Section 4
Structure Excavation, Sheeting and Cofferdams

4.1 General Guidelines for Structure Excavation Protection and Support

The designer should become familiar with the appropriate specifications in the most current version of the Standard Specifications for Construction and Materials. The following guidelines shall in no way supersede the specifications. The intent of these guidelines is to explain the differences between the types of systems that are used to support excavations and those used to protect the workers and to identify:

- When they are used.
- Who is responsible for the design.
- What is to be shown on the Plans.

This section is intended to provide guidance on the commonly used excavation items in bridge construction. Users should refer to Chapter 9 of the Highway Design Manual (HDM) for guidance on excavation protection systems for trench and culvert excavations.

These guidelines conform to OSHA definitions, which differentiate between a support system as being a "structure . . . which provides support to an adjacent structure, underground installation, or the sides of an excavation" and a protective system, which protects workers from cave-ins. "Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection."

The Department’s responsibility in designing excavations is to provide support of the roadway and adjacent structures and utilities. The Contractor’s responsibility in performing excavations is to provide protection for the workers from cave-ins.

It is assumed that designers are familiar with the design procedures necessary to do the designs. If, however, geotechnical design assistance is needed, refer to "Geotechnical Design Procedure for Flexible Wall Systems" GDP-11 or contact the appropriate Departmental Geotechnical Engineer.

If support or protective systems are used in the vicinity of a railroad right-of-way, special requirements are usually necessary. Contact the appropriate Railroad Liaison for additional information. (See Chapter 23 of the Highway Design Manual.)

Protection for employees working in an excavation shall be provided except when:

- The excavation is made entirely in stable rock; or
- The excavation is less than 5 feet deep and an examination of the ground by a competent person gives no indication of a potential cave-in.

For excavations less than 5 feet in depth, only the excavation items need to be shown on the plans. OSHA regulations do not require any special steps be taken regarding worker protection.
For excavation depths from 5 feet through 20 feet, one of the following scenarios shall be used:

1. If there is no encumbrance with elements which would require support, (e.g. traffic lane, underground utilities, structures or their foundations, or the existing right of way etc.) within a safe slope that meets OSHA guidelines (typically: 1 vertical to 1.5 horizontal) measured from the bottom of the excavation to existing ground, it is considered to be in compliance with OSHA regulations that cover worker protection. In this case, only excavation and backfill items need to be specified and the cost estimate shall be based on the payment lines shown on the plans.

2. If there is interference within a safe slope that meets OSHA guidelines (typically the 1 vertical and 1.5 horizontal) but vibrations are minor and repairable subsidence is not considered to be a problem, and there is no interference at least 10 ft. from edge of excavation, then a steeper slope of up to 1 vertical to 1 horizontal may be used, if approved by the Regional Geotechnical Engineer or Geotechnical Engineering Bureau. The cost estimate shall be based on the payment lines shown on the plans.

3. If 1 or 2 above cannot be satisfied, an appropriate sheeting support system is required and shall be designed and detailed on the contract drawings, by the Department or the Department’s Consultant.

For excavations greater than 20 feet, a support system or slope lay back must be site specifically designed and detailed on the contract plans. If a slope lay back is feasible as determined by the Regional Geotechnical Engineer or Geotechnical Engineering Bureau, it shall be designed and detailed on the plans and serve as a support system, and the cost estimate shall be based on the payment lines shown on the plans. A support system shall be designed and specified (i.e., a sheeting item or soldier pile and lagging wall) to provide for worker protection where a designed slope lay back is not feasible.

See the BD-EE series for appropriate excavation and embankment details and item numbers.

4.2 Unclassified Excavation and Disposal

This is a general excavation Item (203.02) to remove material not provided for in another Item. Typically, this involves large excavations using large equipment. No special care, other than reaching grade, is required.

No provisions for a support system are included in this item. Additional items for support or protective systems must be added, as necessary, for support of the excavation or to protect workers.
4.3 Structure, Trench and Culvert, and Conduit Excavation

The Structure Excavation Item (206.01) provides a small, neat excavation using smaller equipment. The Trench and Culvert Items (206.02 and 206.04) provide a neat excavation in a confined space; typically for pipe or culvert excavations. The Conduit Excavation Item (206.03) also provides a neat excavation in a confined space; typically for conduit or direct buried cable excavations. For all Items, special care is required to provide an excavation with an undisturbed bottom.

The designer’s attention is called to Item 206.04 - Trench and Culvert Excavation - O.G., which specifies that the top payment line is "the ground surface prior to commencing work." Over time, the typical construction contract has changed from building a road on new location to rehabilitating an existing facility. Today’s operations on existing location requiring the maintenance of traffic dictates how a contractor sequences the work. This new item should result in the best method of measurement for most construction contracts.

However, there are some instances where it is desirable to use the old method of measurement for trench and culvert excavation. For these instances Item 206.02 - Trench and Culvert Excavation, whose only purpose is to keep the old top payment line and method of measurement, is still appropriate. The instances where this item should be used are:

1. Road built on new location.
2. Construction taking place on existing road where a majority of the road is closed and traffic rerouted by a detour detailed in the plans.
3. When, after considering M&P/T, excavation work, road configuration and other factors, the logical and probable sequence of work the Contractor will choose is general excavation/fill first then trench and culvert excavation second.

The designer, when using Item 206.02 Trench and Culvert excavation under #3, should always consult the Regional Construction Office to confirm the decision. Both items can be used on the same project provided clear details are shown in the contract documents.

The following information is to be shown on the Contract Plans:

- Location
- Typical sections showing payment lines.

4.4 Removal of Substructures

This item (202.19) is used only to remove concrete and masonry. If excavation is needed to remove the substructure, the excavation should be shown and paid for under the Structure Excavation Item (206.01). Item 202.19 is used to partially or fully remove stone or concrete substructures that are not to be repaired or altered and reused.
4.5 **Excavation Protection System**

This Item (552.16) should only be used for Trench and Culvert excavations greater than 5 feet and less than 20 feet in depth. It provides for worker protection only where vibration or minor repairable subsidence are not considered a problem and no lay-back option is available due to ROW constraints, traffic, etc. An EPS is not acceptable for stage construction of highways or bridges or culverts. EPS is also not acceptable to protect workers from a one sided excavation, such as a cut into an existing slope. See Chapter 9 of the Highway Design Manual for details.

4.6 **Interim Sheeting**

4.6.1 **Interim Steel Sheeting**

This Item (552.15) uses steel sheeting to provide temporary support during progression of an excavation. This sheeting is then cut off to an elevation specified in the Contract Plans and the remainder is left in place. The decision to leave in place is usually dictated by soil conditions and will be made by others. The Geotechnical Group, Rails, Structures or even the Department of Environmental Conservation may have input during design and should be consulted. For example, sheeting may be left in place when there is stage construction, when pulling the sheeting may leave voids, or when the sheeting is adjacent to a structure and pulling the sheeting may cause structural damage to the adjacent structure. Sheetig may be previously used material, but must be in satisfactory condition and suitable for the intended application.

This sheeting is to be designed by the State or the State's Consultant. The following information is to be shown on the Contract Plans:

- Plan location of the sheeting placement
- Typical section(s) showing:
  - Elevations for the top and toe of the sheeting.
  - Elevation for the bottom of the excavation.
  - Minimum embedment below the bottom of the excavation.
  - Elevation at which sheeting is to be cut off.
  - Payment lines.
  - Location of wales or bracing, if required.
- Minimum section modulus for the sheeting
- If required, minimum section modulus of wales and size of bracing
Table 1 showing the soil parameters used for the design:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>ELEVATION (Feet)</th>
<th>UNIT WEIGHT (lbs/ft³)</th>
<th>FRICTION ANGLE (Degrees)</th>
<th>COHESION (lb/in²)</th>
<th>WALL FRICTION ANGLE (Degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: Divide the passive earth pressure coefficient ($K_p$) by 1.25.
Groundwater is assumed at Elevation _______.
A surcharge load of ___ lb/in² is assumed at the top of the wall.¹ and ²
Sheeting cannot be driven below Elevation _______, due to ________ (choices: rock, boulders, compact material, obstructions, artesian water pressure).¹ and ²
Any other pertinent information¹

¹ If the sheeting is associated with a structure for which a Foundation Design Report (FDR) has been prepared, the FDR will provide this information. If, however, an FDR has not been prepared or the sheeting is not in the vicinity of the structure, this information is to be provided by the Geotechnical Engineering Bureau or the Regional Geotechnical Engineer for inclusion on the plans.
² If applicable, this note should be added.

Table 4-1
Soil Design Parameters

4.6.2 Interim Timber Sheeting

This Item (552.14) uses timber sheeting to provide temporary support during progression of an excavation. This sheeting is then cut off to an elevation specified in the Contract Plans and the remainder is left in place. The decision to leave in place is usually dictated by soil conditions and will be made by others. The Geotechnical Group, Rails, Structures or even the Department of Environmental Conservation may have input during design and should be consulted. For example; sheeting may be left in place when there is stage construction, when pulling the sheeting may leave voids, or when the sheeting is adjacent to a structure and pulling the sheeting may cause structural damage to the adjacent structure. The timber may be used material and of any acceptable species. It shall be free of any defects that may impair its strength or tightness.

This sheeting is to be designed by the State or the State’s Consultant. The following information is to be shown on the Contract Plans:

- Plan location of the sheeting placement
  - Typical section(s) showing:
    - Elevations for the top and toe of the sheeting
    - Elevation for the bottom of the excavation
    - Minimum embedment below the bottom of the excavation
    - Elevation at which sheeting is to be cut off
    - Payment lines
4.7 Temporary Sheeting

4.7.1 Temporary Steel Sheeting

This Item (552.13) uses steel sheeting to provide temporary support during progression of an excavation. When no longer needed for excavation support, the sheeting shall be removed. The Contractor may leave the sheeting in place only with the written approval of the Engineer. The sheeting may be used material, but must be in satisfactory condition and suitable for the intended application.

This sheeting is to be designed by the State or the State's Consultant. The following information is to be shown on the Contract Plans:

- Plan location of the sheeting placement
- Typical section(s) showing:
  - Elevations for the top and toe of the sheeting.
  - Elevation for the bottom of the excavation.
  - Minimum embedment below the bottom of the excavation.
  - Payment lines.
  - Location of wales or bracing, if required.
- Minimum section modulus for the sheeting
- If required, minimum section modulus of wales and size of bracing
- Show the same table used for Interim Steel Sheeting (Section 4.6.1).

4.7.2 Temporary Timber Sheeting

This Item (552.12) uses timber sheeting to provide temporary support during progression of an excavation. When no longer needed for excavation support, the sheeting shall be removed. The Contractor may leave the sheeting in place only with the written approval of the Engineer. Unless stated otherwise on the Contract Plans, the timber may be used material and of any acceptable species. It shall be free of any defects that may impair its strength or tightness.

This sheeting is to be designed by the State or the State's Consultant. The following information is to be shown on the Contract Plans:

- Plan location of the sheeting placement
- Typical section(s) showing:
  - Elevations for the top and toe of the sheeting.
  - Elevation for the bottom of the excavation.
  - Minimum embedment below the bottom of the excavation.
  - Payment lines.
  - Location of wales or bracing, if required.
• Minimum cross section (use actual dimensions) and stress grade for the timber
• If required, minimum cross section (use actual dimensions) and stress grade for the timber of wales and bracing
• Show the same table used for Interim Steel Sheeting (Section 4.6.1).

4.8 Permanent Sheeting

4.8.1 Permanent Steel Sheeting

This Item (552.11) uses steel sheeting to provide permanent support. Associated work may or may not require an excavation. The sheeting is then left in place to function as a structure. Unless stated otherwise on the Contract Plans, only new, unused ASTM A328-steel is to be used.

This sheeting is to be designed by the State or the State's Consultant. The following information is to be shown on the Contract Plans:

• Plan location of the sheeting placement
• Typical section(s) showing:
  ◦ Elevations for the top and toe of the sheeting.
  ◦ Elevation for the bottom of the excavation, if applicable.
  ◦ Minimum embedment below the bottom of the excavation, if applicable.
  ◦ Payment lines.
  ◦ Location of wales or bracing, if required.
• Minimum section modulus for the sheeting
• If required, minimum section modulus of wales and size of bracing
• Show the same table used for Interim Steel Sheeting (Section 4.6.1) except in the first note change 1.25 to 1.5 for permanent conditions.

4.8.2 Permanent Timber Sheeting

This Item (552.10) uses timber sheeting to provide permanent support. Associated work may or may not require an excavation. The sheeting is then left in place to function as a structure. Unless stated otherwise on the Contract Plans, the timber shall be new, unused material of any acceptable species. It shall be free of any defects that may impair its strength or tightness.

This sheeting is to be designed by the State or the State's consultant. The following information is to be shown on the Contract Plans:

• Plan location of the sheeting placement
• Typical section(s) showing:
  ◦ Elevations for the top and toe of the sheeting
  ◦ Elevation for the bottom of the excavation, if applicable
  ◦ Minimum embedment below the bottom of the excavation, if applicable
  ◦ Payment lines
  ◦ Location of wales or bracing, if required
• Minimum cross section (use actual dimensions) and stress grade for the timber
If required, minimum cross section (use actual dimensions) and stress grade for the timber of wales and bracing
Show the same table used for Interim Steel Sheeting (Section 4.6.1) except in the first note change 1.25 to 1.5 for permanent conditions.

4.9 Cofferdam and Waterway Diversion Guidelines

The designer should become familiar with the specifications for cofferdams in the most current version of the Standard Specifications for Construction and Materials. The following guidelines shall in no way supersede the specifications.

Cofferdams are temporary enclosures to keep excavations free from earth, water, ice, or snow and to permit the excavation to be carried to elevations shown on the Contract Plans. These elevations may be lower than the planned bottom of excavation due to an undercut. Permanent substructure protection systems are not to be paid for under the cofferdam item.

A waterway diversion is a temporary structure that diverts or pumps water around an area so that excavation or work can be accomplished. The use of a waterway diversion is primarily to provide water quality protection. The area from which water is diverted does not need to be earth, water, ice or snow free. A waterway diversion structure is not a substitution for or equal to a cofferdam. Unlike cofferdams, a temporary waterway diversion structure does not need to be designed by a registered Professional Engineer.

The use of cofferdams, permanent sheeting, stream diversions and associated temporary access fills requires permits, approvals and coordination with various State and Federal regulatory agencies (Department of Environmental Conservation, Corps of Engineers, Adirondack Park Agency, Department of State, U.S. Fish and Wildlife Service, National Marine Fisheries Service, New York City Department of Environmental Protection, U.S. Coast Guard). Permits contain conditions that must be adhered to and shall be included in the Contract Documents (proposal/plans). Regulatory agencies may place seasonal restrictions on work in the waterway, may require restoration plans, and limit the types of materials to be used. The Designer should coordinate with the Regional Landscape/Environmental Unit (RL/E Unit) early in the project design to facilitate environmental reviews and permit/coordination procedures. The Designer must also coordinate with the Regional Hydraulics Engineer regarding the location and number of cofferdams and temporary access fills that may be in place at any given time and the number of construction seasons they will be in place. The Regional Hydraulics Engineer can also assist when choosing between a cofferdam or waterway diversion structure or determine if both are necessary.

A cofferdam item should be included in contract plans only if the proposed bottom of footing elevation for a substructure is below the Ordinary High Water (O.H.W.) elevation. A cofferdam item is generally not called for:

- When existing substructure removal is performed in water (this operation need not be performed in a "dewatered" condition unless required by specific project requirements), or
To install stream bank protection (turbidity curtains, dikes, waterway diversions or other erosion and sediment control measures should be utilized, as appropriate, to limit turbidity at the substructure removal site or when performing bank stabilization activities. At times, a closed system may be utilized to confine turbidity without having to be dewatered. Those measures should be paid for under the appropriate Standard Specifications Section 209 pay items).

A temporary waterway diversion structure may be used for operations where stream flow needs to be relocated around a work site but the work site does not require dewatering. For example, placing stone fill along a slope, or excavating for and placing stone fill for keyways.

At the request of the designer, in consultation with the Regional Hydraulics Engineer, the Regional Landscape Architect and/or Environmental Engineer and permitting agency, the cofferdam item shall include additional streambank protection based upon installation timing and waterway flows. No less than a 2-year storm event potential shall be taken into account in designing temporary streambank protection.

When permanent sheeting is called for on the Contract Plans to protect against vessel impact, a cofferdam item shall be included to provide for the cost of de-watering and construction protection. The Contractor will have the option of installing separate cofferdam protection, or incorporating the permanent sheeting in the cofferdam system. If the latter option is chosen, the cofferdam item will cover all additional bracing required to strengthen the sheeting system, if required, and any work necessary to return the permanent sheeting to its required function after the cofferdam operation is complete. On occasion, anchor spuds are driven to facilitate construction of the cofferdam system and they are included in the price bid for the cofferdam.

When the sole purpose of the system is to protect dewatering and construction operations, the entire system will be covered under the cofferdam item.

Where stream diversion or other alternates are allowed as a substitution, the work shall be paid for at the price bid for the cofferdam at that location.

Cofferdams will be paid for on an each basis and shown as an enclosed area on the Contract Plans. This will expedite environmental reviews and permit procedures prior to PS&E. Use a separate serialized item number for each cofferdam to assure that varying field conditions are accounted for at each location. Cofferdams will be classified as either Type 1 or Type 2:

Type 1 (Item 553.01nnnn) cofferdams are required for a water depth exceeding 8 ft., measured from the bottom of excavation to anticipated Ordinary High Water or when special conditions warrant. They must be designed by a Professional Engineer licensed and registered to practice in New York State retained by the Contractor. The design is submitted to the Engineer-in-Charge for review by the DCES a minimum of twenty (20) working days prior to installation.

Type 2 (Item 553.02nnnn) cofferdams are limited to a maximum anticipated depth of 8 ft., measured from the bottom of excavation to anticipated Ordinary High Water. They must be designed by a Professional Engineer licensed and registered to practice in New York State retained by the Contractor. The Contractor submits to the Engineer-in-Charge, for review, the methods to be employed a minimum of ten (10) working days prior to installation. No design computations are required to be submitted.
The Designer shall select the appropriate cofferdam type based on anticipated water elevation and bottom of excavation. Stream integrity characteristics such as high velocity, ice pressure and scour potential may warrant a Type 1 cofferdam even if the depth is less than 8 ft.

For cost estimating purposes, assume that the cofferdam extends 2 ft. above Ordinary High Water and 3 ft. laterally beyond the limits of the proposed footing. See the appropriate section of this manual related to navigable water clearances for additional information. The Contractor shall determine the actual field limits required to satisfy conditions of the specification. (Such as not interfering with battered piles.)

When a cofferdam is used in conjunction with a tremie seal, the designer shall include Note 44 from Section 17.3 on the Contract Plans indicating the critical water elevation at which the system should be flooded in order to prevent the tremie seal from becoming buoyant. The Geotechnical Engineering Bureau will provide the flooding elevation. See Section 11 for additional information on the design of tremie seals.

The location(s) of sediment removal areas shall be indicated on the Contract Plans. The designer should obtain input from the Regional Landscape/Environmental Unit. See Section 17.3, Notes 40 – 44, for standard cofferdam notes to be placed on the contract plans. In some streams the Ordinary High Water elevation can be several feet higher than the Low Water elevation. This could lead to a cofferdam design of excessive size and cost that may be inappropriate for the majority of the construction operation. In consultation with the Regional Hydraulics Engineers it may be appropriate to designate by a note on the plans a more realistic elevation above which the system should be flooded to avoid overloading rather than expect the cofferdam to serve the most severe field condition as inferred in the specification.
<table>
<thead>
<tr>
<th>EXCAVATION REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM 203.02 Unclassified Excavation and Disposal</td>
</tr>
</tbody>
</table>

**Intended Use:**
- General excavation item to remove material not provided for in another item—large excavations using large equipment.
- Provide a small, carefully excavated area with smaller equipment.
- Provide an excavation in a confined space. Example: Pipe and culvert excavations.
- Provide an excavation in a confined space. Example: Conduit and direct buried cable excavations.
- To partially or fully remove stone or concrete substructures that are not to be repaired or altered and reused. (Does not include Excavation.)
- Removal of structural concrete from structural concrete elements. Examples: Patching of abutments and piers; abutment backwall removal to a defined elevation where vertical reinforcing is to remain and the backwall reconstructed.

**Special Care Required:**
- None, other than reaching grade.
- Bottom of excavation to be undisturbed.
- Bottom of excavation to be undisturbed.
- Bottom of excavation to be undisturbed.
- To not damage remaining concrete, if any is to remain.
- To not damage remaining concrete.

**Disposal:**
- Included
- Included
- Included
- Included
- Included
- Included

**Backfill Included:**
- No
- Yes, except select material.
- Yes, except select material.
- Yes
- No. Requirements for Structure Excavation Item 206.01 apply.
- N/A

**Dewatering Included:**
- No
- Yes
- Yes
- Yes
- Yes
- N/A

**Layback Option Available to Contractor:**
- No
- Yes-if detailed without a support or protection system item.
- Yes-if detailed without a support or protection system item.
- Yes-if detailed without a support or protection system item.
- N/A
- N/A

**Protective System Design Responsibility**
- Excavation support is not included in this item. Additional item(s) must be used.
- CONTRACTOR: If no system is specified (excavation without support system).
- STATE OR CONSULTANT: If support system is specified.
- CONTRACTOR: If Excavation Protection System (EPS) Item, cofferdam, or no system specified.
- STATE OR CONSULTANT: If any system other than EPS or cofferdam indicated.
- CONTRACTOR: N/A
- N/A

**Pay Unit**
- Cubic Yard
- Cubic Yard
- Cubic Yard
- Linear Foot
- Cubic Yard
- Cubic Yard

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4.11

Table 4-2
Excavation Requirements
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Intended Use</th>
<th>Final Status</th>
<th>Layback Option Available</th>
<th>De-Watering Included</th>
<th>Pay Unit</th>
<th>Show on Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM 552.10</td>
<td>Permanent Sheeting</td>
<td>Provide excavation support. To remain in place to function as a structure.</td>
<td>Left in place</td>
<td>No</td>
<td>Yes</td>
<td>Square foot</td>
<td>Plan location//Typical Section showing: elev. for sheeting top and toe plus excavation bottom, min. embedment, payment lines//Min. section modulus for sheeting and wales (if required)//Soil parameters table //Groundwater elev. //Pertinent notes.</td>
</tr>
<tr>
<td>ITEM 552.11</td>
<td></td>
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</tr>
<tr>
<td>ITEM 552.12</td>
<td>Temporary Sheeting</td>
<td>Provide excavation support. May be removed from site when no longer required for support unless written approval of Engineer allows it to remain.</td>
<td>Removed or left in place with Engineer’s approval.</td>
<td>No</td>
<td>No</td>
<td>Square foot</td>
<td>Plan location//Typical Section showing: elev. for sheeting top and toe plus excavation bottom, min. embedment, payment lines//Min. section modulus for sheeting and wales (if required)//Soil parameters table //Groundwater elev. //Pertinent notes.</td>
</tr>
<tr>
<td>ITEM 552.13</td>
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<tr>
<td>ITEM 552.14</td>
<td>Interim Sheeting Support System (Left in Place)</td>
<td>Provide temporary excavation support. When no longer needed as support, is cut off and left in place. Example: Wall within embankment for staged construction.</td>
<td>Left in place after use, but cut off to elevation shown/stated on plans.</td>
<td>No</td>
<td>No</td>
<td>Square foot</td>
<td>Plan location//Typical Section showing: elev. for sheeting top and toe plus excavation bottom, min. embedment, payment lines//Min. section modulus for sheeting and wales (if required)//Bracing size (if required)// Soil parameters table//Groundwater elev. //Pertinent notes//Cut-off elevation.</td>
</tr>
<tr>
<td>ITEM 552.15</td>
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<tr>
<td>ITEM 552.16</td>
<td>Excavation Protection System (for details see Section 9.3.12 of HDM)</td>
<td>For excavations less than 20 ft., provide temporary support to protect workers for excavations where layback is not an option. Not to be used in the vicinity of adjacent structure or utility.</td>
<td>Removed or left in place with Engineer’s approval.</td>
<td>No</td>
<td>Yes</td>
<td>Cubic Yard, Linear Foot</td>
<td>Location</td>
</tr>
<tr>
<td>ITEM 206.01*</td>
<td>Trench, Culvert and Structure Excavation</td>
<td>Included in these items is the protection necessary to ensure safety of workers.</td>
<td>Removed after use.</td>
<td></td>
<td></td>
<td></td>
<td>Location Typical Section showing payment lines when situation not covered by Standard Sheets.</td>
</tr>
<tr>
<td>ITEM 206.02*</td>
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<td>ITEM 206.03*</td>
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<td>ITEM 206.04*</td>
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</tbody>
</table>

*If detailed without a support system. See Guidelines
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Intended Use</th>
<th>Designed by</th>
<th>Review by New York State</th>
<th>Materials</th>
<th>Pay Unit</th>
<th>Show on Plans</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>553.01</td>
<td>Cofferdams (Type 1)</td>
<td>Protect and dewater an excavation to install foundation elements.</td>
<td>Contractor's NYS Professional Engineer</td>
<td>Design, including computations and method of installation.</td>
<td>New or used timber or steel sheeting, impermeable earth-filled bags, precast concrete, commercially designed system.</td>
<td>Each</td>
<td>Plan Location</td>
<td>Exceeding 8 ft. or special conditions warrant.</td>
</tr>
<tr>
<td>553.02</td>
<td>Cofferdams (Type 2)</td>
<td>Protect and dewater an excavation to install foundation elements.</td>
<td>Contractor's NYS Professional Engineer</td>
<td>Methods to be employed</td>
<td>New or used timber or steel sheeting, impermeable earth-filled bags, precast concrete, commercially designed system.</td>
<td>Each</td>
<td>Plan Location</td>
<td>8 ft. maximum</td>
</tr>
<tr>
<td>553.03</td>
<td>Temporary Waterway Diversion Structure</td>
<td>Divert flow</td>
<td>Contractor</td>
<td>Methods to be employed</td>
<td>New or used timber or steel sheeting, impermeable earth-filled bags, precast concrete, commercially designed system, such as a Portadam.</td>
<td>Each</td>
<td>Plan Location</td>
<td>8 ft. maximum</td>
</tr>
</tbody>
</table>

Table 4-4
Cofferdam Requirements