Section 2102. Roadway and Borrow Excavation

2102.01 DESCRIPTION.

Excavate, haul, place, compact, and shape construction materials.

2102.02 MATERIALS.

A. Class 10.

Includes:

- Normal earth materials such as loam, silt, gumbo, peat, clay, soft shale, sand, and gravel.
- Fragmentary rock or boulders handled in the manner normal to this class of excavation.
- Any combination of the above described materials and any other material not classified as Class 12 or Class 13.

B. Class 12.

Includes:

- Granite, trap, quartzite, chert, limestone, sandstone, hard shale, or slate in natural ledges or displaced masses.
- Rock fragments or boulders which occur on the surface or in subsurface deposits mixed with earth, sand, or gravel when their size, number, or location prevents them from being handled in a manner normal to Class 10 excavation.

C. Class 13.

Includes all materials included under the definitions of Classes 10 and 12 and any other material encountered, regardless of its nature.

D. Borrow.

1. Select Treatment Material.

a. Cohesive Soils.

Meet all of the following requirements:

1) 45% or less silt size fraction.

2) 110 pcf (1750 kg/m^3) or greater density (AASHTO T 99 Proctor Density).

3) Plasticity index greater than 10.

4) A-6 or A-7-6 soils of glacial origin.

b. Granular Soils.

Meet all of the following requirements:

1) 15% or less silt and clay.

2) 110 pcf (1750 kg/m^3) or greater density (AASHTO T 99 Proctor Density).

3) Plasticity index, 3 or less.

4) A-1, A-2, or A-3 (0).

c. Special Backfill Material Material.

Meet the requirements of Section 4132

2. Suitable Soils.

a. Ensure all soils provided for the construction of embankments meet the requirements below. They are suitable when moisture control or moisture and density control is designated.

1) 95 pounds per cubic foot (1500 kg/m^3) or greater density (AASHTO T 99 Proctor Density).

2) AASHTO M 145-91 index of less than 30.

b. Soils not meeting these requirements are considered unsuitable soils.

c. When placing soil below water, use clean granular material.

3. Unsuitable Soils.

Unsuitable soils shall be placed in the work only as specified by Standard Road Plan RL-1B or shall be removed as directed by the Engineer. Use in the work will be according to the definitions in Table 2102.02-1:

Table 2102.02-1: Uses for Unsuitable Soils

Definition	Use
1. Peat or Muck. **2.** Soils with a plasticity index of 35 or greater. **3.** A-7-5 or A-5 having a density less than 85 pcf (1350 kg/m^3) (AASHTO T 99 Proctor Density).	Slope Dressing Only.
1. All soils other than A-7-5 or A-5 having a density of 95 pcf (1500 kg/m^3) or less (AASHTO T 99 Proctor Density). **2.** All soils other than A-7-5 or A-5 containing 3.0% or more carbon.	Type C placement placed 3 feet (1 m) below top of subgrade in fills.
1. A-7-6 (30 or greater). **2.** Residual clays (overlaying bedrock) regardless of classification.	Type B placement placed 5 feet (1.5 m) below top of subgrade in fills.
1. Shale. **2.** A-7-5 or A-5 soils having a density greater than 86 pcf (1351 kg/m^3) but less than 95 pcf (1500 kg/m^3) (AASHTO T 99 Proctor Density).	Type A placement placed in layers 5 feet (1.5 m) below top of subgrade in fills (Alternate layers to consist of suitable soils or Type C placement soils).

E. Selected Backfill Material.

Shown in the contract documents.

F. Special Backfill Material.

Meet the requirements of Section 4132.

2102.03 CONSTRUCTION.

A. General.

1. Prepare the site and construct the embankment according to Section 2107.

2. Remove materials as indicated in the contract documents and from borrow pits, exclusive of that designated as channel excavation.

3. Remove material necessary to provide suitable approaches from intersecting highways and private entrances.

4. Shape and slope materials for construction of the roadbed, slopes, gutters, and inlet and outlet ditches according to these specifications and the alignment, grade, and cross sections shown in the contract documents or established by the Engineer.

5. Before beginning construction, remove grass, weeds, other herbaceous vegetation, and rubbish as provided in Article 2102.03, G.

6. Work around utility poles if it is impractical to remove them before excavation or embankment construction.

B. Classification of Excavation.

1. **Class 10 Excavation.**
   Excavate Class 10 material.

2. **Class 12 Excavation.**
   Excavate Class 12 material.

3. **Class 13 Excavation.**
   a. Excavate Class 13 material. This classification covers work commonly referred to as "Unclassified Excavation". Use or remove Class 13 material as provided for in the contract documents.
   b. The contract documents will specify the limits for Class 13 excavation. Excavation within these limits will not be classified as Class 10 or Class 12 excavation.

C. Removal and Placement of Boulders.

1. Remove or bury boulders. Remove, where necessary, surface collections of boulders within the limits of the work for satisfactory completion of the work.

2. After completion of excavation operations, collect loose boulders and rocks. Also collect pieces of broken PCC that have a vertical projection 4 inches (100 mm) or more above the surface or the ground, or have a minimum diameter of 6 inches (150 mm) and that appear during the finishing operation.

3. Boulders, except those handled in a way normal to Class 10 excavation, will be classified as Class 12 excavation. Unless otherwise specified, place boulders in any of the following ways:
   a. Boulders too large to be loaded and hauled with available equipment may be buried in locations where they will not be exposed by erosion. Ensure that boulders buried this way are

covered with at least 1 foot (0.3 m) of earth. Excavation made for the purpose of burying boulders will not be measured or paid for.

b. Boulders or rock fragments may be used in construction of embankments provided they are covered with at least 1 foot (0.3 m) of earth and they do not interfere with specified compaction of the embankment. If boulders delivered to the embankment in combination with finer material interfere with compaction, remove and place them as provided in this article.

c. If the quantity of boulders or rock fragments available at any one time is more than 100 cubic yards (100 m^3), the material may be placed in the embankment no less than 2 feet (0.6 m) below the finished grade line according to Article 2107.03, J. Cover with at least 2 feet (0.6 m) of earth on slopes.

4. Boulders not placed as provided above may, with approval of the Engineer, be:

a. Used for filling gullies.

b. Racked in neat compact piles at locations the Engineer designates within the right-of-way and accessible from the traveled way.

c. Buried within the right-of-way at locations the Engineer designates.

D. Removal of Unsuitable or Unstable Soil and Placement of Selected or Special Backfill Material.

1. Removal of unsuitable or unstable soil or placement of selected or special backfill material, or both, may be required in the contract documents or by the Engineer.

2. If the finished grade line leaves a subgrade of unsuitable or unstable soil, the Engineer may require the Contractor to remove that soil as below grade excavation and place backfill material to the finished grade line. Material encountered above the elevation of finished subgrade which cannot be properly consolidated in the embankment may be designated as unstable soil by the Engineer. If the surface on which the plans indicate that selected or special backfill material is to be placed is such that it will be seriously distorted by hauling equipment, the Engineer may designate this material as unstable.

3. Remove unsuitable or unstable soil and place selected or special backfill material according to the following requirements:

a. Removal of Unsuitable or Unstable Soil.

1) Remove these soils to the elevation shown in the contracts documents or as directed by the Engineer. Remove and place them as directed in the contract documents or by the Engineer and, in the case of unsuitable soils, according to Article 2107.03, N.

2) Conduct operations so that the Engineer is given the opportunity to take cross sectional measurements required before the backfill material is placed.

b. Backfill Materials.

1) Obtain selected backfill materials from locations shown in the contract documents or as directed by the Engineer.

2) Furnish special backfill material that meets the requirements of Article 2102.02, F. Place salvaged materials used as special backfill material in uniform lifts no more than 6 inches (150 mm) thick. Place salvaged composite material used as special backfill material in uniform lifts of no more than 6 inches (150 mm) thick.

c. Placement of Backfill Material.

1) Place special or selected backfill material in areas shown in the contract documents or as directed by the Engineer. Place and compact as provided in Section 2107 with the following modifications:

a) Where compaction with moisture and density control or with moisture control is required, ensure the moisture content of special backfill material is within the limits specified.

b) When select backfill material is placed for subgrade treatment purposes, compact using moisture control.

2) Ensure the moisture content of backfill material is uniform. If necessary, adjust by processing in an approved pugmill or by adding water and road mixing in place prior to spreading and compacting.

a) Use selected backfill material that at the time of spreading and compacting is no drier than 2.5 percentage points below the optimum moisture shown in the contract documents. If not shown, the Engineer will determine the optimum moisture.

b) Use special backfill material that at the time of spreading and rolling is no drier than 2 percentage points below, and does not exceed, the maximum amount that will permit obtaining required compaction without rutting.

3) When 2 feet (0.6 m) or more of selected or special backfill material is placed in areas where unstable soils have been excavated, the condition of the underlying soil may limit the amount of compaction to be done in the bottom 1 foot (0.3 m) of subgrade treatment. In exceptionally wet or unstable areas, the Contractor may be permitted to end dump the first 1 foot (0.3 m) of treatment material and doze it into position with only partial compaction, as directed by the Engineer. Compact the material above the bottom 1 foot (0.3 m) as provided above.

4) When less than 2 feet (0.6 m) of selected or special backfill material is placed in areas of exceptionally wet or unstable soils, the Engineer may require a tamping type roller to be used for compaction of the material placed in the first foot (0.3 m) of thickness.

E. Rock Cuts.

1. When excavation to the finished grade line results in a roadbed surface consisting of loose or solid rock, excavate 1 foot (0.3 m) below the finished grade of the roadbed. Place backfill material to the required grade with suitable earth. Subject to the Engineer's approval, the earth backfill material may be obtained from any point within the right-of-way

where suitable backfill material material is available. Conduct operations so that the Engineer is given the opportunity to take cross section measurements required before backfill material is placed.

2. When presplitting of rock cuts is required, refer to Section 2103.

3. The contract documents may require that part or all of the Class 12 Excavation be crushed. When crushing is required, crush the rock to the size or gradation, or both, specified in the contract documents. Stockpile or use the crushed materials as specified in the contract documents.

F. Borrow.

1. General.

a. Unless provided otherwise in the contract documents, when the quantity of material required for embankments is not available within the limits of the roadway cross sections or specific borrow areas as indicated, make up the deficiency from borrow areas the Contracting Authority provides and defines on the plans or furnish equivalent material from alternate borrow areas (in lieu of plan borrows) or Contractor furnished borrow.

b. The following definitions apply to this specification:

1) Designated Borrow Areas.
A general term for borrow areas the Contracting Authority provides; including mandatory and optional borrow areas.

a) Mandatory Borrow Areas.
An area provided by the Contracting Authority from which the Contractor is expected to obtain borrow material and to operate in the area according to the contract documents. Mandatory borrow areas will be designated in the contract documents.

b) Optional Borrow Area.
An area provided by the Contracting Authority from which the Contractor may obtain borrow material. If so obtained, the Contractor is expected to operate in the area according to the contract documents. Borrow areas are optional borrow areas unless specifically designated as mandatory borrow areas.

2) Alternate Borrow Areas.
An area outside the highway right-of-way provided by the Contractor from which the Contractor may obtain borrow material in lieu of designated borrow areas and to be used according to the contract documents.

3) Contractor Furnished Borrow.
A general term for borrow material provided by the Contractor. The type of material shall be as specified in the contract documents. If the type of material is not specified, provide Suitable Soils. Contractor may elect to provide Select Treatment Material in lieu of Suitable Soils.

c. Upon completion, excavate borrow areas that are sufficiently regular in cross section to permit accurate measurement. Carefully blend to natural land forms and avoid unnecessary damage to the

land. Do not turn natural drainage of surface water on to adjoining owners. Use diligence in draining the surface water in its natural course or channel. Complete excavation consistent with the existing natural drainage conditions or as shown in the contract documents.

d. Where a mandatory borrow area is designated in the contract documents, it is mandatory that borrow material be obtained from the borrow location designated and in accordance with the borrow design on the contract documents, unless permission is obtained from the Engineer to obtain borrow from another location.

e. Unless the contract documents designate borrow areas as mandatory borrow areas, borrow areas will be considered optional borrow areas. The Contractor has the option of either using the optional borrow areas or proposing to furnish equivalent material from alternate borrow areas.

2. Contactor's Plan.

a. Submit a plan to the Engineer for use of proposed alternate or designated borrow intended to be used in a manner different from that shown in the contract documents. Also, sample the proposed alternate borrow areas by core drilling or test pits. When the Contracting Authority determines it is necessary, sample in the presence of the Engineer. Test samples and provide results and verification samples to the Contracting Authority

b. The submission for use of alternate borrow areas shall include all such areas necessary or contemplated for completion of the planned work.

c. Approval of materials and their use will be based on AASHTO M 145-91 and includes the following:

1) Select Treatment Materials.

a) The Engineer's approval is required for all soils required for select subgrade treatments. The Contractor may elect to substitute with special backfill material or modified subbase material at one-half the required rate at no additional cost to the Contracting Authority. If special backfill material or modified subbase material is used in lieu of select material, the Contractor shall provide for suitable surface and subsurface drainage of this material and provide suitable soils in lower portion of original subgrade treatment layer at no additional cost to the Contracting Authority.

(1) Cohesive Soils.
Meet the requirements of Article 2102.02, D, 1, a.

(2) Granular Soils.
Meet the requirements of Article 2102.02, D, 1, b.

(3) Special Backfill Material.
Meet the requirements of Section 4132.

(4) Modified Subbase Material.
Meet the requirements of Section 4123.

b) Use select treatment sources with sufficient uniformity and size to assure that complete individual treatment areas will be constructed with similar material. Substitution of

treatment types (cohesive, granular, special backfill, or modified subbase material) will be allowed only with the Engineer's permission.

2) **Suitable Soils.**
Meet the requirements of Article 2102.02, D, 2.

3) **Unsuitable Soils.**
Meet the requirements of Article 2102.02, D, 3.

4) **Other Materials.**
Place materials not covered above as required by Standard Specifications.

d. The Engineer may decline approval of an alternate borrow area when:

1) Necessary clearances cannot be obtained prior to the time scheduled for commencement of work.
2) Restrictions attached to clearances will delay or interfere with scheduled completion of work or may result in less than necessary quantities of required borrow materials.
3) Contractor's plan for use of borrow areas, including Contractor's verification of quantity and quality of required material, is not sufficient to assure availability of required material.
4) Contractor's proposed plans fail to meet requirements of the contract documents.

e. The Engineer will be allowed time to evaluate each alternate borrow area. If the clearance is not obtained within 30 calendar days, the proposed use of that borrow area may be rejected. During this evaluation period, the Contractor will not be charged for working days the Contractor does not work because the Contractor cannot use the borrow area.

f. The maximum allowance for each contract is not to exceed 30 working days. This allowance will not apply to work for which an intermediate completion time is specified. It will be given only when the delay will not interfere with others authorized to work on the project. It does not increase the Engineer's responsibility to provide coordination.

g. The Contracting Authority will not be responsible for damages due to a delay in approval of an alternate borrow area or when approval of an alternate borrow area is declined.

3. Contractor Provided Clearances.
Obtain and provide Engineer necessary environmental, archaeological, and historic preservation clearances and comply with all restrictions attached to these clearances for alternate borrow areas and sites where Contractor furnished borrow is obtained. Obtain other licenses and permits involved in the proposed use of these areas.

4. Restoration.

a. Optional borrow areas shown on the Contractor's plan shall be left in at least as good a condition as that required by the contract documents for designated borrow areas. This applies whether all or only a part of the site or the material is used for borrow.

b. Use and rehabilitate optional borrow areas andalternate borrow areas (unless Contractor and landowner have agreed to the final design of the alternate borrow area) so that:

1) The sites can continue to be used for the purpose for which they were used prior to removal of borrow.

2) The sites may still be used for those higher and more profitable or better potential uses to which the site might have been put to prior to removal of borrow material.

c. The Engineer will require restoration according to 314.12, Code of Iowa, to meet the above requirement. The overall Contractor's plan shall neither detract from nor interfere with the air, light, and view of motorists nor of adjacent landowners.

5. Obligations and Payment.

Use of an alternate borrow area shall not increase future obligations or total cost to the Contracting Authority. Complete all excavation from the roadway and the mandatory borrow areas.

6. Starting Work.

Except for exploratory purposes, do not start work and take material from an alternate borrow or a Contractor furnished borrow area until after:

- The Engineer approves the borrow proposal in writing, and
- Providing the Engineer with a written release executed by the property owner and the Contractor relieving the Contracting Authority of any and all obligations to the property owner and saving the Contracting Authority harmless from all claims for injury to persons or damage to property resulting from the Contractor's operations.

7. Material Verification.

Material supplied from alternate borrow areas or Contractor furnished borrow may be verified by the Contracting Authority for compliance with these requirements. When testing by the Contracting Authority is required, a minimum of 10 working days is necessary for testing. When the Engineer orders, remove and replace material verified not in close compliance with these requirements, at no additional cost to the Contracting Authority.

G. Placement of Surplus Material.

Place excavated surplus material as directed by the Engineer. Use to widen adjacent embankments, flatten sideslopes, or construct berms according to Article 2107.03, L.

H. Provisions for Drainage.

1. Construct intercepting ditches as shown in the contract documents.

2. In cuts alongside hills where there is a possibility of surface water causing damage to the backslope of the cut, construct intercepting ditches with appropriate flume outlets to intercept surface water. Where surface water or water from side ditches would otherwise follow the toe

of the embankment slope, direct the water away from the toe of the slope with runout ditches.

3. When the Engineer requires locating tile of lines, construct trenches and place backfill material at locations shown in the contract documents or as directed by the Engineer. Construct a continuous trench having a minimum depth of 5 feet (1.5 m) and a minimum width of 4 inches (100 mm). Construct trenches outside the limits of the embankment. The Engineer will examine the trench and excavated material to locate tile lines. Do not start placing backfill material without the Engineer's approval. Place backfill material in all trenches.

4. If, during the course of the work, the natural flow of surface waters or artificial drains is interrupted, provide temporary drainage facilities needed to prevent damage to public or private property. Restore the original drainage facilities as soon as the work will permit. The Contractor is fully liable for all damages arising from action or inaction in providing for temporary drainage.

I. Protection of Trees and Shrubs.

Ensure trees and shrubs to be preserved are protected from injury during grading operations. The Engineer may require barricades or fences for this purpose.

J. Archaeological Salvage.

Temporarily discontinue operations at sites whenever remains of prehistoric people's dwelling sites, burial sites, or artifacts of historical or archaeological significance are encountered. The Engineer, in conjunction with proper archaeological authorities of the State of Iowa, will promptly examine the exposure and determine the disposition.

K. Finishing.

1. Finish excavation and embankment, including borrow pits, in a high quality manner to the specified or designed grade and cross section. On projects which do not involve a surface course other than a traffic compacted surface, the Engineer may waive setting finishing stakes if grade and cross section are within compliance and appearance and riding qualities are satisfactory. Keep backslopes neatly finished as construction progresses.

2. Keep finishing work as close as possible to construction operations. Ensure stream pollution by soil erosion does not occur. When erosion control items are a part of the contract, the contract documents may specify a completion date for specific areas. When these dates are not specified, complete erosion control work on finished areas within 5 working days after completion of finishing. Keep finishing operations current with other construction operations.

3. Maintain partly finished work. If partly finished work is not maintained in a manner satisfactory to the Engineer, the Engineer may order, in writing, that all other work be discontinued until all finishing and

maintenance work is in a satisfactory condition. Before the final acceptance, finish the roadway to the specified or designed line, grade, and cross section.

4. Grade slopes, shoulders, and ditches to the degree obtainable using power equipment operating under favorable conditions and operated by skilled workers. Hand methods of finishing will be required only when satisfactory results are not otherwise obtained.

5. Finish backslopes and foreslopes to conform to the cross section. Remove bulges and fill sags. Unless specifically excluded, roughen backslopes and foreslopes as a final finishing operation, except those which contain sufficient sand or rock to make roughening impractical. Roughen to a minimum depth of 3 inches (75 mm) by scarification, use of a heavy disk, or other suitable means.

6. Operate surface roughening equipment parallel with the toe of the slope. If an objectionable amount of material being roughened rolls down the slope, start the roughening operation at the toe of the slope and proceed in parallel strips up the slope.

7. Construct temporary water pollution control according to Section 2602.

L. Grading for Paving.

1. When grading work is done immediately prior to paving work covered by a separate contract, build the rough grade to the full width of the roadbed. Build with a crown to provide sufficient surface drainage. Construct the roadbed so that the surface is:
- **a.** Not lower at any point than the elevation of the corresponding pavement subgrade.
- **b.** Not above this elevation by more than 3 inches (75 mm), except at structures or when required by the contract documents.

2. Earth moving equipment with legal axle loads will be permitted to operate on new pavements or resurfaced roads if the road is not open to general traffic. Earth moving equipment will not be permitted to operate on pavements or resurfaced roads open to general traffic.

3. The above restrictions will not be construed to:
- **a.** Prevent the Contractor from hauling across pavement with legal loads at locations the Engineer designates.
- **b.** Prohibit the Contractor from turning across pavement to the opposite shoulder when embankment height or ditch depth prevents turning in the opposite direction.

4. Furnish flaggers as necessary for safe operations, at no additional cost to the Contracting Authority.

2102.04 METHOD OF MEASUREMENT.

A. Measurement for Roadway and Borrow Excavation will be as follows:

1. **Excavation.**
   - **a.** Cubic yards (cubic meters), as determined by the Engineer, for the quantity of Class 10, Class 12, or Class 13 material excavated from:
     - The roadway,
     - Borrow pits,
     - Areas where unsuitable or unstable soil is shown in the contract documents or designated by the Engineer, and
     - Drainage channels, other than intercepting ditches and flumes.
   - **b.** Except as provided in this article, measurements will be made by cross sectioning of the area excavated before and after excavation. Quantities will be computed from the cross section measurements by the average end area method, which may be generated from aerial photography. The volume of topsoil stripped and salvaged as provided in Section 2105 will be excluded from quantities measured as provided above.
   - **c.** Payment will be made for the quantity of Class 10 excavation shown in the contract documents, adjusted by an increase or decrease in borrow excavation or change in backslope. Should the Contractor or the Engineer desire actual measurement, written notice shall be given to the other party at any time during the construction period. If actual measurement is requested, the preliminary cross sections and the balance points shown in the contract documents will be used. This method shall be used in conjunction with the quantities shown in the contract documents related to work as provided for in Articles 2107.04 and 2108.04.
   - **d.** When embankment-in-place is specified, the Engineer will determine the quantity of materials placed using cross section and end area methods. The quantity for which payment is made will not exceed that necessary to construct the embankment to the neat cross section shown in the contract documents, adjusted for settlement. The Engineer may elect to measure the embankment after selected backfill material and topsoil have been spread and deduct the computed quantities of selected backfill material and topsoils from the quantities of total embankment.
   - **e.** Overhaul will not be measured or paid for when excavation is paid for as embankment-in-place. Prior to computation of embankment quantities, the original ground profile and original ground elevations shown on the cross sections will be adjusted to conform as nearly as practical to information obtained from taking elevations on settlement plates.
   - **f.** Measurement for boulders or rock fragments classified as Class 12 excavation will be as follows:
     - **1)** Boulders buried near the site: individually.
     - **2)** Boulders or rock fragments deposited in piles: by the volume of the pile.
     - **3)** Boulders or rock fragments handled separately from fine material and placed in embankments or in gullies: in the transporting vehicle.
     - **4)** All boulders, rocks, or PCC collected as part of the finishing operations: in the transporting vehicle or in piles.

5) When boulders or rock fragments are mixed with earth, sand, gravel, or other fine material and cannot be handled in a way normal to Class 10 excavation, the total volume of the mixture of rock and fine material will be determined by cross sectional measurements, if practical. If not, the Engineer will estimate total volume. The quantity thus determined will be considered as Class 12 excavation.

6) Boulders or rock fragments handled and deposited in final position in a manner normal to Class 10 excavation will not be measured as Class 12 excavation.

2. Intercepting Ditches and Flumes.
Feet (meters) along their center lines.

3. Selected Backfill Material.
Quantity shown in the contract documents.

4. Special Backfill Material.

a. Tons (megagrams) or cubic yards (cubic meters) of material placed.

b. If measurement by weight (mass) is impractical, the material may be measured by volume in the transporting vehicle. This volume will be converted to tons (megagrams) using a conversion factor the Engineer determines.

5. Water for Embankment Construction.

a. Water for Embankment Construction required by the Engineer: thousands of gallons (kiloliters) by gauging the contents of the transporting vehicle or by metering the supply.

b. Water used in connection with specified compaction with moisture and density control or with moisture control: not measured for payment.

6. Locating Tile Lines.
Distance in stations (meters) of constructing trenches and placing backfill material.

7. Crushing of Class 12 Excavation.

a. Cubic yards (cubic meters) shown in the contract documents.

b. Prior to the start of this work, if either the Engineer or the Contractor desires actual measurement, the Engineer will determine in cubic yards (cubic meters) the quantity of Class 12 Excavation that will be crushed computed from the cross section measurements by the average end area method based on soil borings.

B. Removal of pipe culverts that are not encased in concrete are incidental to excavation and will not be measured or paid for.

2102.05 BASIS OF PAYMENT.

A. Payment for Roadway and Borrow Excavation will be the contract unit price as follows:

1. Roadway and Borrow Excavation.

a. Class 10, Class 12, and Class 13 excavation or embankment-in-place:

1) Per cubic yard (cubic meter).

2) Payments are full compensation for:

- Material excavated in the manner prescribed in these specifications, the preparation of the site for embankment, and the formation and compaction of embankment.
- Finishing the earth roadway, side ditches, and slopes.
- Repairing and replacing fences that have been unnecessarily damaged or removed by the Contractor.
- Incidental work required to make the grading work complete.

b. Excavation work done prior to the staking and cross sectioning of the work by the Engineer: no payment will be made.

c. Below grade excavation:

1) When the contract contains a separate unit price for below grade excavation, all excavation made below grade according to the contract documents or on order of the Engineer will be paid for at the contract unit price for the class of excavation involved.

2) When the contract does not contain a unit price for below grade excavation, the Engineer orders below grade excavation, and the contract documents do not indicate that below grade excavation will be required, it will be paid for:

- At double the contract unit price for Class 10 and Class 13 excavation to a maximum depth of 3 feet (1 m).
- As extra work as provided in Article 1109.03, B, if the depth of Class 10 or Class 13 excavation exceeds 3 feet (1 m).
- At the contract unit price for Class 12 excavation.

d. Excavation involved in rebuilding embankments: by class of excavation involved.

e. Excavation for runout ditches to divert the flow of water from side ditches away from the toe of embankments: paid for at the contract unit price for Class 10, Class 12, or Class 13 excavation, as the case may be.

f. When the contract contains a unit price for Class 10 excavation only and the contract documents do not indicate that Class 12 excavation is to be expected, any necessary Class 12 excavation, either above or below grade, will be paid for at 10 times the contract unit price for Class 10 excavation.

2. Intercepting Ditches and Flumes.

For removal of surface water from side hill cuts into side ditches: per linear foot (meter).

3. **Selected Backfill Material.**
   - **a.** Per cubic yard (cubic meter).
   - **b.** Except for water added, payment is full compensation for all work involved in excavating, hauling, and incorporating this material into the roadway.

4. **Special Backfill Material.**
   - **a.** Per ton (megagram) or cubic yard (cubic meter) including water naturally present in the material.
   - **b.** Except for water added, payment is full compensation for all work involved in:
     - Furnishing material,
     - Excavating material,
     - Processing material, when the source is designated in the contract documents,
     - Hauling this material, and
     - Incorporating material into the roadway.
   - **c.** If furnished by the Contractor and processed in an approved pugmill to a moisture content satisfactory to the Engineer: per ton (megagram) based on scale weights, including water. If payment is made in the above manner, no separate payment will be allowed for water or its incorporation into the mixture.
   - **d.** The contract will have a separate item for Special Backfill, Place Only, in tons (Mg) or cubic yards (m^3), when the Contracting Authority is providing the material or if the material is available from mandatory crushing of pavement or pavement scarification on the contract. The cost of crushing or pavement scarification should be included in the Contractor's price for special backfill material if recycling is not required but the Contractor chooses to crush the pavement removed or scarify the HMA surfacing for special backfill material.

5. **Water for Embankment Construction.**
   - **a.** Water for Embankment Construction added by order of the Engineer: per 1000 gallons (kiloliter).
   - **b.** Payment is full compensation for furnishing, transporting, and manipulation to incorporate the water ordered by the Engineer to be applied.
   - **c.** If the contract does not contain a unit price for water, and moistening of the material is authorized or ordered, water will be paid for as extra work at the rate of $12.00 per 1000 gallons ($3.20 per kiloliter).
   - **d.** Payment will not be made for water used in connection with specified compaction with moisture and density control or with moisture control.

6. **Locating Tile Lines.**
   Per station (meter).

7. **Crushing of Class 12 Excavation.**
   Per cubic yard (cubic meter).

B. When Type B compaction is specified, work performed at the Engineer's direction to dry the material in excess of that obtained by the maximum number of diskings specified in Article 2107.03, F shall be performed as extra work as provided in Article 1109.03, B.

C. Extra compensation will not be allowed for working around utilities.

D. Work performed in connection with preservation of archaeological salvage will be paid for as provided in Article 1109.03, B.

E. If the contract does not include an item for Stripping, Salvaging, and Spreading Topsoil (Section 2105), such work the Engineer orders will be paid for at 1.5 times the contract unit price for Class 10 excavation.