

*VM* **VILLAGE OF MATTAWAN**  
*Rural living at its best*

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**SECTION**  
**31-23-33**

Last Revised

**2008**

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Village of Mattawan's Construction Specifications for  
Excavating, Backfilling and Compacting.

Excavating,  
Backfilling  
and  
Compacting

## SECTION 31 23 33

### TRENCHING, EXCAVATING, BACKFILLING AND COMPACTING Village of Mattawan (10/7/2008)

#### PART 1 - GENERAL

##### 1.01 SUMMARY:

- A. This Section includes the work required for trenching, excavating and backfilling, special pipe foundations and special work below grade.

##### 1.02 DEFINITIONS:

- A. Maximum Density: Maximum dry weight in pounds per cubic foot of a specific material..
- B. Optimum Moisture: Percentage of water at maximum density.
- C. Rock Excavation: Includes all boulders or rock weighing 4,000 pounds (approximately one cubic yard) or more and all solid or ledge rock, slate, shale, sandstone and other hard materials that require continuous use of pneumatic tools, heavy rippers or continuous drilling and blasting for removal. Pavements are not included.
- D. Suitable Excavated Material: Mineral (inorganic) soil free of cinders, refuse, sod, boulders, rocks, pavement, soft or plastic clays, vegetable or other organic material, and capable of being compacted as specified. Moisture content has bearing on the suitability of materials to be used.
- E. Granular Material: Coarse grained materials having no cohesion, which derives its resistance to displacement from internal stability.
- F. Cohesive Material: Fine grained material which derives its resistance to displacement by manual attraction between particles of the mass, involving forces of molecular origin (i.e. Clays are considered cohesive).
- G. Grade Terminology: Article 3.07 SCHEDULES.

##### 1.03 REFERENCES:

- A. MDOT - Michigan Department of Transportation, *"2003 Standard Specifications for Construction"*.
- B. ASTM - American Society of Testing Materials, latest edition.

##### 1.04 JOB CONDITIONS:

- A. Obtain and comply with construction permits from agencies having jurisdiction over the work.
- B. Scheduling: Clean up promptly following utility installation backfilling.

- C. Dust Control: Broom or apply dust palliatives as needed.
- D. Driveway Closing: Eight (8) hour maximum with prior notification to resident. Maintain emergency access to all properties during construction.
- E. Signs, mailboxes and other movable surface features:
  - 1. Witness location prior to removal. Relocate to accessible location and maintain during construction.
  - 2. Upon completion of construction, replace to original position and condition.
  - 3. Replace regulatory traffic control signs immediately after utilities are placed and backfilled.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS:**

- A. Trench Backfill:
  - 1. Granular Material shall be MDOT 902.08, Table 902-3, Class III limited to 1.0 inch maximum size.
  - 2. Select Granular Material shall be MDOT 902.08, Table 902-3, Class II or IIa limited to 1.0 inch maximum size.
  - 3. Concrete shall be Grade S3, 3,000 psi compressive strength, 4 inch maximum slump.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION:**

- A. Clearing and Grubbing:
  - 1. Save and protect all trees and vegetation not identified to be removed.
  - 2. Repair or replace trees, shrubs and other vegetation damaged by CONTRACTOR's operation at no additional charge.
- B. Conflicting Underground Facilities:
  - 1. Before starting work, establish location and extent of existing underground facilities in work area.
  - 2. Establish potential conflict areas prior to construction.
  - 3. Excavate and expose existing underground facilities presenting potential conflict to determine their exact location and elevation.
  - 4. Advise ENGINEER of conflicts and obtain instructions on how to proceed.
  - 5. Make adjustments in proposed utility location at no additional cost to OWNER.
  - 6. Make arrangements with owner of existing underground facilities for relocation, if necessary.
  - 7. Schedule work accordingly.

### **3.02 EXCAVATION:**

- A. General:
  - 1. Dispose of surplus and unsuitable excavated material.
  - 2. Remove, salvage and stockpile topsoil on-site in area designated by ENGINEER.
  - 3. Unsuitable material encountered in subgrade or below payment line: Notify ENGINEER and obtain instruction on how to proceed.

- B. Trenches:
  - 1. Depth: Provide a uniform and continuous bearing and support for proposed utility on solid and undisturbed or compact granular material.
  - 2. Minimum Width: Allow space for jointing and bedding.
  - 3. Maximum Width: The following limitations shall apply at utility crown:
    - a. 6 inch through 10 inch diameter: 30 inches.
    - b. 12 inch through 30 inch diameter: Outside diameter plus 24 inches.
    - c. 30 inch and over diameter: Outside diameter plus 36 inches.
    - d. Elliptical: Outside pipe width plus 36 inches.
- C. Blasting:
  - 1. Not allowed unless otherwise indicated.
  - 2. If allowed, obtain and comply with required permits.
  - 3. If allowed, perform only during hours approved by OWNER.
- D. Length of Open Trench shall be 200 feet maximum.
- E. Damage to Existing Underground Utilities:
  - 1. Report all damage to ENGINEER and utility owner.
  - 2. Repair to utility owners standard.

### 3.03 BACKFILLING:

- A. Pipe bedding area: Compact granular material to ninety percent (90%) of maximum density according to the Modified Proctor Method or to ninety-five percent (95%) of maximum density using the Michigan Cone Test.
- B. Trench Backfill Area:
  - 1. Under permanent pavement, shoulder areas and areas within a one on one slope from the shoulder edge:
    - a. Compact granular material in 9.0 inch layers to ninety percent (90%) of maximum density according to the Modified Proctor Method or to ninety-five percent (95%) of maximum density using the Michigan Cone Test.
  - 2. Under nonpermanent pavement: Same as permanent pavement.
  - 3. Under unimproved right-of-way areas: Compact suitable excavated material to eighty-five percent (85%) of maximum density.
  - 4. Under landscaped and unimproved areas: Compact suitable excavated material to eighty percent (80%) of maximum density.
  - 5. Under undercut existing structure: Place concrete.
- C. Structures:
  - 1. Density requirements: Same as Trenches.
  - 2. Concrete structure: Place backfill only after seventy-five percent (75%) of concrete design strength has been reached.

### 3.04 TRENCH UNDERCUTTING AND BACKFILL:

- A. Excavation: Perform to ENGINEER's instructions.
- B. Backfill: Provide to payment line with granular material compacted in place.

3.05 COMPACTION, TESTING AND INSPECTION:

- A. Surplus excavated and unsuitable excavated material shall become the property of the CONTRACTOR.
- B. Dispose of surplus excavated or unsuitable excavated materials off-site.
- C. Performance and test equipment will be provided by ENGINEER or OWNER approved independent laboratory.
- D. Moisture - Density relationships:
  - 1. Cohesive (clays) soils: ASTM D 1557 (Modified Proctor).
  - 2. Granular (sands) soils: Michigan Cone Test.
- E. Field Density: Either of following:
  - 1. ASTM D-2167 (Rubber Balloon).
  - 2. ASTM D-2922 (Nuclear).
- F. Furnish equipment and personnel to provide access to test location and depth. Density tests will be performed at various levels, as determined by ENGINEER, during or after backfilling operation.
- G. Correct any deficiencies resulting from insufficient or improper compaction. Retesting of density in areas of failed tests shall be performed by ENGINEER at the CONTRACTOR's expense.

3.06 SCHEDULES:

- A. Utility Trenching, Excavating and Backfilling Terminology.

**END OF SECTION**