Stream Simulation

Appendix H—Sample Contract Provisions

This appendix includes sections from a contract developed on the Willamette National Forest in Oregon: the list of items, supplemental specifications, Section H - Special Contract Requirements, and drawings. The example contract documents can serve as "starting points" for your project, but they will need to be thoroughly modified for local conditions.

Table H 1—Sample schedule of items (Bid Schedule)

Item No.	Description	Method of Measurement	Unit	Estimate Quantity	Unit Price	Total
Reconstruction of Road _____ , mp _____						
152(02)	Construction surveying and staking (road)	AQ	Sta	3	$_____	$_____
171(03)	Construction surveying and staking (structure)	AQ	Each	1	$_____	$_____
201(03)	Clearing and grubbing, slash treatment methods for tops and limbs 12, logs 12, stumps 12, utilization of timber 2	LSQ	LS	All Req'd	$_____	$_____
202(02)	Removal of existing 13-ft.-diameter multiplate pipe, disposal method A	AQ	Ea	1	$_____	$_____
204(19)	Soil erosion and pollution control	LSQ	LS	All Req'd	$_____	$_____
204(20)	Dewatering and sediment control	LSQ	LS	All Req'd	$_____	$_____
206(02)	Foundation fill	DQ	CY	1,565	$_____	$_____
206(07)	Structural excavation	LSQ	LS	All req'd	$_____	$_____
251(01)	Placed riprap, class 6, method A	DQ	CY	138	$_____	$_____
251(14)	Placed channel rock, rock-36, method D	AQ	EA	30	$_____	$_____
251(15)a	Placed streambed simulation rock, subarmor, method D	DQ	CY	315	$_____	$_____
251(16)	Filler material, placement method E	DQ	CY	26	$_____	$_____
301(10)	Untreated aggregate course, type base, grading C, compaction B	DQ	CY	84	$_____	$_____
552(03)	Structural concrete, class A (AE), for footings	AQ	CY	69	$_____	$_____

Table H 1—Sample schedule of items (Bid Schedule) continued

Item No.	Description	Method of Measurement	Unit	Estimate Quantity	Unit Price	Total
Reconstruction of Road _____ , mp _____						
554(03)	Reinforcing steel	LSQ	LS	All Req'd	$_____	$_____
601(01)	Mobilization	LSQ	LS	All Req'd	$_____	$_____
607(03)	Gate temporary, type I barricade, size 16' wide x 2 8" high	AQ	Each	2	$_____	$_____
617(06)	Steel 5.75" x 15" corrugation long-span structure, plate zinc-coated, 34' span, 15' 3" rise, .25" thickness	AQ	FT	28	$_____	$_____
625(02)	Seeding, hydraulic method (with mulch)	DQ	Acre	0.12	$_____	$_____

SUPPLEMENTAL SPECIFICATION 157—SOIL EROSION CONTROL

Description

157.01

Add the following after the first sentence: The work shall also include stream bypass construction and dewatering.

Materials

157.02 Requirements

Add the following:

Coarse Aggregate for Portland Cement Concrete..... 703.02
Plastic Lining..... 725.19
Bentonite..... 725.20
Erosion Control Culvert Pipe 713.15
Plastic Pipe 706.08
Aluminum-Alloy Corrugated Pipe 707.03
Metallic-Coated Corrugated Steel Pipe 707.02
Watertight Gaskets..... 712.03

Construction Requirements

157.03 General

Add the following after the first paragraph:

The contractor's written plan shall include, as a minimum, the dewatering and sediment control requirements AS SHOWN ON THE DRAWINGS and in this specification. The contractor shall submit the complete plan at least 15 days prior to start of work and shall not commence work until approved in writing by the contracting officer. The plan shall be executed without modification unless authorized in writing by the contracting officer. The work shall be in conformance with applicable Federal, State, and local government regulations.

157.04 Controls and Limitations on Work. Add the following:

The contractor shall operate in a manner that will protect aquatic organisms.

Construct the dewatering and sediment control requirements AS SHOWN ON THE DRAWINGS, in accord with and according to the contractor's approved plan.

Notify the contracting officer of the intention to dewater the stream at least 72 hours in advance. DO NOT REROUTE WATER until approved by the contracting officer. A fisheries biologist (approved by the contracting officer) and other Government personnel must be present and prepared to rescue aquatic organisms prior to rerouting of the stream. Work that would jeopardize fish shall not be permitted during the dewatering operation. Dewater the stream slowly and incrementally in order to facilitate the fish rescue. The rescue operation will generally take several hours.

The newly constructed simulated streambed must be approved by the contracting officer prior to releasing water through the project site. After approval, water shall be released slowly and incrementally over a period of at least 1 hour, or as approved by the contracting officer.

157.09 Diversions

Add the following:

Stream Bypass Dam and Pipe. Construct a sandbag dam and bypass pipe to divert the stream water around the excavation. A channel lined with an impermeable membrane may be substituted for the bypass pipe when approved by the contracting officer.

Primary Bypass Dam. Construct the sandbag dam in a dry condition by first pumping the stream around the dam, placing a feeder dam, or placing temporary sandbag cofferdam(s). Place the sandbag dam AS SHOWN ON THE DRAWINGS or approved by the contracting officer. Remove rocks and other irregularities from the streambed to form a smooth bedding for the dam. Place the dam so that water does not seep from the downstream side of the dam; if seepage occurs, improve the dam by adding sandbags, improving or adding seals, or adding pumping or other means to eliminate seepage from the dam.

Bypass Pipe. Place bypass pipe AS SHOWN ON THE DRAWINGS or approved by the contracting officer and in accordance with Section 603-Metal Pipe or 603B-Plastic Pipe. The upstream invert of the pipe shall be placed at the lowest point in the stream channel; remove rocks from the streambed, as needed. Install joints and elbows, as needed to accommodate the site layout. Use watertight seals, when SHOWN ON THE DRAWINGS. Lay of the pipe must be approved by the contracting officer prior to backfilling.

Compact the backfill according to method A. Allow water to pass through pipe only after a downstream splash apron has been prepared in a manner

that will protect the stream from scour and turbidity. The installation shall be constructed in a manner that avoids injury to aquatic organisms, such as fish being dashed onto sharp rocks at the outfall of the pipe.

Feeder Dam and Pipe. Construct a sandbag dam and pipe upstream of the primary bypass dam/pipe AS SHOWN ON THE DRAWINGS or approved by the contracting officer, for the purpose of feeding the streamflow into the primary bypass pipe and improving the efficiency of the primary bypass dam.

Downstream Dam. When water flows into the work area from downstream, place a sandbag or geotextile/straw-bale dam AS SHOWN ON THE DRAWINGS or approved by the contracting officer to prevent water from entering the work area.

Sandbags. Place sandbags AS SHOWN ON THE DRAWINGS or approved by the contracting officer. Prior to placing the lower rows of sandbags, remove the larger rocks from the streambed to form a smooth bed. Sandbags shall contain only clean sand or coarse concrete aggregate. The bags shall be loosely filled and tamped in place to minimize seepage between, under, and around the bags.

Primary Dam Impermeable Membrane. Place the membrane within the sandbag dam and entrenched in the streambed AS SHOWN ON THE DRAWINGS or approved by the contracting officer. The membrane shall have a minimum thickness of 10mil and be free of tears or punctures. Compact soil in the trench along bottom edge of the membrane to form a water seal; when approved by the contracting officer, a small amount of granular bentonite may be used along the bottom edge of the membrane to form a watertight seal between the membrane and the streambed. Cut a hole in the membrane to fit the bypass pipe and seal the membrane to the bypass pipe or the bypass pipe collar using such means such as adhesive strips to form a durable watertight seal.

Bypass Pipe Collar. Install and maintain a leak-proof pipe collar immediately downstream of the impermeable membrane AS SHOWN ON THE DRAWINGS or approved by the contracting officer. The collar shall be an Ethylene Propylene Diene Monomer (EPDM) liner having a thickness of 45mil. A smooth round hole shall be cut in the liner with diameter one-half that of the bypass pipe, and pulled over the end of the pipe into place. EPDM-seam tape and compression band(s) shall be used to form a durable watertight seal between the collar and the pipe. The liner

shall extend to the sides and top by a distance of one pipe diameter. The lower edge of the collar shall be entrenched in the streambed along the downstream side of the dam's impermeable membrane. When approved by the contracting officer, a small amount of granular bentonite may be used along the bottom edge of the collar to form a watertight seal between the collar and the streambed.

Pumps. Install pumps as required to reroute the stream around the construction site and dewater foundations. When failure of a pump would result in movement of sediment or turbidity beyond the work area, a back-up pump shall be readily available.

Bypass Pump. When SHOWN ON THE DRAWINGS, supply and operate a pump that has the pumping capacity greater than the flow in the stream, to be used for installing and removing the gravity bypass pipe(s) and dam(s), and at other times to facilitate construction operations (and used during storms to supplement the gravity bypass). The pump shall be equipped with approved fish screens, appropriate suction and discharge hoses, fittings, and flow regulation equipment needed to route the stream around the construction site to the discharge point SHOWN ON THE DRAWINGS or approved by the contracting officer. Pumps shall be clean and free of leaks. Oil lubricant in the pump seal systems shall consist of food-grade mineral oil.

Sump Pumps. Supply two pumps capable of dewatering the structure foundation AS SHOWN ON THE DRAWINGS or approved by the contracting officer. Pumps shall be clean and free of leaks. Sediment in the sump pump discharge shall be removed from the water prior to reentering the waterway.

Sump Water Discharge. Discharge sump water AS SHOWN ON THE DRAWINGS or as approved by the contracting officer. Apply one or more methods to remove sediment from sediment-laden water. Apply additional methods, as needed, to eliminate all visual evidence that sump water discharge is causing a downstream turbidity increase. Monitor operations to insure continuing compliance with water quality requirements. Note, in the following methods, where a manufacturer is shown, there may be other manufacturers who supply similar products or methods of treatment. Unless stated otherwise, it is not our intent to endorse a particular manufacturer in this document. The reader should further research similar products.

(a) Natural Vegetation/Soil Dispersal and Filtration. Sump water may be discharged onto areas of ground most advantageous for dispersal and filtration of sediment, for example, flat heavily vegetated soil. When single point discharge does not function adequately, discharge sump water into a perforated pipe laid level so that the sump discharge will disperse over a wide area.

(b) Silt Bag(s) Filtration. Discharge sump water into a silt bag. The bag shall be constructed of Mirafi 180N, or approved equal, with sewn seam strengths of 90-percent efficiency according to ASTM D4632. The bag shall be constructed to hold and filter sump water. Place silt bag(s) on level ground above a layer of straw 1-foot thick.

(c) Settling Basin(s). Discharge sump water into a basin or basins. The basins may be premanufactured tanks, folding tanks, geotextile, or membranes placed over a sandbag or weed-free straw berm, or other similar basins designed to separate sediment from the water.

Suspended Sediment Coagulation Agent. When the above methods (a), (b), or (c) do not function adequately, add an approved coagulation agent to the water prior to discharging the water onto natural vegetation, silt bag(s), or settling basin(s) described in methods (a), (b), or (c). The flocculation agent shall be Chitosan-based Storm-Klear Gel-Floc, or an approved equal. Storm-Klear products are manufactured by Vanson HaloSource, Inc., and are distributed by Natural Site Solutions, Redmond, Washington. Use the suspended sediment coagulation agent according to the manufacturer's recommendations.

After placement of the simulated stream materials AS SHOWN ON THE DRAWINGS, wash the fines into the surface of the new streambed. Treat the sump water discharge as before.

Sedimats. Place Sedimats across the streambed AS SHOWN ON THE DRAWINGS or approved by the contracting officer and as recommended by the product manufacturer. The Sedimat is a proprietary product manufactured by Indian Valley Industries, Inc. and distributed by Columbia Storage Inc., Vancouver, Washington. Use Sedimats according to the manufacturer's recommendations.

157.13 Maintenance and Cleanup

Add the following:

Maintain all elements of the operation in order to dewater the foundation, facilitate construction, prevent harm to aquatic organisms, and prevent sediment and turbidity from entering the stream.

When removing the sandbag dam(s), sand must be removed from the waterway; if coarse concrete aggregate is used in the sandbags, the gravel may be distributed evenly across the waterway as directed by the contracting officer.

Geotextiles used in sediment control operations shall be removed from Government property after use.

Bare soil left from filtering or settling operations shall be shaped to drain, seed, and mulch with weed-free straw.

Measurement

157.15

Add the following after the last item:

Measure dewatering and sediment control as a lump sum.

SUPPLEMENTAL SPECIFICATION 251—STREAMBED CONSTRUCTION

Description

251.01

Add the following after the first sentence:

The work shall include streambed-simulation construction.

Materials

251.02 Requirements

(Add the following materials)

Channel Rock 705.07

Streambed-Simulation Rock 705.08

Construction Requirements

Add the following:

251.04A Placed streambed-simulation rock and channel rocks

Prior to the start of construction, submit a written plan for obtaining, mixing, placing, and shaping streambed-simulation rock, channel rocks, and select borrow. The plan must indicate how the material will be tested to verify that it meets all of the requirements of this specification. Do not substitute onsite materials for material sources specified in the contract, unless a revised plan is first submitted and approved in writing by the contracting officer.

Placed stream-simulation rock is rock placed on a prepared surface to form a well-graded, low-permeability mass, similar in appearance and texture to the adjacent natural streambed. No metal track or rubber-tired equipment shall be driven on or operated directly on metal or concrete structure surfaces. Onsite excavation materials will only be accepted as substituting for specified source material, if it can be shown by the contractor to meet all of the requirements of the specified material. Material not meeting the gradation or diameters specified will not be accepted, unless approved in writing by the contracting officer.

Method D, Machine Placed. Place streambed-simulation-rock in one or more layers, not to exceed 6 inches or 1.5 x* D_{84}, whichever is larger. Fill voids within each layer with filler material according to 251.10A before placing the next layer. Do not place streambed-simulation rock by methods that cause segregation or damage to the prepared surface or culvert surface. Place or rearrange individual rocks by mechanical methods to obtain a compact, low-permeability mass matching the stream-simulation

bed details SHOWN ON THE DRAWINGS. Place channel rocks in the configurations and locations SHOWN ON THE DRAWINGS.

Method E, End Dumped. Dump streambed-simulation rock in one or more layers not to exceed 6 inches or 1.5 x* D_{84} diameter, whichever is larger. Fill voids within each layer with filler material according to 251.10A before placing the next layer. Distribute larger rocks throughout the mass of stone. Obtain a uniformly dense, compact, low-permeability bed with a surface matching the stream-simulation bed details, as SHOWN ON THE DRAWINGS. Place filler material according to 251.10A. Place channel rocks in the configurations and locations as SHOWN ON THE DRAWINGS.

Method F, Hand Placed. Place stream-simulation rock by using hand labor. Material may be hand-carried, or carried in wheelbarrows and end-dumped to obtain its full thickness or in layers, if the depth exceeds 24 inches. Compact each load using hand-operated equipment to obtain a uniformly dense, compact, low-permeability bed with a surface matching the stream-simulation bed details as SHOWN ON THE DRAWINGS. Place filler material according to 251.10A before placing the next layer. Place channel rocks in the configurations and locations SHOWN ON THE DRAWINGS.

251.10A. Placed Filler Material

Fill all voids between individual streambed-simulation rocks and all voids left during placement of channel rocks and streambed-simulation rock adjacent to footings, concrete structures, or corrugated pipes with select borrow as specified in Subsection 704.07. Use water pressure, metal tamping rods, and similar hand-operated equipment to force material into all surface and subsurface voids between the structure and rocks and between individual rocks. Fill shall extend to 100 percent of the rocks' height between layers and 67 percent of their height on the bed surface or as SHOWN ON THE DRAWINGS.

Measurement

Add the following:

Measure placed channel rocks by each. Measure streambed-simulation rock by the cubic yard in place. Measure filler material by the cubic yard in place.

SUPPLEMENTAL SPECIFICATION 705—STREAMBED-SIMULATION MATERIALS

Add the following:

705.07 Channel rocks – Channel rocks shall have a long axis 133 percent or longer than the median axis.

Table 705-4—Size requirement for channel rocks

Channel Rock Class (diameter, inches)	Approximate Weight (pounds)	Median Axis Dimension & Variation in inches
Rock-4	3	4 +/- 1
Rock-6	10	6 +/- 1
Rock-9	33	9 +/- 2
Rock-12	80	12 +/- 2
Rock-16	185	16 +/- 2
Rock-20	365	20 +/- 2
Rock-24	630	24 +/- 3
Rock-30	1,230	30 +/- 3
Rock-36	2,120	36 +/- 4
Rock-42	3,370	42 +/- 4
Rock-48	5,030	48 +/- 5
Rock-54	7,160	54 +/- 5
Rock-60	9,820	60 +/- 6

Note: Rock classes are shown on the drawings for all key features to be constructed.

Table 705-7– Project gradation requirements for streambed-simulation bed material, (inches)

Standard sieve	Stream-simulation bed material (percent finer)	Filler material (percent finer)

Note: Figure 7.18 shows how to fill out table 705-7.

SPECIAL CONTRACT REQUIREMENTS (H-CLAUSES)

H.1 SEASONAL RESTRICTIONS

For protection of resources, time restrictions will apply. Work will be conducted only during the time frames listed below:

- All work shall be completed between _____ and _____.
- Site disturbance and all other general construction work may not begin until _____, unless wildlife restrictions are waived by the district wildlife biologist.
- All in-water work is restricted to _____ through _____, unless extended by the (local permitting agency, such as Oregon Department of Fish and Wildlife).

H.2 PHYSICAL DATA (FAR 52.236-4) (APR 1984)

Data and information furnished or referred to below is for the contractor's information. The Government shall not be responsible for any interpretation of, or conclusion drawn from, the data or information by the contractor.

The indications of physical conditions on the drawings and in the specifications are the result of site investigations by the _____ (Forest Service, FHWA, etc.). The investigational methods have included the site survey as shown on the drawings and visual observations of the ground surface.

Weather conditions typical for this area indicate the following normal fire season: _____ to _____.

H.3 LANDSCAPE PRESERVATION

The contractor shall not remove, deface, injure, or destroy trees, shrubs, lawn, or natural features not designated for treatment. The contractor shall confine operations to within the clearing limits or other areas designated in the contract documents and prevent the depositing of rocks, excavated materials, stumps, or other debris outside of these limits. Material that falls outside of these limits shall be retrieved, disposed of, or incorporated in, the work as directed by the contracting officer.

To prevent fuel and oil spills. The contractor shall maintain storage facilities for oil or oil products on site; appropriate preventive measures shall be taken to insure that any spill of such oil or oil products does not enter any stream or other waters of the United States. When pumps are used near a stream, a fuel containment pan shall be placed under the pump to prevent fuel and oil contacting the soil in the event of a spill from the pump. If a spill of a petroleum product should occur in water, the contractor shall immediately notify the engineer and the (local Emergency Response System, such as Oregon Emergency Response System).

Servicing of all equipment shall be done only in the areas approved by the contracting officer. If the total oil or oil products storage exceeds 1,320 gallons or if any single container exceeds a capacity of 660 gallons, the contractor shall prepare a spill prevention control and countermeasures plan. Such a plan shall meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer.

No objectionable material shall be allowed to enter any stream, river, lake, or other body of water. Material which falls in these areas shall be retrieved and disposed of, or incorporated into the work, as directed by the contracting officer. Damage to vegetation or structures outside the project limits shall be repaired, as directed by the contracting officer.

The contractor shall not operate equipment or otherwise disturb the natural vegetation and soil beyond the areas flagged on the ground or beyond 2 feet from the top of cuts or toes of fills.

Prior to the start of construction, the contractor shall submit to the engineer for approval a schedule and plan for soil erosion and pollution control measures for the following phases of work:

- Item 157—Dewatering And Sediment Control.
- Item 201—Clearing and Grubbing.
- Item 203—Removal of Structures and Obstructions.
- Item 209 or 208—Structural Excavation.
- Item 251—Channel Rock, Streambed Simulation Rock, Select Borrow.
- Item 552—Structural Concrete.

Stream Simulation

The soil erosion and pollution control measures shall be designed to prevent any visually perceptible difference in turbidity of the water flowing 100 feet downstream of the project (when compared to the water upstream of the project). The plan shall incorporate, as a minimum but not limited to, the measures AS SHOWN IN THE DRAWINGS. The following control measures and materials shall be available on the project site:

- Plastic sheets or other suitable covers for exposed soil during rainstorms.
- Weed-free straw bales, silt fences or other similar erosion barriers placed at the lower edges of soil slopes that prevent soils from eroding into adjacent streams.
- Covering of all exposed areas of soils with certified weed-free straw mulch upon final completion of the work.
- Sump discharge for dewatering the excavation shall use settling ponds or distribution systems (for example, perforated pipe laid on the ground away from streams) placed in a manner that will cause water infiltration into the surrounding soils.
- Temporary stream diversions, as shown in the drawing or as improved upon by the contractor and approved by the engineer.
- Other measures and materials proposed by the contractor and approved by the contracting officer.

If construction activities cause a visually perceptible increase of stream turbidity for a period in excess of 30 minutes, the contractor shall cease the operations that are causing the turbidity and modify the control measures, as needed to prevent further pollution.

The contractor shall have a SPILL RESPONSE KIT on the project whenever equipment is operating. The spill kit shall be sufficient to absorb up to 34 gallons of oil and be designed to float on the surface, while absorbing oil and repelling water. The kit shall meet or exceed the physical properties of the “New Pig Products Spill Kit #408.”

Equipment shall be furnished on a fully operational basis of modern design and in good operating condition with no fuel or oil leaks. Repairs and move-in/move-out are the contractor’s responsibility. All equipment shall be power-washed to remove all foreign or noxious seeds/weeds prior to entering Forest Service land.

Straw shall be certified weed free.

H.4 MOISTURE SENSITIVE SOILS

Contractors are cautioned that the roadway structure must be designed so that the completed road will support highway-legal loads during a limited-use season. Construction equipment often subjects the uncompleted roadway structure to loadings it was not designed to support. This is especially critical during periods of excessive moisture and will require careful selection and scheduling to permit efficient operation. The contractor at their expense shall correct any damage resulting from operations that render the material unsuitable for use or results in potential siltation of streams.

H.5 VALUE ENGINEERING

Value engineering change proposals which change the service or function of a facility or produce irreconcilable conflicts with management objectives will not be considered.

The following work is excluded from consideration under the value engineering clause: NONE.

H.6 PRODUCT SUBSTITUTION

Any modification of items, designs, materials, products, or equipment (including Government-furnished property), made necessary because of a substitution, shall be the responsibility of the contractor without adjustment in contract price or time. The contracting officer's approval of any substitute shall not affect the contractor's responsibility for such modification. Any and all substitutions shall be requested by the contractor after award of the contract has been made.

No approvals will be made prior to award.

The contractor shall provide written documentation and all testing information to verify that the proposed substitution product meets all the of the specification requirements.

H.7 ROAD USE AND MAINTENANCE

H.7.1 Use of Roads

See Special Project Specification 104.021 for use authorization and limitations.

H.7.2 Traffic Control

The contractor may close Road _____ as needed for construction for a period not to exceed _____ consecutive days. During the times of closure,

the contractor shall provide and maintain “Road Closed Ahead” signs and other devices at locations leading to the project site, as prescribed in the traffic control plan.

The contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs, and other traffic control devices; they shall take all necessary precautions for the protection of the work and safety of the public. Barricades and other obstructions shall be illuminated during the hours of darkness. Suitable warning signs shall be provided to control and direct traffic properly.

The contractor shall erect warning signs in advance to any place on the project, where operations may interfere with the use of the road or trail by traffic, and at all intermediate points, where the project crosses or coincides with an existing road or trail.

H.8 CONSTRUCTION STAKES, LINES, AND GRADES

The Forest Service has placed control points at the project site. The hubs and stakes constitute the field control from which the contractor shall execute the work, and shall be left in place until the engineer approves their removal.

The contractor shall do all further surveying, staking, and engineering to establish the horizontal and vertical control necessary for the finished work to comply with the lines and grades shown on the drawings or stated in the specifications. This work is incidental to the pay items.

If any construction control points have been destroyed or displaced by the contractor’s negligence or operation, the contractor shall promptly notify the engineer. If these points are destroyed or displaced due to contractor’s negligence or operation, the cost of replacing them will be charged to the contractor.

In the case of any construction changes, the contractor shall cooperate with the engineer and facilitate the prompt reestablishment of the field control for the readjusted work.

H.9 PROSECUTION OF WORK

The contractor shall conduct activities so that interference with the public shall be kept at a minimum. Any activities requiring any type of closure to the public will be scheduled with the COR at least ____ days in advance.

The contractor shall use measures and precautions necessary to warn and protect the public and Government personnel during work at the project site. Such actions include, but are not limited to, furnishing and maintaining barricades and signs around the work site and roping off the area.

For blasting precautions and methods, the contractor shall comply with State and Federal laws in regards to transportation, storage, and use of explosives. The contractor shall post a watchperson at a safe distance on all approaches to a blasting area on all approaching roads and trails. The contractor shall also notify all people in the vicinity prior to a detonation.

H.10 CONTROL OF MATERIAL

H.10.1 Rights in and use of materials

The contractor may use on the project suitable stone, gravel, or sand encountered in the excavation that can be shown by testing and in written documentation that it meets the project specifications.

H.10.2 Excavation

_____(specify type)

H.10.3 Material sources

Borrow sources, if needed, must be approved in advance by the engineer. Such borrow sources shall be restored to a natural appearance. Rocks and mineral soil excavated within the normal excavation shall be conserved and used, as needed where they meet project specifications and are approved in writing by the contracting officer.

H.10.4 Storage and stockpiling of materials

Materials shall be stored to assure the preservation of quality and fitness for the work. Stored materials shall be located to facilitate their prompt inspection. Sites on Forest Service-administered land, approved by the Forest Service, may be used for storage purposes and for the placing of the contractor's plant equipment. All storage sites provided by the Forest Service shall be restored at the contractor's expense. Contractor shall be responsible for making arrangements for storage on other than Forest Service-administered lands.

H.10.5 Local disposal sites

Designated disposal sites for this project are as shown on the drawings.

H.10.6 Earthwork tolerances

Unless working tolerances are specified, all work performed and materials furnished shall be in reasonably close conformity with lines, grades, cross sections, dimensions, and material requirements shown on the drawings, indicated in the specifications, or designated on the ground. "Reasonably close conformity" shall be in compliance with what is reasonable and customary for manufacturing and construction tolerances.

H.11 STATE PERMITS

Roads in the project work area necessary to complete the project are designated as "within the immediate construction project" for consideration under ORS 767.025 as to the nonapplicability of PUC requirements.

H.12 PROTECTION OF CULTURAL RESOURCES

The location of known historic or prehistoric sites, buildings, objects, and properties related to American history, architecture, archeology, and culture (such as settler or Indian artifacts) protected by the American Antiquities Act of 1906 (16 U.S.C. 431-433), National Historic Preservation Act of 1966 (16 U.S.C. 470), and the Archeological Resources Protection Act of 1979 (PL 96-95 and 36 CFR 261.9(e)) shall be identified on the ground by the Forest Service. The Forest Service may unilaterally modify or cancel this contract to protect an area, object of antiquity, artifact, or similar object which is or may be entitled to protection under these acts regardless of when the area, object, or artifact was discovered or identified. Discovery of such areas or objects by either party shall be promptly reported to the other party.

The contractor shall protect all known and identified historic or prehistoric sites, buildings, objects, and properties related to American history, architecture, archeology, and culture against destruction, obliteration, removal, or damage during their operations. In accordance with 36 CFR 296.14(c) the contractor shall bear the costs of restoration, provided that such payment shall not relieved the contractor from civil or criminal remedies otherwise provided by law.

Wheeled or track-laying equipment shall not be operated within such areas except on roads. Unless agreed otherwise, trees shall not be felled into such areas.

H.13 PROTECTION OF HABITAT OF ENDANGERED, THREATENED, AND SENSITIVE SPECIES

Location of areas needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act of l973, as amended, or as determined to be sensitive by the regional forester under authority of FSM 2670, are shown on the drawings and identified on the ground. Measures needed to protect such areas have been included elsewhere in this contract or are as follows: None.

If protection measures prove inadequate, if other such areas are discovered, or if new species are listed as federally threatened or endangered or as sensitive by the regional forester, the Forest Service may either cancel or unilaterally modify this contract to provide additional protection regardless of when such facts become known. Discovery of such areas by either contractor or inspector shall be promptly reported to the other party.

H.14 SANITATION AND SERVICING REQUIREMENTS

Unless substitute measures or equipment are authorized in writing by the contracting officer, protection of air and water quality shall include the use of approved chemical toilets by all persons engaged in road construction or in removing timber under this contract while they are inside the forest boundary. Such facilities shall be furnished by contractor in quantities and at locations approved by the engineer. No habitation or overnight dwelling by employees of the contractor shall be permitted on national forest land without advance written approval from the contracting officer.

Oil-absorbing mats are required under all stationary landing equipment, or equipment being serviced within the forest boundary to prevent leaking or spilled petroleum-based products from contaminating soil and water resources. Such material will be furnished by the contactor and approved by the contracting officer.

The contractor agrees that all persons engaged in work under this contract will have a certificate from a medical doctor certifying them to be free from all diseases communicable through drinking water.

H.15 POTENTIAL SAFETY HAZARDS

Data and information furnished or referred to below is for the contractor's information. The government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the contractor. This list shall not be deemed to be all-inclusive. The contractor shall bear the sole responsibility for taking all appropriate actions necessary to prevent accidents and injuries to individuals at the worksite.

The following checked activities have been identified by the government as potential safety hazards.

[ ] Confined space entry.

[ ] Temporary excavation/deep trenching/slope stability.

[ ] Tree falling.

[ ] Fall hazard from work heights exceeding 6 feet.

[ ] Blasting.

[ ] Traffic control on high-volume and/or high-speed and/or limited-visibility roads.

[ ] Heavy equipment operation.

[ ] Tree climbing and/or tower climbing.

[ ] Fire hazards.

[ ] Hazardous materials handling.

[ ] Electrical hazard.

[ ] Hydraulic and/or pneumatic and/or other high-pressure hazards.

[ ] Mechanical hazards such as pulleys, springs, etc.

[ ] Other _____.

H.16 FINAL CLEANUP

Contractor shall remove and dispose all of their own trash and refuse from the contract area. Material to be removed includes, but is not limited to, camp refuse; for example, tin cans, aluminum foil, glass, paper, garbage, used engine oil, oil filters, oil cans, grease cartridges, etc. The contractor shall also remove and dispose of upon completion of the project, all stakes, old culverts, flagging, and similar debris within the project area. Roads shall be swept and washed to remove soil and rock materials. This cleanup is a subsidiary item for which no special payment will be made. All debris shall be removed from national forest land in accordance with State and local disposal requirements.

H.17 PROTECTION OF IMPROVEMENTS

Unless otherwise agreed to in writing, the contractor shall remove the existing signs within the work area and reinstall them to their approximate existing locations.

SAMPLE LIST OF PROJECT DRAWINGS

	Figure(s)
Title Sheet	H.1
Vicinity Map	H.2
Estimate of Quantities	H.3
Sign and Gate Plan	H.4, 5
Site Plan (topographic map, structure and road location, storage area location)	H.12
Dewatering Plan (including channel excavation work needing dewatering)	H.6, 7, 13
Dewatering Details (specification, drawing, additional design details)	H.8
Long Profile and Stream-simulation Details (abbreviated)	H.9, 14
Cross Sections and Stream-simulation Details	H.10, 15
Road Template and P-line Location (coordinates)	
Structure Design	
Structure Details	
Concrete Details (footing, collar, etc.)	H.11, 16
Drill Investigation Information	

[Note—Some of these drawings will take more than one sheet.]

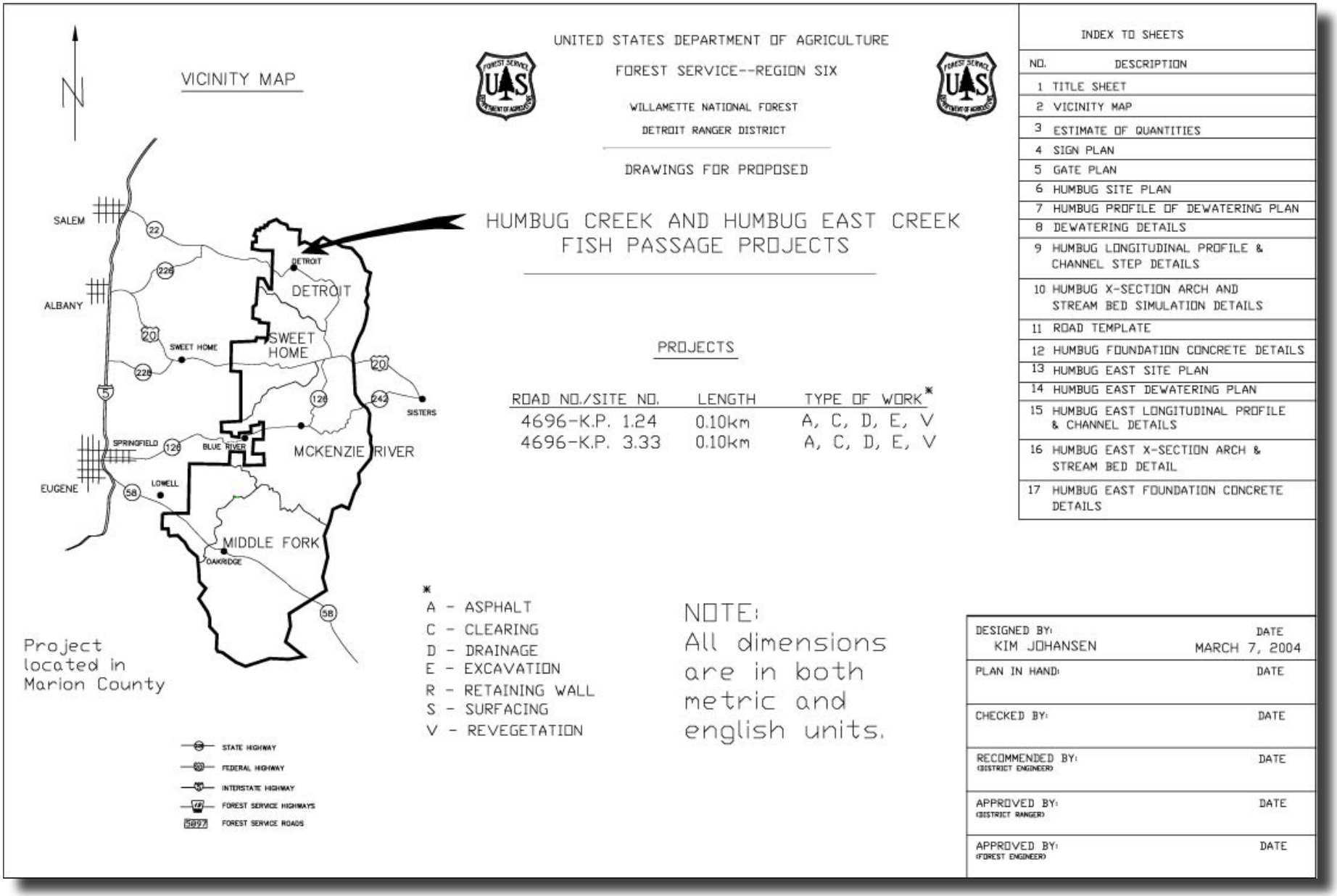

Figure H.1—Humbug Sheet 1: Title Sheet.

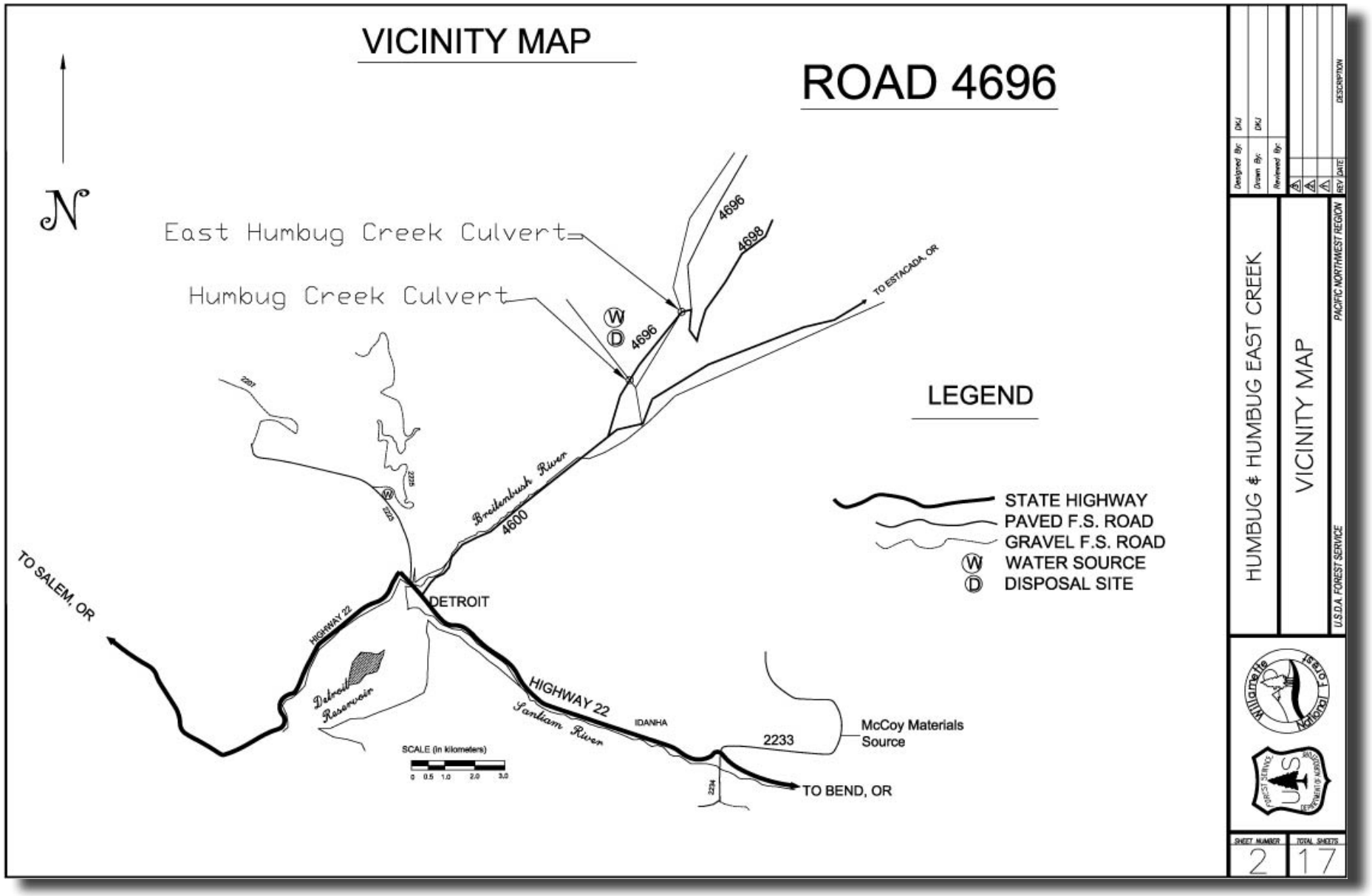

Figure H.2—Humbug Sheet 2: Vicinity Map.

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	METHOD OF MEASUREMENT	UNIT	ESTIMATED QUANTITY		TOTAL	Comments
				Humbug	Humbug East		
171(02)	Construction staking, precision C, Method 1	AQ	km	0.10	.10	.2	
171(03)	Staking structures, precision C, Method 1	AQ	Ea	1	1	2	
201(03)	Clearing and grubbing, slash treatment methods for tops and limbs 12, logs 12, stumps 12, utilization of timber 2	LSQ	LS	All Req'd	All Req'd	All Req'd	
202(02)	Removal of existing 13.5-Ft. and 14Ft. diameter multi-plate pipe and concrete headwall, disposal method A	AQ	Ea	1	1	2	
203(07)	Excavation, placement method 2	LSQ	LS	All Req'd		All Req'd	Stream channel excavation
204(19)	Soil erosion and pollution control	LSQ	LS	All Req'd	All Req'd	All Req'd	
204(20)	Dewatering and Sediment Control	LSQ	LS	All Req'd	All Req'd	All Req'd	
204(22)	Install Log-Jams	LSQ	LS	All Req'd		All Req'd	Move two large logs
206(02)	Foundation fill	DQ	m^3	808	479	1287	Commercial source, AASHTO A-1-a
206(07)	Structural Excavation	LSQ	LS	All req'd	All Req'd	All req'd	
251(14)a	Placed Channel Rock, Rock class 20, method D	AQ	EA	66	30	96	Steps – commerical source
251(14)b	Placed Channel Rock, Rock class 30, method D	AQ	EA	54		54	Footer rocks – commercial source
251(14)c	Placed Channel Rock, Rock class 36, method D	AQ	EA	6		6	Bank boulders – commercial source
251(15)a	Placed Stream Bed Simulation Rock, Bed Class 9, method D	DQ	m^3		118	118	Stream bed in culvert – commercial source
251(15)b	Placed Stream Bed Simulation Rock, Bed Class15, method D	DQ	m^3		146	146	Culvert banks – commercial source
251(15)c	Placed Stream Bed Simulation Rock, Bed Class18, method D	DQ	m^3	371		371	Stream bed in culvert – commercial source
251(16)	Placed Select Borrow	DQ	m^3	20	15	35	To fill voids in stream bed material – commercial source
304(10)	Crushed aggregate, type base, grading C, compaction B	DQ	m^3	63	59	122	Commercial source
403(01)	Hot asphalt concrete plant mix	VQ	Ton	63	59	122	
552(03)	Structural concrete, class A(AE), for footings	AQ	m^3	63	52	115	Footings and collars
554(03)	Reinforcing steel	LSQ	LS	All Req'd	All Req'd	All Req'd	
601(01)	Mobilization	LSQ	LS	All Req'd	All req'd	All Req'd	
601(02)	Equipment Cleaning	AQ	Ea	1		1	All equipment before work begins
607(03)	Gate temporary, type I barricade, size 4.9m wide x 800mm high	AQ	Ea	2		2	
617(06)	Galvanized steel 145mm x 380mm corrugation open bottom arch long-span structure, plate asphalt-coated, 10998mm (36-feet, 1-inch) span, 5029mm (16.5-feet) rise, 7.1mm thickness	AQ	m	22.6		22.6	
617(05)	Galvanized steel 145mm x 380mm corrugation structure-plate box culvert, 10973mm (36-feet) span, 3175mm (10.5feet) rise, asphalt-coated, 7.1mm thickness	AQ	m		19.5	19.5	
625[02]	Seeding, hydraulic method (with mulch)	DQ	ha	0.05	0.05	0.10	

Designed By: DKJ
Drawn By: DKJ
Reviewed By:
REV | DATE | DESCRIPTION

HUMBUG & HUMBUG EAST CREEK

ESTIMATE OF QUANTITIES

PACIFIC NORTHWEST REGION
U.S.D.A. FOREST SERVICE

Willamette National Forest

SHEET NUMBER 3
TOTAL SHEETS 17

Figure H.3—Humbug E-W Sheet 3: Estimate of Quantities.

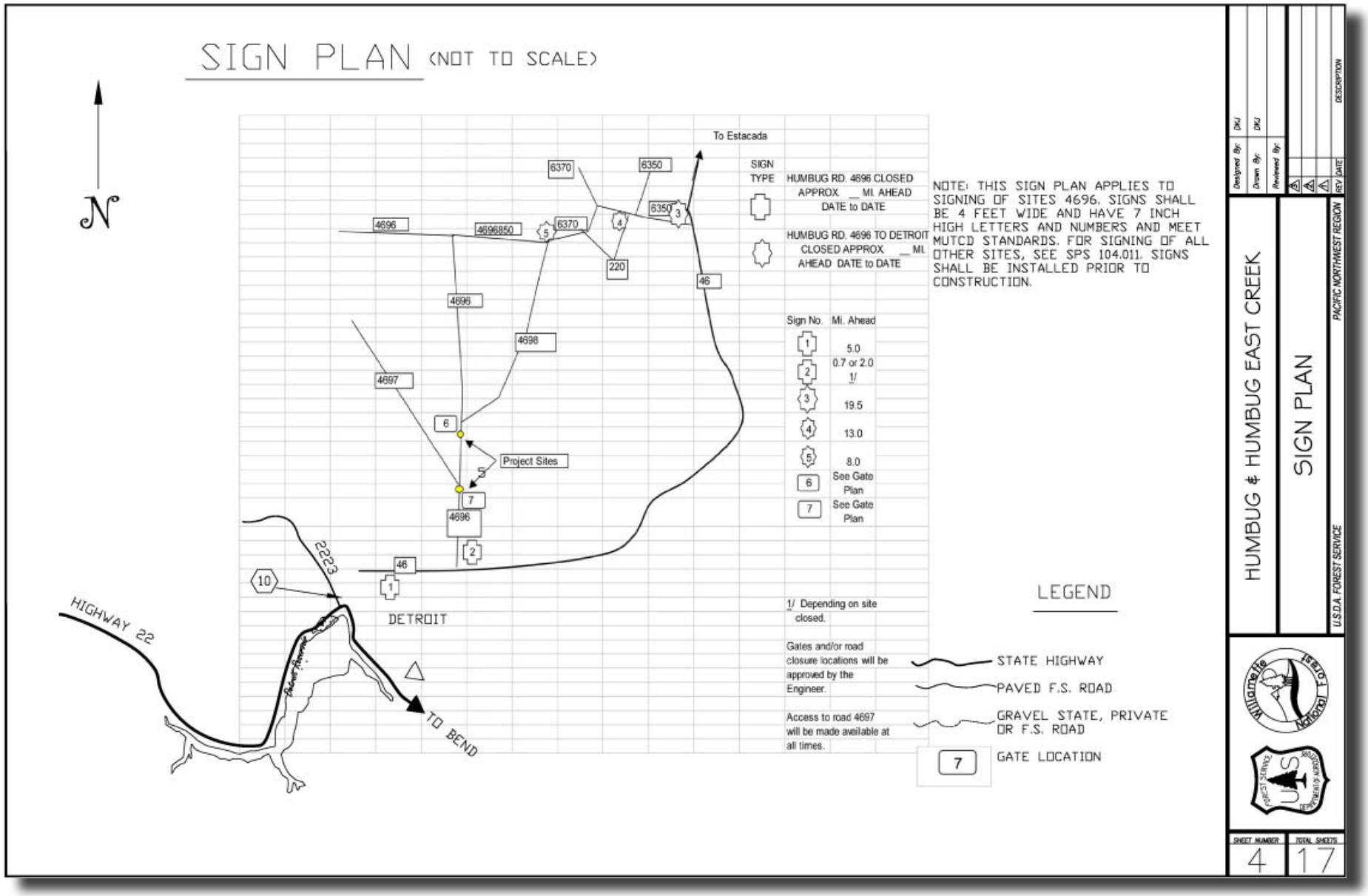

Figure H.4—Humbug Sheet 4: Sign Plan.

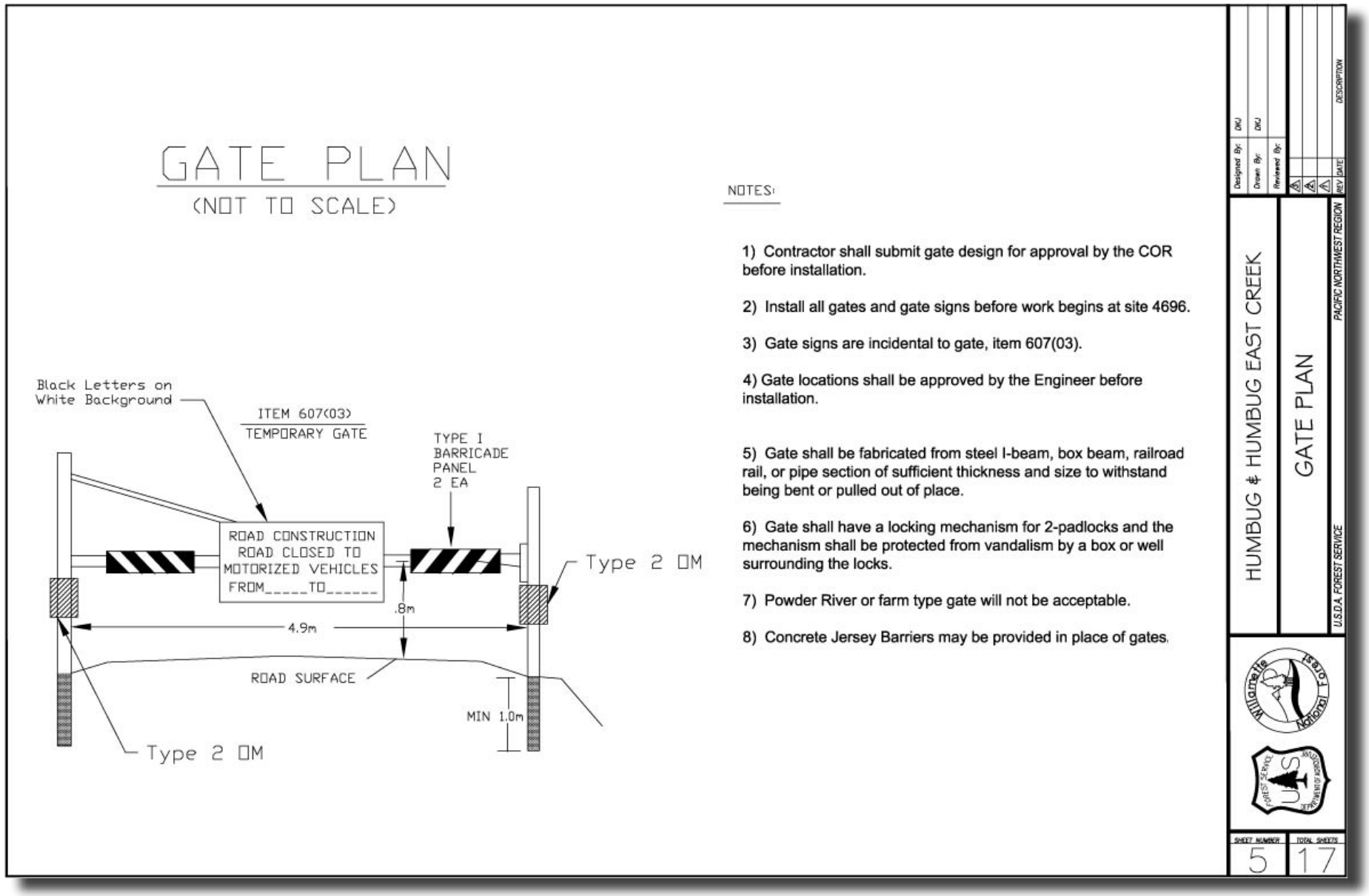

Figure H.5—Humbug Sheet 5 - Gate Plan.

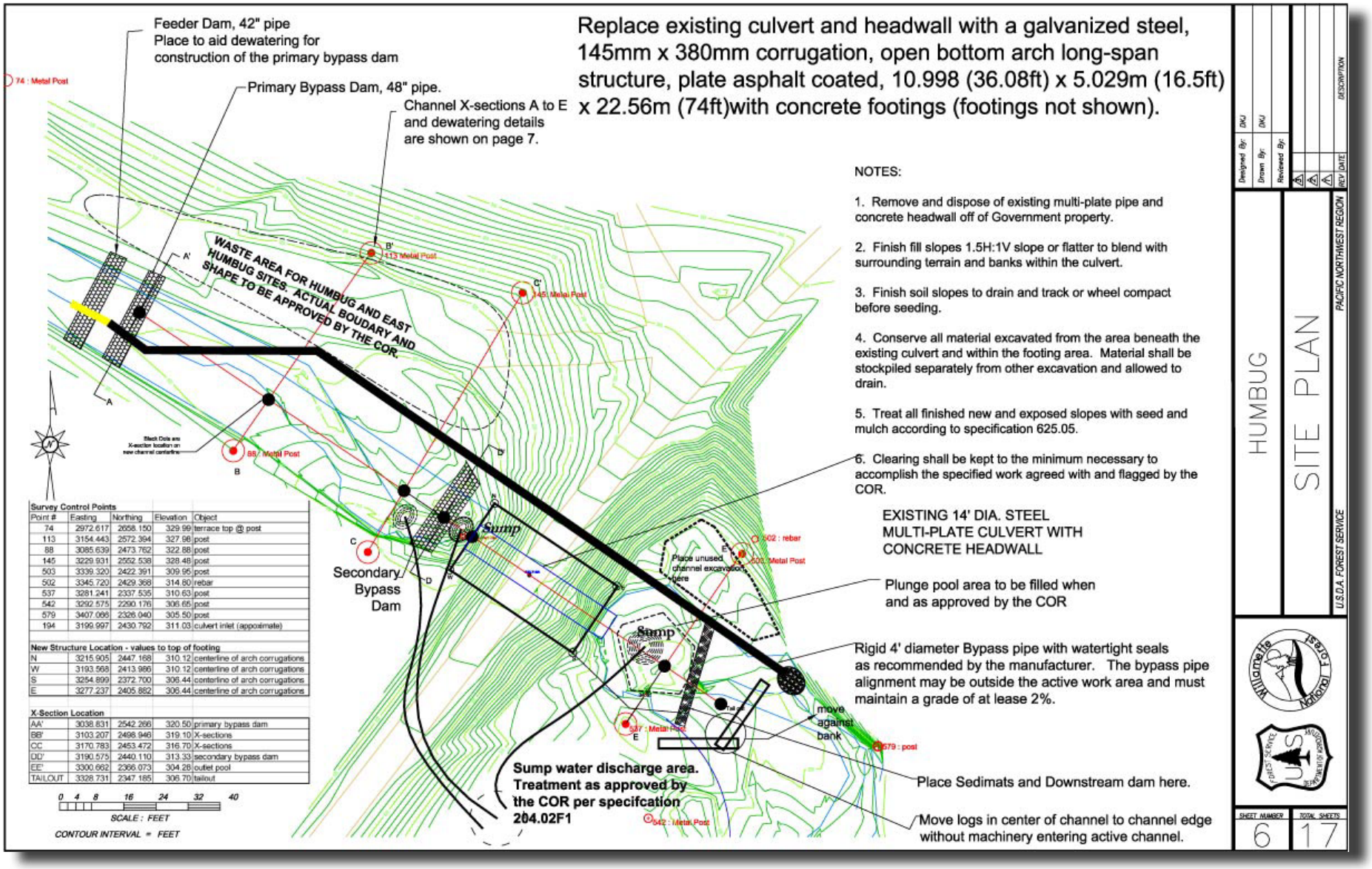

Figure H.6—Humbug West Sheet 6 - Site Plan with Dewatering System.

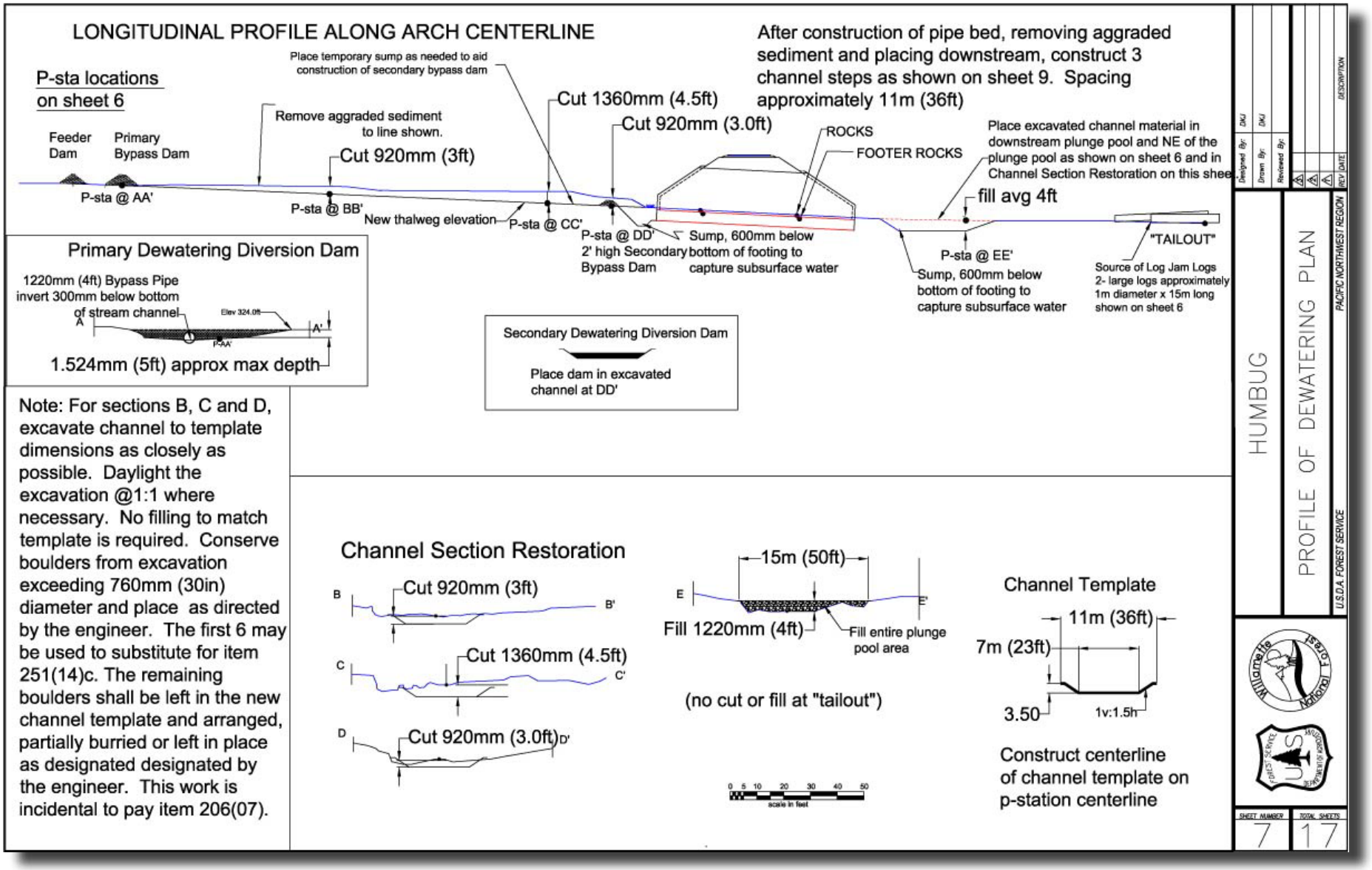

Figure H.7—Humbug West Sheet 7 - Profile of Dewatering Plan.

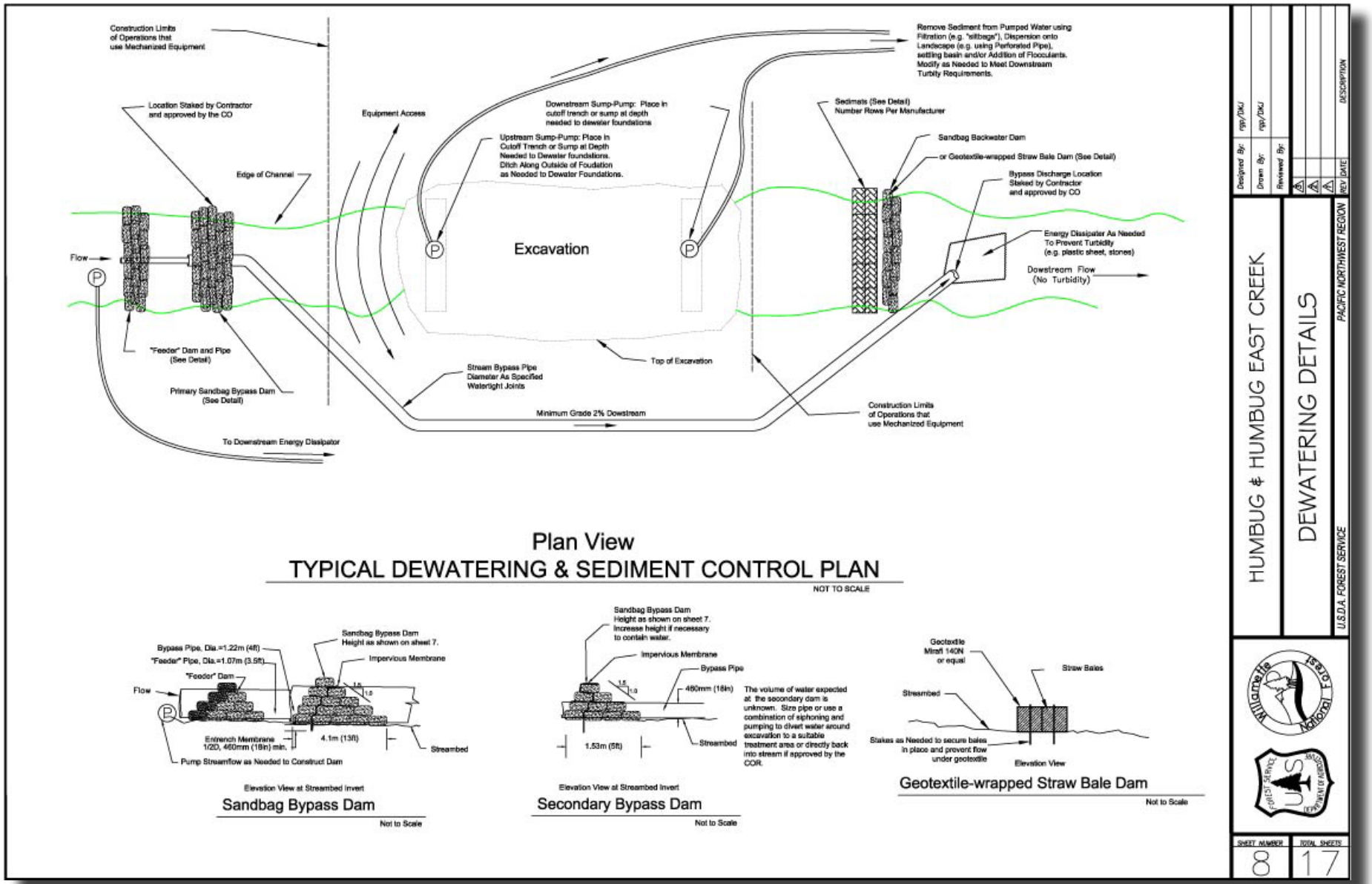

Figure H.8—Humbug Sheet 8 - Dewatering Details.

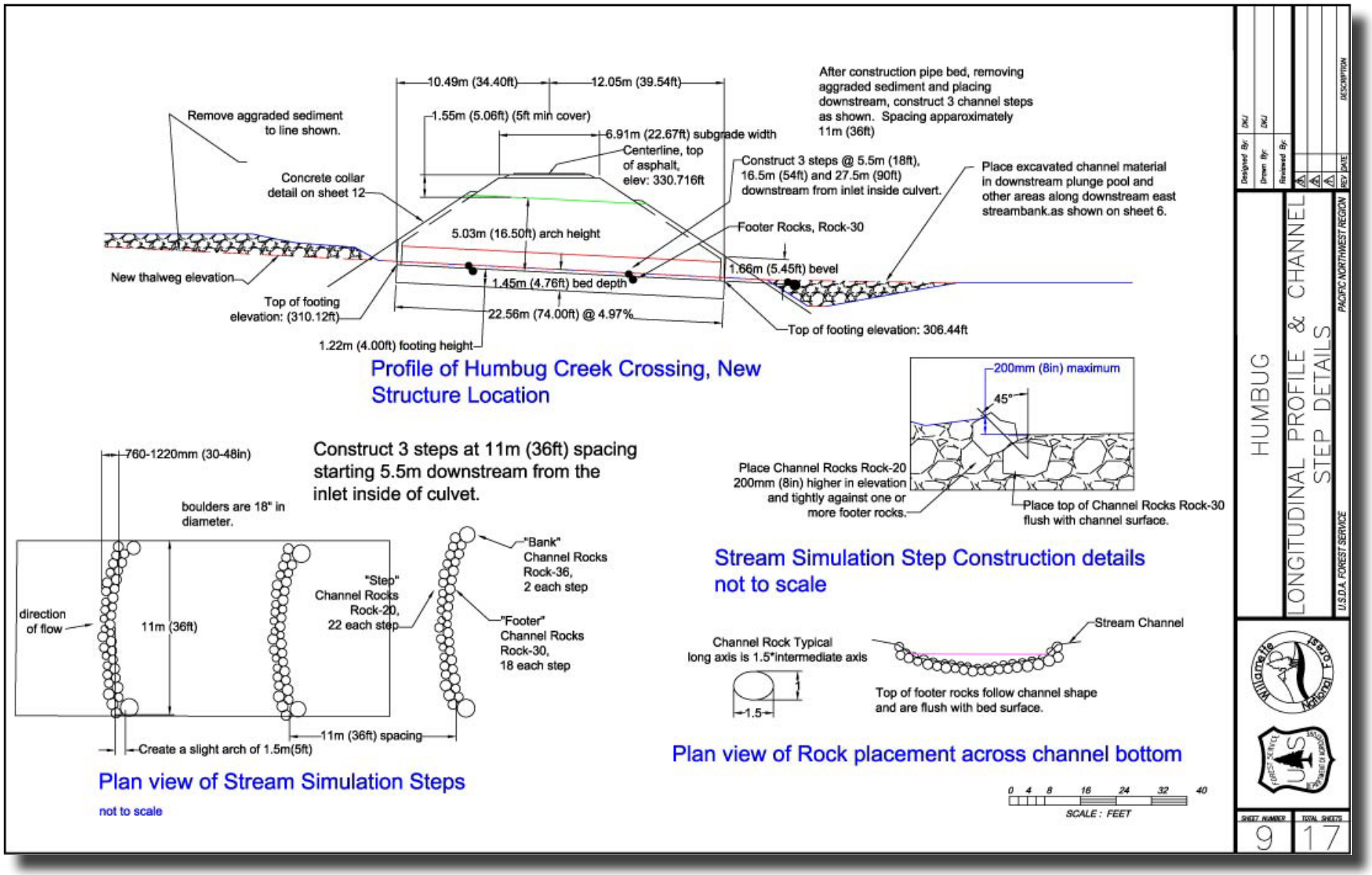

Figure H.9—Humbug West Sheet 9 - Long Profile and Grade Control Details.

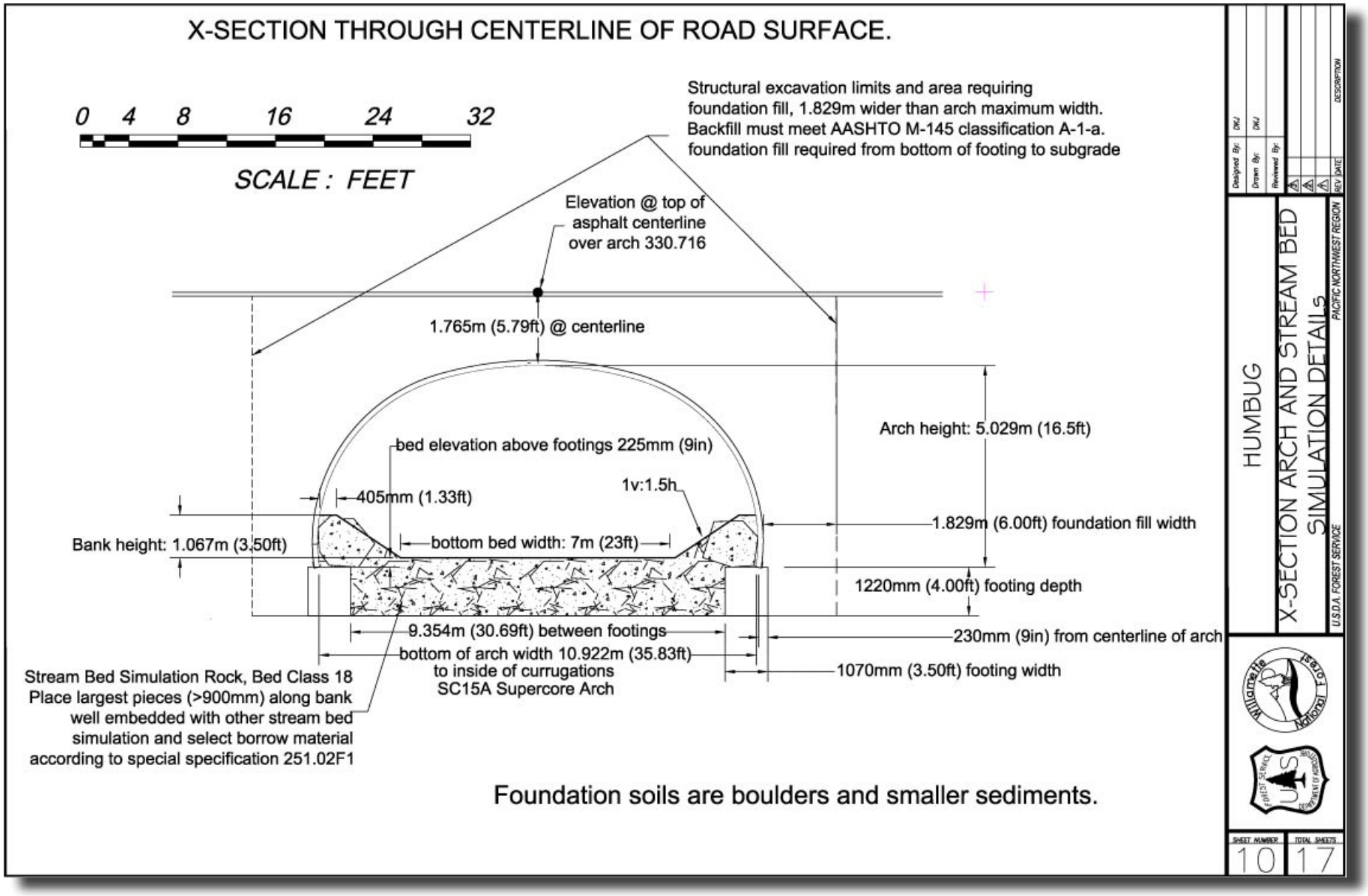

Figure H.10—Humbug West Sheet 10 - Cross Section of Arch and Stream-Simulation Bed Details.

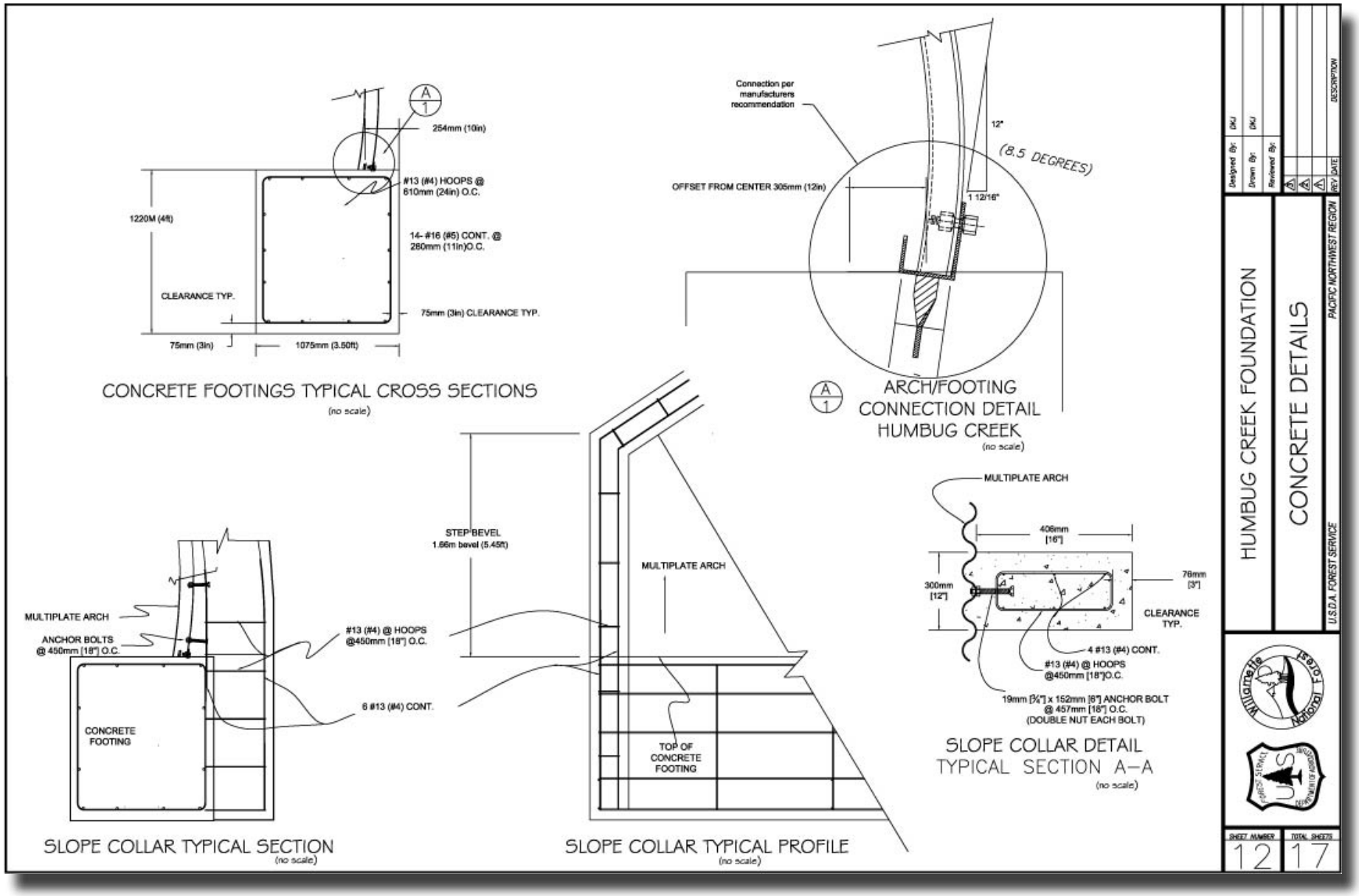

Figure H.11—Humbug West Sheet 12 - Foundation Details.

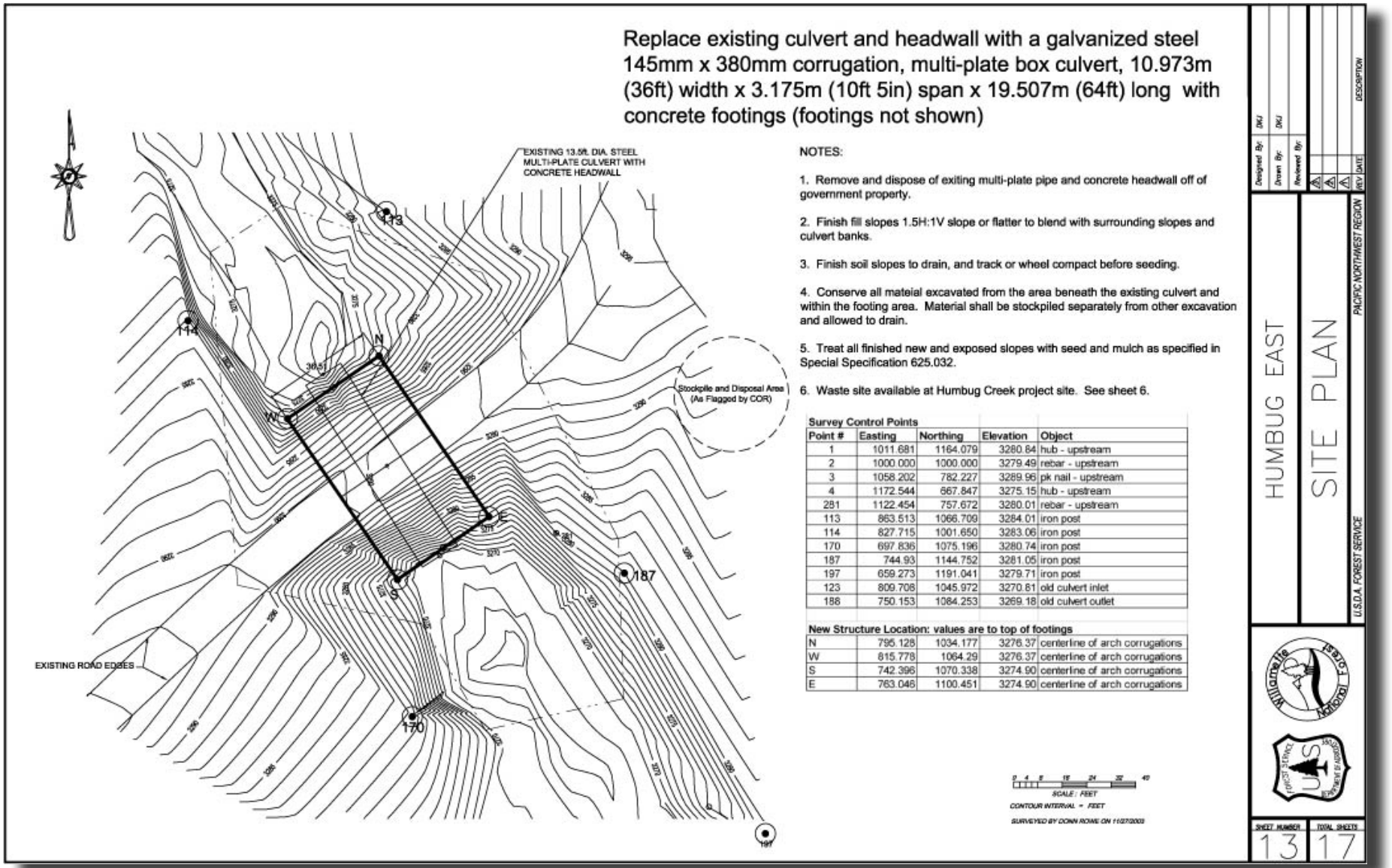

Figure H.12—Humbug East Sheet 13 - Site Plan.

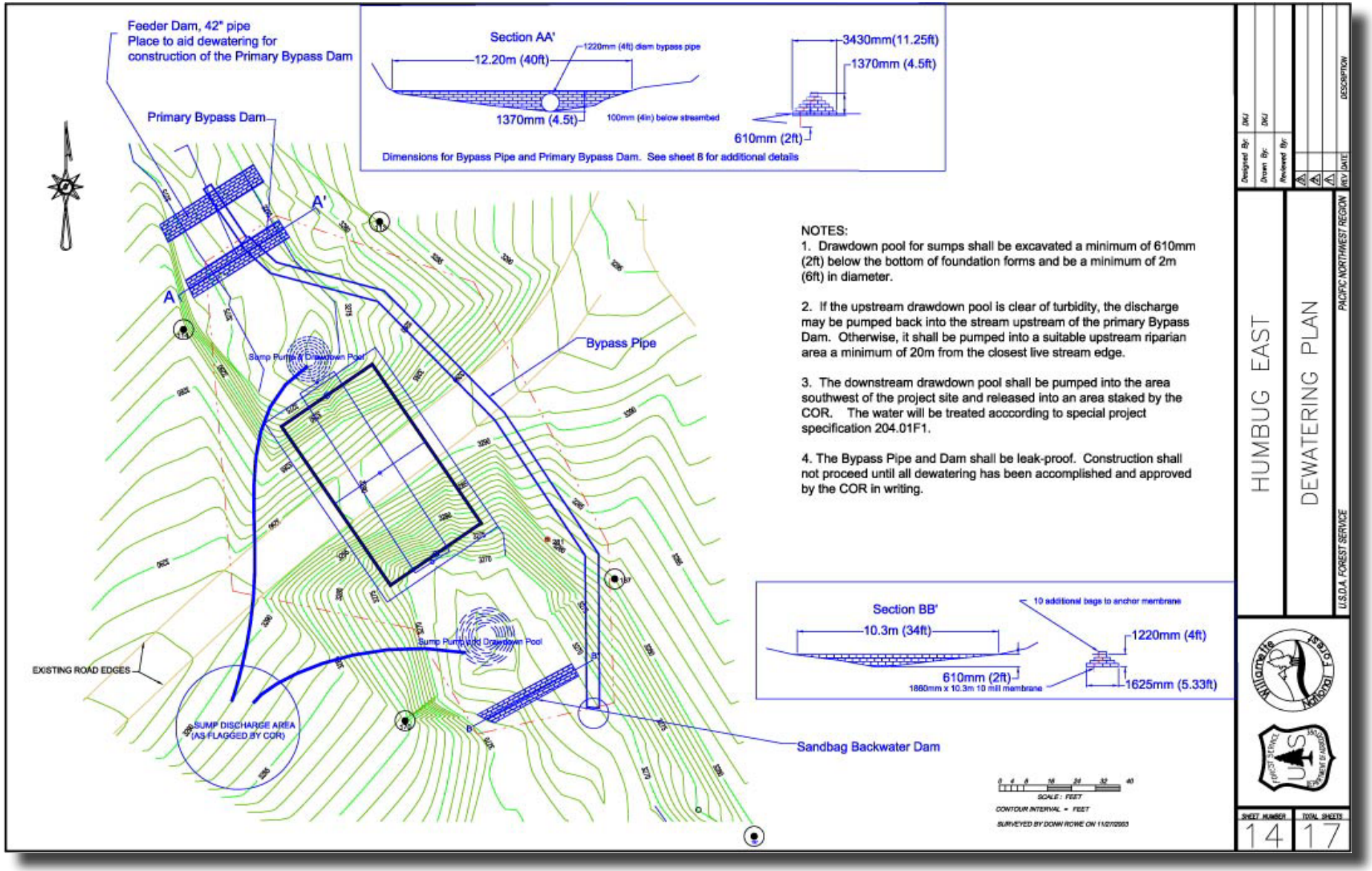

Figure H.13—Humbug East Sheet 14 - Site Plan with Dewatering System.

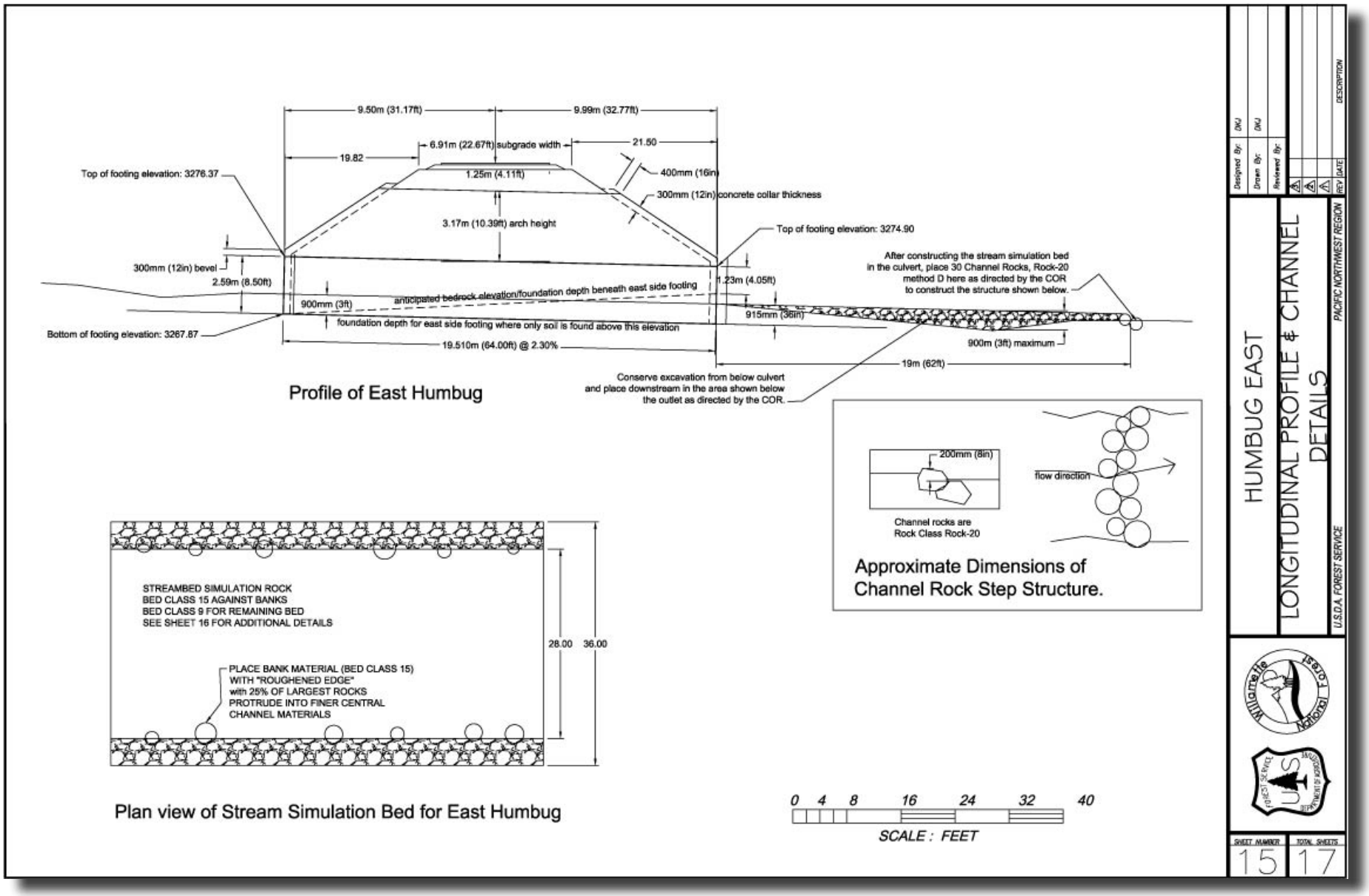

Figure H.14—Humbug East Sheet 15 - Longitudinal Profile with Stream-Simulation Bed Details.

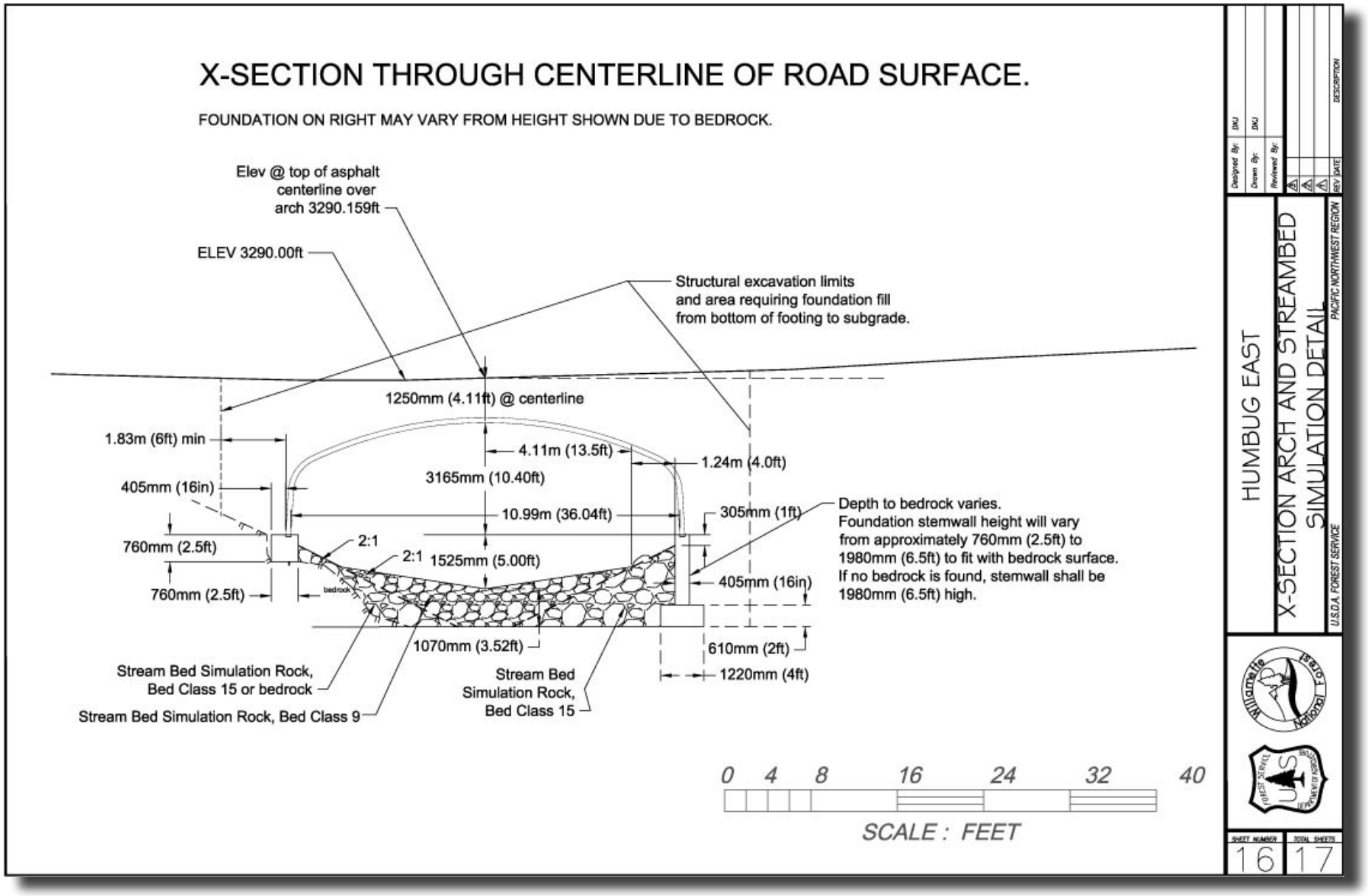

Figure H.15—Humbug East Sheet 16 - Cross Section of Arch and Stream-Simulation Bed.

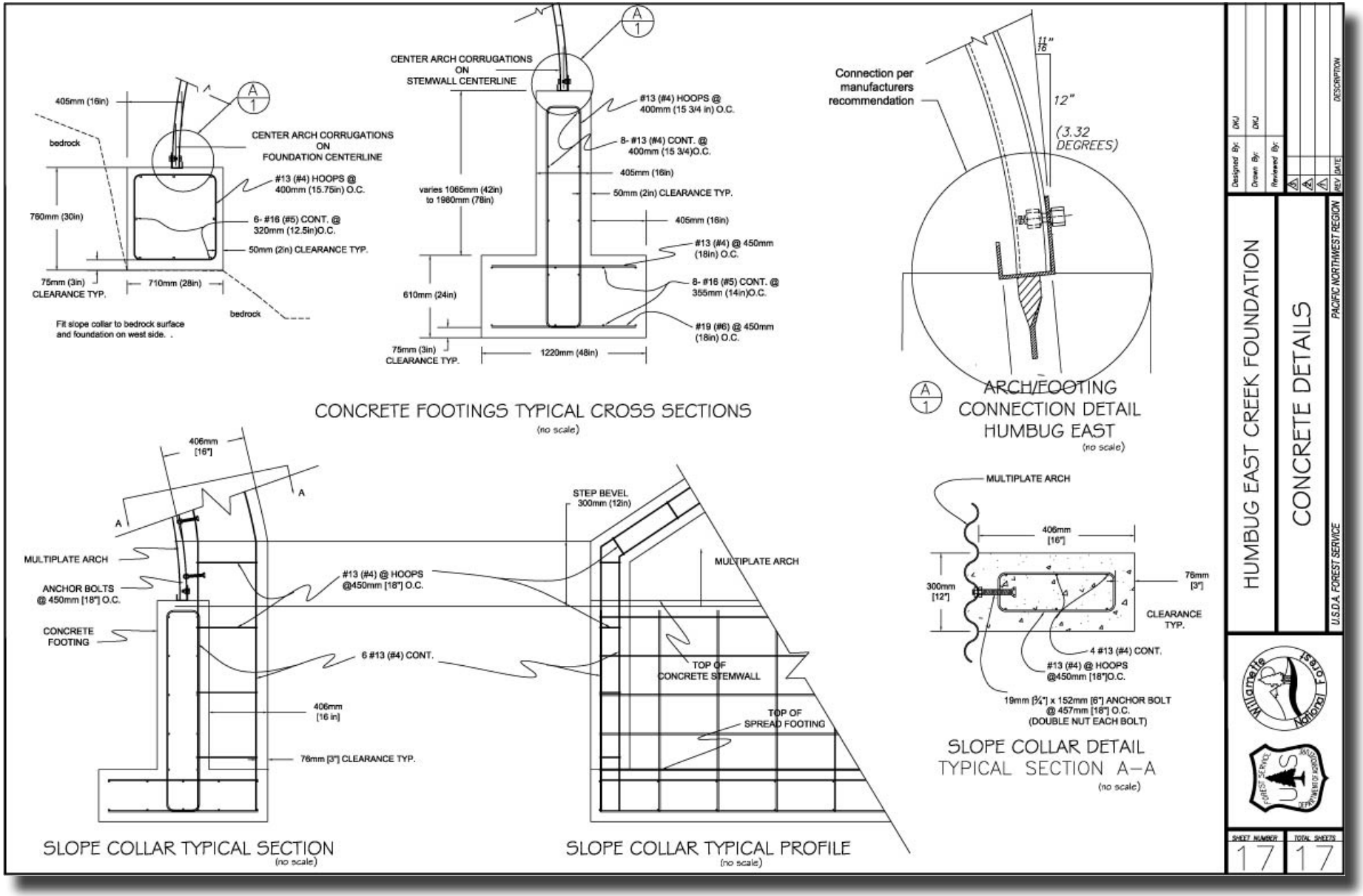

Figure H.16—Humbug Sheet 17 - Foundation Details.