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# National Engineering Handbook

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## Part 642

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# Specifications for Construction Contracts

Issued May 2001

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**Contents:**

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**Chapter 1 General Contract Specification Procedures**

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<b>642.0100</b>	<b>General</b>	<b>1-1</b>
	(a) Nonfederal construction contract .....	1-1
	(b) Federal construction contract .....	1-1
	(c) Purpose .....	1-1
<b>642.0101</b>	<b>Terms and definitions</b>	<b>1-2</b>
<b>642.0102</b>	<b>Applicability</b>	<b>1-2</b>
<b>642.0103</b>	<b>National standard construction specifications</b>	<b>1-3</b>
<b>642.0104</b>	<b>National standard material specifications</b>	<b>1-3</b>
<b>642.0105</b>	<b>Selecting appropriate national standard specifications</b>	<b>1-4</b>
<b>642.0106</b>	<b>Interim specifications</b>	<b>1-4</b>
<b>642.0107</b>	<b>One-time-use specifications</b>	<b>1-5</b>
<b>642.0108</b>	<b>Bid schedule</b>	<b>1-6</b>
	(a) Designating the items of work .....	1-6
	(b) Division of the work into items .....	1-6
	(c) Numbering and titling .....	1-7
	(d) Pay items .....	1-7
<b>642.0109</b>	<b>Contract specifications</b>	<b>1-8</b>
	(a) Compilation .....	1-8
	(b) Identifying .....	1-8
	(c) Measurement and payment .....	1-9
	(d) Preparing construction details .....	1-9
<b>Examples</b>	<b>Example 1-1 Typical bid schedule .....</b>	<b>1-7</b>
	<b>Example 1-2 Typical construction detail for a specific contract .....</b>	<b>1-10</b>
	for excavation	
	<b>Example 1-3 Typical construction detail to cross reference a.....</b>	<b>1-14</b>
	subsidiary item	

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**Chapter 2 National Standard Construction Specifications**


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	----- Effective date -----	
	Instruction	Specification
Site preparation		
1—Clearing	5/01	5/01
2—Clearing and Grubbing	5/01	5/01
3—Structure Removal	5/01	5/01
4—Channel Clearing and Shaping	5/01	5/01
5—Pollution Control	5/01	5/01
6—Seeding, Sprigging, and Mulching	5/01	5/01
7—Construction Surveys	5/01	5/01
8—Mobilization and Demobilization	5/01	5/01
9—Traffic Control	5/01	5/01
10—Water for Construction	5/01	5/01
Foundation work		
11—Removal of Water	5/01	5/01
12—Relief Wells	5/01	5/01
13—Piling	5/01	5/01
14—Pressure Grouting	5/01	5/01
Earthwork		
21—Excavation	5/01	5/01
22—(Reserved)		
23—Earthfill	5/01	5/01
24—Drainfill	5/01	5/01
25—Rockfill	5/01	5/01
26—Topsoiling	5/01	5/01
27—Diversions and Waterways	5/01	5/01
28—Lime Treated Earthfill	5/01	5/01
29—Soil-Cement	5/01	5/01
Concrete and reinforcement		
31—Concrete for Major Structures	5/01	11/05
32—Structure Concrete	5/01	5/01
33—Shotcrete	5/01	5/01
34—Steel Reinforcement	5/01	11/05
35—Concrete Repair	5/01	5/01
36—Roller Compacted Concrete	9/04	11/05

	----- Effective date -----	
	Instruction	Specification
<b>Nonmetal pipe conduits and drains</b>		
41—Reinforced Concrete Pressure Pipe Conduits	5/01	5/01
42—Concrete Pipe Conduits and Drains	5/01	5/01
43—Clay Pipe	5/01	5/01
44—Corrugated Polyethylene Tubing	5/01	5/01
45—Plastic Pipe	5/01	5/01
46—Tile Drains	5/01	11/05
<b>Metal pipe conduits</b>		
51—Corrugated Metal Pipe	5/01	5/01
52—Steel Pipe	5/01	5/01
53—Ductile-Iron Pipe	5/01	5/01
<b>Riprap and slope protection</b>		
61—Rock Riprap	5/01	11/05
62—Grouted Rock Riprap	5/01	5/01
63—Treatment of Rock Surfaces	5/01	5/01
64—Wire Mesh Gabions and Mattresses Twisted (Woven) or Welded Mesh	5/01	11/05
<b>Water control gates and valves</b>		
71—Water Control Gates	5/01	5/01
<b>Miscellaneous structural work</b>		
81—Metal Fabrication and Installation	5/01	5/01
82—Painting Metalwork	5/01	11/05
83—Timber Fabrication and Installation	5/01	5/01
84—Painting Wood	11/05	11/05
<b>Miscellaneous construction</b>		
91—Chain Link Fence	5/01	5/01
92—Field Fence	5/01	5/01
93—Identification Markers or Plaques	5/01	5/01
94—Contractor Quality Control	5/01	5/01
95—Geotextile	5/01	5/01
96—Field Office	5/01	5/01
97—Flexible Membrane Liner	11/05	11/05
98—Geosynthetic Clay Liner	11/05	11/05

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**Chapter 3 National Standard Material Specifications**


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	Effective date
<b>Foundation materials</b>	
511—Steel Piles	5/01
512—Wood Piles	5/01
513—Precast Concrete Piles	5/01
514—Cast-In-Place Concrete Piles With Shells	5/01
<b>Aggregates and rock</b>	
521—Aggregates for Drainfill and Filters	5/01
522—Aggregates for Portland Cement Concrete	5/01
523—Rock for Riprap	11/05
524—Aggregates for Roller Compacted Concrete	11/05
<b>Concrete materials</b>	
531—Portland Cement	5/01
532—Mineral Admixtures for Concrete	5/01
533—Chemical Admixtures for Concrete	11/05
534—Concrete Curing Compound	5/01
535—Preformed Expansion Joint Filler	5/01
536—Sealing Compound for Joints in Concrete and Concrete Pipe	5/01
537—Nonmetallic Waterstops	5/01
538—Metal Waterstops	5/01
539—Steel Reinforcement (for concrete)	11/05
<b>Nonmetal pipe and fittings</b>	
541—Reinforced Concrete Pressure Pipe	5/01
542—Concrete Culvert Pipe	11/05
543—Nonreinforced Concrete Pipe	5/01
544—Clay Pipe and Drain Tile	11/05
545—(Reserved)	
546—(Reserved)	
547—Plastic Pipe	11/05
548—Corrugated Polyethylene Tubing	5/01
<b>Metal pipe and fittings</b>	
551—Coated Corrugated Steel Pipe	11/05
552—Aluminum Corrugated Pipe	5/01
553—Ductile-Iron Pipe	5/01
554—Steel Pipe	5/01
<b>Water control gates and valves</b>	
571—Slide Gates	11/05
572—Flap Gates, Metal	11/05
573—Radial Gates	5/01

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	Effective date
Miscellaneous structural materials	
581—Metal	11/05
582—Galvanizing	5/01
583—Coal Tar-Epoxy Paint	11/05
584—Structural Timber and Lumber	5/01
585—Wood Preservatives and Treatment	5/01
Miscellaneous construction materials	
591—Field Fencing Material	5/01
592—Geotextile	5/01
593—Lime	11/05
594—Flexible Membrane Liner	11/05
595—Geosynthetic Clay Liner	11/05

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**642.0100 General****(a) Non-Federal construction  
contract**

The body of a non-Federal construction contract consists of the general provisions, bid schedule, specifications, drawings, and, when applicable, special provisions and wage rate decisions. The general provisions are administrative and technical requirements that apply to all items of construction and to all contracts. In Natural Resources Conservation Service (NRCS) practice, these general provisions are furnished in a pre-printed Form SCS-AS-43. The special provisions are administrative instructions and requirements that apply to the specific contract and are prepared by the responsible administrative office.

The bid schedule tabulates the items of work for which direct payment will be made, shows the estimated quantities of work and the units of measurement, and provides space for the entry of contract prices. The specifications and drawings include the technical details and requirements of the contract. The office responsible for the design of the work develops the drawings and specifications and, in cooperation with the responsible administrative office, the bid schedule.

**(b) Federal construction  
contract**

The body of a Federal construction contract is assembled following the uniform contract format shown in Federal Acquisition Regulations (FAR) 14.201-1. Each section of an invitation for bids contains specific kinds of information for the contractor.

- Section A is the Standard Form 1442 Construction Contract cover sheet.
- Section B is the bid schedule as in non-Federal contract.

- Section C is the specifications and drawings or a reference to their attachment as Section J.
- Section D, packaging instructions, is usually blank.
- Sections E, F, and G have the inspection, performance time, and contract administration data, respectively.
- Section H is the most similar section to the non-Federal special provisions.
- Section I is the *boilerplate* provisions common to all construction contracts. It may include most clauses by reference.
- Section J is the list of attachments.
- Sections K, L, and M are instructions and certifications necessary to complete the bid package properly. These three sections do not become part of the contract.

The technical specialist responsible for the design must work closely with the contracting officer to assure that the contract clauses are coordinated with the design requirements.

**(c) Purpose**

The purpose of Part 642, Specifications of the National Engineering Handbook (NEH) is to establish national standard construction and material specifications and procedures for developing interim and one-time-use specifications, preparing contract specifications, and bid schedules.



## 642.0101 Terms and definitions

The following terms and definitions are established for use in all NRCS documents, publications, and correspondence relating to specifications for construction contracts:

**National Standard Construction Specifications**—State the technical and workmanship requirements for the various operations required in the construction of the works, the methods of measurement, and the basis of payment.

**National Standard Material Specifications**—State the quality of materials to be incorporated in the permanent works.

**Interim Specifications**—Specifications prepared by States for use in contracts that include construction items or materials not covered by national standard specifications.

**Standard Specifications**—National standard and interim specifications.

**Unique or One-Time-Use Specifications**—Specifications for construction or material items that are unique to the contract and are not covered by national standard specifications or State interim specifications. The specifications are prepared within the State and intended for one-time-use only in a specific contract.

**Construction Details**—Prepared by the design office and state the special requirements peculiar to a specific work of construction. They may take the form of written addenda to the standard construction specifications or notes on the drawings.

**Contract specifications**—The complete specifications prepared for a specific contract and consist of an assembly of appropriate standard and one-time-use specifications supplemented by lists and descriptions of items of work and construction details.

## 642.0102 Applicability

The national standard specifications in this handbook were prepared for use in construction work administered by NRCS. They were developed to

- ensure adherence to laws and regulations,
- prevent conflicts within the specifications and between the specifications and other contract requirements,
- prevent omission of essential elements,
- prevent inclusion of extraneous materials,
- provide a uniform basis for interpretation, and
- ensure uniform quality of NRCS project works.

NRCS policy on preparation and use of these specifications is in the National Engineering Manual, Part 542, Specifications.

National standard specifications are prepared for construction operations and construction materials frequently required in NRCS projects. National standard construction specifications are in chapter 2 of this handbook. National standard material specifications are in chapter 3. These specifications will be modified by the Conservation Engineering Division whenever it appears appropriate to do so. Suggestions for changes, additions, deletions, or corrections should be submitted to the Director of the Conservation Engineering Division.

### 642.0103 National standard construction specifications

National standard construction specifications are to be used verbatim. Some national standard specifications have sections that contain alternative methods of achieving work. The specification writer may delete the methods not used in the contract; however, the method selected must be used verbatim. Only methods identified in the specification may be deleted from the national standard construction specification. Details on how to delete the methods and revise the section are included in the instructions.

Each of the construction specifications is supplemented by instructions for its use. These instructions state the applicability of the specification and describe the items of information that must be included in the contract specifications and drawings to completely define the specified item. They also give the conditions under which it may be appropriate to use any of the various methods listed. These supplementary instructions are included for use by design personnel and are not to be included in contract specifications.

### 642.0104 National standard material specifications

National standard material specifications are prepared for those materials whose quality must be uniform in all areas of applicability. National standard material specifications are to be used verbatim. They are not supplemented by instructions for use. Items of information that must be included in the contract specifications to completely describe the materials required for a specific contract are listed in the instructions for use of the construction specifications to which the material specifications are complementary.

Reference to material specifications may be in the national standard construction specifications or may be placed in the construction details (either written in the specifications or noted on the contract drawings).

## 642.0105 Selecting appropriate national standard specifications

The type of work to be done or the type of structural detail required often dictates the construction method or sequence. The specification requirements must be compatible with the methods that must be used. The specification writer must also make sure that the methods selected in one specification are compatible with those selected in another. For example, the method of designating pay limits for excavation and earthfill.

## 642.0106 Interim specifications

States may prepare interim specifications for use in their State for items not covered by national standard construction and material specifications (such as methods or materials unique to a given locality) if there is a recurring need. Interim specifications are not to be developed if an industry standard is available, OMB A119.

Interim construction specifications must:

- Conform to the format of the national standard construction specifications.
- Be numbered consecutively starting with number 200 and be dated and identified. Interim construction specifications prepared by the former National Technical Centers (NTC's) that continue to have application need to be adapted as a State interim and numbered accordingly.
- Contain terms and definitions that are compatible with those used in the national standard construction specifications.
- Be concise and free from ambiguous clauses.
- Contain measurement and payment clauses written in the same manner as those in the national standard construction specifications.

Interim construction specifications are to be used verbatim. Some interim specifications have sections that contain alternative methods of achieving work. The specification author may delete the methods not used in the contract; however, the method selected must be used verbatim. Only methods identified in the specification may be deleted from the interim construction specification. Details on how to delete the methods and revise the section are included in the instructions.

Interim material specifications must:

- Conform to the format of the national standard material specifications.
- Be numbered consecutively starting with the number 300 for States and be dated and identified. Material specifications prepared by the former NTC's that continue to have application need to be adapted by the State and numbered accordingly.
- Describe materials by reference to American Society for Testing and Materials (ASTM) and other accepted reference standards and specifications.
- Interim material specifications are to be used verbatim.

The geographical area of application of each interim construction or material specification must be identified at the lower left corner of each page of the specification. The identifying symbol should consist of NRCS and date followed by the State abbreviation and project name:

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States are to review and concur with all interim specifications when conducting peer reviews for designs conducted by another State. For Class VIII engineering design approval level projects, interim specifications need to be submitted and identified when transmitting to the Director of the Conservation Engineering Division for review. When the specification for a material covered by an existing ASTM or other accepted specification or standard has requirements other than those included in the existing specification or standard, the engineering staff that prepared the specification shall prepare a written justification for the deviation. This justification is submitted with the specification to the State that will conduct the peer review.

Interim specifications that are technically sound and have proven to be national in scope will be considered for inclusion in the national standard construction and material specifications.

## 642.0107 One-time-use specifications

Unique or one-time-use specifications are prepared for construction work or construction materials not covered by standard specifications and are for one-time-use in a specific contract. These specifications shall be approved before their use by the state conservation engineer. If such one-time-use specifications are later considered for adoption as interim specifications, they shall be submitted for approval according to the procedures prescribed for review of interim specifications. One-time-use specifications shall be formatted according to the national standard specifications. They shall be numbered in the 400's for construction specifications and in the 600's for material specifications. The conditions and requirements for interim specifications are also applicable to one-time-use specifications.

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## 642.0108 Bid schedule

The bid schedule forms the basis for payments to the contractor and must list all items of work for which direct payment will be made. Since the efficiency of contract administration is directly affected by the manner in which the schedule is organized, the preparation of the bid schedule requires the close cooperation of the responsible design engineer and the contracting officer. Operating procedures must include provision for administrative review of the bid schedule in the early stages of its development as well as upon completion. Example 1-1 shows a typical bid schedule.

### (a) Designating the items of work

Considerable judgment based on design, construction, and contracting experience is required to divide the work into items for inclusion in the bid schedule. The schedule must be sufficiently comprehensive to allow the contractor to make reasonably accurate estimates of the cost of doing the work. It must also enable the contracting officer to keep orderly records of work progress and to accurately compute progress and final payments due. On the other hand, the number of scheduled items should be held to the minimum needed to accomplish these purposes. The practicable extent to which the work should be divided into scheduled items must be judged in light of the quantities of work involved and local construction practices and procedures. The bid schedule should include those items necessary to result in fair and equitable treatment of the owner(s) and the contractor.

### (b) Division of the work into items

For maximum efficiency of contract administration, the work should be divided into items based on the following principles:

**The work should be divided into items in a manner that ensures reasonable refinement of unit prices.** The cost of any given type of work will vary according to its complexity and the complicating effects of the conditions under which it must be done. Generally, the scope of a bid item should be limited to a given type of work of a particular order of complexity and cost. Exceptions to this rule may be justified on small jobs involving relatively small quantities of work.

**The work should be divided into items to prevent confusion of supplemental job requirements.** Similar types of work may involve different sizes of components or different qualities of materials. To prevent confusion, each variation of a given type of work should be established as a separate item of work. Also, the grouping of nonrelated items or similar components of separate works of improvement should be avoided.

**The work should be divided into items in a manner consistent with the cost sharing arrangements established in the watershed plan and the project agreement.** For many projects, certain works of improvement may be paid for entirely or partly by the local sponsoring organization. To facilitate accounting of project costs, the work for such improvements should be established as separate items of work in the bid schedule.

### (c) Numbering and titling

Bid items must be numbered consecutively beginning with the number one (1). Subitem numbers shall not be used. Each bid item shall be given a descriptive title that distinctly identifies the work to be done. **All items that involve significant quantities of work (or significant procurement cost in the case of prefabricated units) should be designated as a separate bid item.**

An item involving a **relatively insignificant** quantity of work that is subject to only **minor variation** may be designated as a subsidiary item. Compensation for this item is included in the payment for another item that has a logical relationship to the subsidiary item. Subsidiary items are not numbered nor listed in the bid schedule, but must be designated and described in the "Items of Work and Construction Details" of the item and also referenced in the "Items of Work and Construction Details" section of the specification for the pay item to which it is subsidiary.

### (d) Pay items

Measurable items whose quantities may be subject to variation should be designated for payment on a unit price basis. The estimated quantity of work and units of measurement must be shown in the schedule. Items that involve significant quantities of work, but are either not conveniently measurable or have quantities that are not subject to variation, may be designated for payment on a lump-sum basis.

Units of measurement must be compatible with the measurement and payment clauses of the specifications.

#### **Example 1-1** Typical bid schedule

<b>Bid Schedule</b>							
Item	Work	Spec. no.	Est. quan.	Unit	Unit price	Amount	
1	Clearing, class A	1	12.5	acre	_____	_____	
2	Mobilization and demobilization	8	1	job	<u>xxxx</u>	_____	
3	Excavation, common	21	300	cubic yard	_____	_____	
4	Rock riprap	61	500	ton	_____	_____	
					Total	\$_____	



## 642.0109 Contract specifications

Contract specifications shall consist of an assembly of the appropriate standard and one-time-use construction and material specifications. Each construction specification will be supplemented by a section entitled *Items of Work and Construction Details*. The supplemental section of each construction specification shall

- be prepared especially for each invitation,
- designate by number and title all of the bid items (exactly as numbered and titled in the bid schedule) to be performed in conformance with the requirements of the specification,
- designate all subsidiary items to be performed in conformance with the requirements of the specification,
- for each designated item of work, state such supplemental requirements and items of information as are needed to relate the construction specification to the job at hand,
- bear the number that is next in sequence after the number of the last section of the standard specification, and
- be inserted into the contract specification as the last page(s) of the construction specification.

### (a) Compilation

A contract specification must conform verbatim to the standard construction or material specification except where a section in the standard specification contains more than one method, only the applicable method need be included. The methods selected must be compatible with one another and with the conditions, materials, and methods prevalent in the area of applicability

and the requirements of the specified structural element.

More than one method may be included in any section of a construction specification, in which case, the methods shall be numbered sequentially (i.e., Method 1, Method 2, ...). The method applicable to each respective item of work, material, measurement, and payment shall be identified in the construction detail section. The optional methods are identified in the instructions for each construction specification.

When only one method of measurement and payment is included in the construction specification, deletions are required in the standard specification. In addition to deletion of the other methods contained in the standard specification, the text ***All Methods The following provisions apply to all methods of measurement and payment*** must be deleted from the last paragraph and the remaining text left justified. This guidance is included with the instruction associated with each construction specification.

### (b) Identifying

The title of each contract specification shall be the same as that of the standard construction or material specification. One-time-use specifications shall have titles that do not conflict with the standard specifications in the contract.

When a construction specification is modified for a specific job by deleting specific methods from the standard specification, the state abbreviation and project name shall be added. This indicates to the user and reviewers that the standard specification has been modified. The date at the bottom of the pages of the national standard specification shall not be changed. The pages should be renumbered consecutively.

When a State elects to use a specific selection of methods from a standard construction specification as a State construction specification, the

State version of this specification shall bear the same number and date as the standard construction specification plus the State name added. The pages should be renumbered consecutively.

When a construction specification is not modified by deleting specific methods from the standard specification, the numbering and footer information on the standard specification shall not be changed.

The *Items of Work and Construction Details* pages shall have **NRCS – (effective date of the IWCD)** on the first line in the lower left corner of the page, and the **State abbreviation – Project Name** on the second line in the lower left corner of the page. The specification number, together with the page number, will be located at the lower right corner of each page of the IWCD.

### (c) Measurement and payment

Each construction specification contains a section that describes the method of measurement to be used for the work performed or the material furnished and the payment method for full compensation of the work described. The basis for designating separate work items was described in 642.0108, Bid schedule. Within the conditions described therein, each of the construction specifications may be modified to include a lump sum payment method. The format and wording of the method is generally as follows:

For items of work for which specific lump sum prices as established in the contract, the quantity of work will not be measured for payment. Payment for this item will be made at the contract lump sum price for the item and will constitute full compensation for completion of the work.

### (d) Preparing construction details

The construction details for each item of work should be concise. They normally include the following items. (An individual instruction for use of each construction specification is in chapter 2 of this handbook.)

- Definitions and descriptions needed to define the scope of work.
- Information required to define the types and qualities of materials to be used in the work.
- Special requirements, such as foundation preparation, grading tolerances, provisions for coordinating with other work, and obtaining "as built" geology data.
- Other items of instruction necessary to define the construction requirements peculiar to the item of work.

The construction details should contain only information and instructions needed to relate the construction specification to the job. Provisions of the specification do not need to be emphasized or interpreted by repetition of the provisions in the construction details in the same or similar words.

In preparing construction details, notes on the drawings have the effect of specifications in defining the type and quality of materials to be furnished and in defining the scope of the work. Supplemental information or requirements that are directly related to details shown on the drawings may be stated in notes on the drawings rather than in the specifications if that arrangement more conveniently and effectively conveys the information to the individuals benefiting from the data. The engineer responsible for the design must use good judgment in deciding where various supplemental data should be located for maximum effectiveness. Generally, information shown by notes on the drawings need not be repeated in the specifications; however, if there is a compelling reason for doing so, great care must



be taken to prevent conflicts between the notes and the specifications.

Construction details should not conflict with or interpret the general terms and conditions of the contract. They may modify a clause in the standard specifications if the standard specification contains the phrase "unless otherwise specified ...."

Example 1-2 shows a typical construction detail prepared for a specific contract for excavation. This information is inserted at the end of Construction Specification 21, Excavation. Example 1-3 shows a typical construction detail to cross-reference a subsidiary item, earthfill (see example 1-2, item g). This detail would be written for a specific contract and inserted into Construction Specification 23, Earthfill.

**Example 1-2** Typical construction detail for a specific contract for excavation

## 11. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and construction details are:

a. Bid Item 7, Excavation, Foundation, Common

- (1) This item shall consist of the excavation of unsuitable materials from the foundation of the main dam in areas that are located within the base area of the dam, but outside the limits of cutoff trench.
- (2) The depth of excavation required is estimated five (5) feet at the central half of the base area of the dam and tapering to about two (2) feet at the edges. The actual depths and extent of foundation excavation will be determined by the engineer after examination of the material encountered.
- (3) The sides of all foundation excavations shall be steeper than 1 1/2 horizontal to 1 vertical.
- (4) In Section 5, Use of Excavated Materials, method 1 will apply.
- (5) In Section 6, Disposal of Waste Materials, method 2 will apply.
- (6) In Section 10, Measurement and Payment, method 1 will apply.

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**Example 1-2** Typical construction detail for a specific contract for excavation—Continued

- b. Bid Item 8, Excavation, Cutoff Trench, Common
- (1) This item consists of all common excavation required within the limits of the cutoff trench as shown on the drawings.
  - (2) The depth of excavation required is estimated to extend generally down to near elevation 1105. The actual depths of excavation will be determined by the engineer after examination of the materials encountered.
  - (3) In Section 5, Use of Excavated Materials, method 1 will apply.
  - (4) In Section 6, Disposal of Waste Materials, method 2 will apply.
  - (5) In Section 10, Measurement and Payment, method 1 will apply.
- c. Bid Item 9, Excavation, Cutoff Trench, Rock
- (1) This item consists of all rock excavation required within the limits of the cutoff trench as shown on the drawings.
  - (2) In Section 4, Blasting, a blasting plan shall be furnished to the engineer for review prior to the start of any blasting operations.
  - (3) In Section 5, Use of Excavated Materials, method 1 will apply.
  - (4) In Section 6, Disposal of Waste Materials, method 2 will apply.
  - (5) In Section 10, Measurement and Payment, method 1 will apply.
- d. Bid Item 10, Excavation, Principal Spillway, Common
- (1) This item consists of all common excavation required within the limits shown on the drawings for the installation of the pipe conduit, riser footing, and outlet structure except for that portion of the excavation located within the limits of the cutoff trench or above the lower limit of foundation excavation.
  - (2) In Section 5, Use of Excavated Materials, method 1 will apply.
  - (3) In Section 6, Disposal of Waste Materials, method 2 will apply.
  - (4) In Section 10, Measurement and Payment, method 1 will apply.

**Example 1-2** Typical construction detail for a specific contract for excavation—Continued

## e. Bid Item 11 Excavation, Principal Spillway, Rock

- (1) This item consists of all rock excavation required within the limits shown on the drawings for the installation of the pipe conduit, riser footing, and outlet structure except for that portion of the excavation located within the limits of the cutoff trench.
- (2) In Section 4, Blasting, a blasting plan shall be provided to the engineer for review prior to the start of any blasting operations.
- (3) In Section 5, Use of Excavated Materials, method 1 will apply.
- (4) In Section 6, Disposal of Waste Materials, method 2 will apply.
- (5) In Section 10, Measurement and Payment, method 2 will apply.

## f. Bid Item 12, Excavation, Emergency Spillway, Common

- (1) This item consists of all common excavation required within the limits shown on the drawings for the construction of the emergency spillway.
- (2) The grading tolerances for emergency excavation control section (Emergency Spillway Stations 11+30 to 12+10) shall be plus or minus 0.1 foot from grade shown. The grading tolerances for other emergency spillway excavations shall be plus or minus 0.2 foot from the grades shown.
- (3) In Section 5, Use of Excavation Materials, method 1 will apply.
- (4) In Section 6, Disposal of Waste Materials, method 2 will apply.
- (5) In Section 10, Measurement and Payment, method 1 will apply.

**Example 1-2** Typical construction detail for a specific contract for excavation—Continued

## g. Subsidiary Item, Excavation, Borrow, Common

- (1) This item consists of all common excavation required to obtain suitable earthfill materials required to construct the permanent works.
- (2) In Section 8, Borrow Excavation, all borrow areas shall be graded to prevent the ponding of water. Finished slopes shall not be steeper than four (4) horizontal to one (1) vertical.
- (3) In Section 10, Measurement and Payment, no separate payment will be made for borrow excavation. Compensation for borrow excavation will be included in the payment for Bid Item 13, Earthfill Zone I.

**Example 1-3** Typical construction detail to cross reference a subsidiary item**10. Items of work and construction details**

Items of work to be performed in conformance with this specification and construction details are:

- a. Bid Item 13, Earthfill, Zone I
  - (1) This item consists of placing and compacting all suitable materials required to construct Zone I of the embankment and the desilting pond. It also includes back-filling the cutoff trench and constructing a two (2) foot thick blanket on the left abutment as shown on the drawings.
  - (2) In Section 2, Materials, the following shall apply:
    - (a) The material for Zone I shall be the natural deposits of gravel, sands, silts, and clays obtained from borrow area 1 and suitable materials from the required excavations.
    - (b) Material selected to construction Zone I, Earthfill, shall contain not less than 35 percent fines (material passing the No. 200 sieve) when determined on a dry weight basis of the portion of the mass smaller than three (3) inches in nominal diameter, when tested in accordance with ASTM D-1140.
    - (c) Unsuitable or oversize material shall be removed from fill materials before placement on the embankment and shall be wasted in the designated disposal locations shown on the drawings. Acceptable rock materials larger than six (6) inches in diameter shall be removed from Zone I and placed in Zone II or placed as rock riprap as applicable.
  - (3) In Section 4, Placement, the fill shall be placed in layers not exceeding nine (9) inches in thickness prior to compaction. The maximum size of rock incorporated in the fill matrix shall be six (6) inches.
  - (4) In Section 5, Control of Moisture, the moisture content of the fill matrix at the time of compaction shall be maintained with the range of two (2) percentage points below to two (2) percentage points above optimum moisture content.
  - (5) In Section 6, Compaction, compaction shall be Class A. The fill matrix shall be compacted to at least ninety-five (95) percent of the maximum density determined by compaction tests of the fill materials by the appropriate method outlined in ASTM D698.
  - (6) In Section 9, Measurement and Payment, Method 2 and 6 will apply. Such payment will constitute full compensation for related Subsidiary Item, Excavation, Borrow, Common.