work specified herein shall not be bid items; the costs shall be charged to other items unless a bid item is included on the bid sheet.



INSPECTION TRENCH DEPTH	
LEVEE HEIGHT	DEPTH
0' TO 6'	EQUAL TO HEIGHT OF LEVEE (3' MIN.)
6' OR HIGHER	6'

SECTION NO. 3600	DRAWING NO. 5.1
REV,D. 2012	
INSPECTION TRENCH	
CITY OF FARGO ENGINEERING DEPARTMENT	
APPROVED BED	DATE 2-21-2012