

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE
N/A

PAGE OF PAGES
1

2. AMENDMENT/MODIFICATION NO.
0001

3. EFFECTIVE DATE
8 MAY 2003

4. REQUISITION/PURCHASE REQ. NO.

5. PROJECT NO. (If applicable)
DACW09-03-B-0004

6. ISSUED BY
CODE

7. ADMINISTERED BY (If other than Item 6)
CODE

U.S. ARMY ENGINEER DISTRICT, LOS ANGELES
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

() 9A. AMENDMENT OF SOLICITATION NO.

DACW09-03-B-0004

() 9B. DATED (SEE ITEM 11)
20 MAY 2003 (Bid Opening Date)

10A. MODIFICATION OF CONTRACTS/ORDER NO.

10B. DATED (SEE ITEM 13)

CODE FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers tended.

is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

() A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

WATER SUPPLY/MAINTENANCE ROADS, Rio Salado, Phoenix, Maricopa County, Arizona

4 Encl:

1. REVISED SECTION 00010 - (Section 00010 Bid Schedule and Notes)
2. REVISED SECTION 01270 - (Section 01270 Measurement and Payment)
3. REVISED SECTION 02300 - (Section 02300 Earthwork)
4. REVISED DRAWINGS (17 drawings): Dist File Nos. 471-0532 (C-38); 471-0533 (C-39); 471-0545 (C-51); 471-0546 (C-52); 471-0547 (C-53); 471-0556 (S-4); 471-0559 (S-7); 471-0567 (S-15); 471-0574 (M-7); 471-0575 (M-8); 471-0576 (M-9); 471-0581 (M-14); 471-0582 (M-15); 471-0583 (M-16); and 471-0584 (M-17).

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)

16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)

15B. CONTRACTOR/OFFEROR

15C. DATE SIGNED

16B. UNITED STATES OF AMERICA

16C. DATE SIGNED

(Signature of person authorized to sign)

BY

(Signature of Contracting Officer)

SECTION 00010

BID SCHEDULE

PART 1 GENERAL

Note : Some of the lump sum items reference drawings and plans that utilize English units of measurements.

1.1 Bid Items

Item	Description	Quantity	Unit	
			Unit Price	Amount
0001	CLEARING, GRUBBING, AND DEMOLITION	58	ACRE	\$____.____ \$____.____
0002	GENERAL SITE EXCAVATION			
0002A	FIRST 43,231 CUBIC YARDS	43,231	CY	\$____.____ \$____.____
0002B	OVER 43,231 CUBIC YARDS	10,808	CY	\$____.____ \$____.____
0003	GENERAL SITE FILL & EMBANKMENTS			
0003A	FIRST 143,360 CUBIC YARDS	143,360	CY	\$____.____ \$____.____
0003B	OVER 143,360 CUBIC YARDS	35,841	CY	\$____.____ \$____.____
0004	EXCAVATION AND DISPOSAL OF CONSTRUCTION DEBRIS, HOUSEHOLD WASTE, INERT MATERIAL, AND MIXED WASTE			
0004A	FIRST 2,000 CUBIC YARDS	2,000	CY	\$____.____ \$____.____
0004B	OVER 2,000 CUBIC YARDS	400	CY	\$____.____ \$____.____
0005A	GABION BASKET SLOPE PROTECTION	2,202	SY	\$____.____ \$____.____
0005B	GABION MATTRESS SLOPE PROTECTION	12,000	SY	\$____.____ \$____.____
0006	FENCING AND GATES	1.00	LS	\$____.____ \$____.____
0007	STORM DRAINAGE	1.00	LS	\$____.____ \$____.____
0008	7TH STREET RESERVOIR LOW FLOW CHANNEL FEED CONVEYANCE	1.00	LS	\$____.____ \$____.____

Item	Description	Quantity	Unit	Unit	
				Price	Amount
0009	7TH AVENUE RESERVOIR LOW FLOW CHANNEL FEED CONVEYANCE	1.00	LS	\$_____.	\$_____.
0010	LLDPE LINED CANAL	1.00	LS	\$_____.	\$_____.
0011	PRESSURIZED WATER DISTRIBUTION PIPING 10" HDPE	26,432	LF	\$_____.	\$_____.
0012	PRESSURIZED WATER DISTRIBUTION PIPING CONNECTED TO BRIDGE 8" DIP	1,498	LF	\$_____.	\$_____.
0013	RAW WATER SUPPLY PIPING 14" HDPE	16,200	LF	\$_____.	\$_____.
0014	RAW WATER SUPPLY PIPING CONNECTED TO BRIDGE 12" DIP	1,600	LF	\$_____.	\$_____.
0015	7TH STREET WATER DISTRIBUTION PUMPING STATION	1.00	LS	\$_____.	\$_____.
0016	7TH AVENUE WATER DISTRIBUTION PUMPING STATION	1.00	LS	\$_____.	\$_____.
0017	ELECTRICAL AND CONTROLS CONDUIT AND WIRING	1.00	LS	\$_____.	\$_____.
0018	RESERVOIR LINER AND EDGE TREATMENT	1.00	LS	\$_____.	\$_____.
0019	MAINTENANCE ROAD BASE COURSE CONNECTED TO BRIDGE 12" DIP	43,584	SY	\$_____.	\$_____.
0020	MAINTENANCE ROAD ASPHALTIC CONCRETE	3,138	TONS	\$_____.	\$_____.
0021	SOFT TRAIL	1.00	LS	\$_____.	\$_____.
0022	11TH AVENUE MAINTENANCE ROAD BRIDGE (NORTH BANK)	1.00	LS	\$_____.	\$_____.
0023	CENTRAL AVENUE MAINTENANCE ROAD BRIDGE (NORTH BANK)	1.00	LS	\$_____.	\$_____.

Item	Description	Quantity	Unit	
			Unit Price	Amount
0024	TIRE EXCAVATION			
0024A	FIRST 90 TONS	90	TONS \$_____.	\$_____.
0024B	OVER 90 TONS	60	TONS \$_____.	\$_____.
0025	DOUBLE CONTAINMENT FOR 10" PRESSURE DSW PIPING	3,200	LF \$_____.	\$_____.
0026	DOUBLE CONTAINMENT FOR 14" RAW WATER SUPPLY PIPING	3,950	LF \$_____.	\$_____.

TOTAL ESTIMATED AMOUNT \$_____.

Abbreviations:

- LF = LINEAR FOOT
- CY = CUBIC YARD
- SY = SQUARE YARD
- TONS = TON (2000 LBS)
- LS = LUMP SUM
- ACRE = ACRE

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01270

MEASUREMENT AND PAYMENT

- 1.1 SUBMITTALS
- 1.2 LUMP SUM PAYMENT ITEMS
 - 1.2.1 Item No. 1, Clearing, Grubbing, and Demolition
 - 1.2.1.1 Payment
 - 1.2.1.2 Unit of Measure
 - 1.2.2 Item No. 15, 7th Street Water Distribution Pumping Station
 - 1.2.2.1 Payment
 - 1.2.2.2 Unit of Measure
 - 1.2.3 Item No. 16, 7TH Ave. Water Distribution Pumping Station
 - 1.2.3.1 Payment
 - 1.2.3.2 Unit of Measure
 - 1.2.4 Item No. 17, Electrical and Controls Conduit and Wiring
 - 1.2.4.1 Payment
 - 1.2.4.2 Unit of Measure
 - 1.2.5 Item No. 18, Reservoir Liner and Edge Treatment
 - 1.2.5.1 Payment
 - 1.2.5.2 Unit of Measure
 - 1.2.6 Item No. 22, 11th Ave. Maintenance Road Bridge (North Bank)
 - 1.2.6.1 Payment
 - 1.2.6.2 Unit of Measure
 - 1.2.7 Item No. 23, Central Ave. Maintenance Road Bridge (North Bank)
 - 1.2.7.1 Payment
 - 1.2.7.2 Unit of Measure
 - 1.2.8 Item No. 8 and 9, Low Flow Channel Feed Conveyance
 - 1.2.8.1 Payment
 - 1.2.8.2 Unit of Measure
 - 1.2.9 Item No. 6, Fencing and Gates
 - 1.2.9.1 Payment
 - 1.2.9.2 Unit of Measure
 - 1.2.10 Item No. 10, LLDPE Lined Canal
 - 1.2.10.1 Payment
 - 1.2.10.2 Unit of Measure
 - 1.2.11 Item No. 7, Storm Drainage
 - 1.2.11.1 Payment
 - 1.2.11.2 Unit of Measure
 - 1.2.12 Item No. 21, Soft Trail
 - 1.2.12.1 Payment
 - 1.2.12.2 Unit of Measure
- 1.3 UNIT PRICE PAYMENT ITEMS
 - 1.3.1 Items No. 2a and 2b, General Site Excavation for Project Facilities
 - 1.3.1.1 Payment
 - 1.3.1.2 Measurement
 - 1.3.1.3 Unit of Measure
 - 1.3.2 Items No. 3a and 3b, General Site Fills and Embankments for Project Facilities
 - 1.3.2.1 Payment

- 1.3.2.2 Measurement
- 1.3.2.3 Unit of Measure
- 1.3.3 Items No. 4a and 4b, Excavation and Disposal of Construction Debris, Household Waste, Inert Material, and Mixed Waste
 - 1.3.3.1 Payment
 - 1.3.3.2 Measurement
 - 1.3.3.3 Unit of Measure
- 1.3.4 Item No. 5a, Gabion Basket Slope Protection
 - 1.3.4.1 Payment
 - 1.3.4.2 Measurement
 - 1.3.4.3 Unit of Measure
- 1.3.5 Item No. 5b, Gabion Mattress Slope Protection
 - 1.3.5.1 Payment
 - 1.3.5.2 Measurement
 - 1.3.5.3 Unit of Measure
- 1.3.6 Item No. 11, Pressurized Distribution Supply Water Piping (10" HDPE)
 - 1.3.6.1 Payment
 - 1.3.6.2 Measurement
 - 1.3.6.3 Unit of Measure
- 1.3.7 Item No. 12, Pressurized Distribution Water Supply Piping Connected to Bridge (8" DIP)
 - 1.3.7.1 Payment
 - 1.3.7.2 Measurement
 - 1.3.7.3 Unit of Measure
- 1.3.8 Item No. 13, Raw Water Supply Piping (14" HDPE)
 - 1.3.8.1 Payment
 - 1.3.8.2 Measurement
 - 1.3.8.3 Unit of Measure
- 1.3.9 Item No. 14, Raw Water Supply Piping Connected to Bridge (12" DIP)
 - 1.3.9.1 Payment
 - 1.3.9.2 Measurement
 - 1.3.9.3 Unit of Measure
- 1.3.10 Item No. 19, Maintenance Roads Base Course
 - 1.3.10.1 Payment
 - 1.3.10.2 Measurement
 - 1.3.10.3 Unit of Measure
- 1.3.11 Item No. 20, Maintenance Roads Asphaltic Concrete
 - 1.3.11.1 Payment
 - 1.3.11.2 Measurement
 - 1.3.11.3 Unit of Measure
- 1.3.12 Item No. 24, Tire Removal
 - 1.3.12.1 Payment
 - 1.3.12.2 Measurement
 - 1.3.12.3 Unit of Measure
- 1.3.13 Item No. 25, Double Containment for 10" Pressure Water Distribution Supply Water Piping
 - 1.3.13.1 Payment
 - 1.3.13.2 Measurement
 - 1.3.13.3 Unit of Measure
- 1.3.14 Item No. 26, Double Containment for 14" Raw Water Supply Piping
 - 1.3.14.1 Payment
 - 1.3.14.2 Measurement
 - 1.3.14.3 Unit of Measure

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 01270

MEASUREMENT AND PAYMENT

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Weight Certificates; G, RE

Submit certified weight certificates for Maintenance Roads Asphaltic Concrete.

1.2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, and performing any associated Contractor quality control reports, mobilization, demobilization, obtaining bonds, insurance, and permits, providing temporary facilities and utilities, payment for usage of utilities, furnishing and installing project and safety signs, furnishing, installing, and maintaining the Government field office, scheduling, providing submittals, attending meetings, preparing as-built Drawings, providing traffic control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.2.1 Item No. 1, Clearing, Grubbing, and Demolition

1.2.1.1 Payment

Payment includes all labor and equipment required for clearing, grubbing, demolition of any specified structures, and protection of all other structures, and disposal of waste identified within the project limits.

1.2.1.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.2 Item No. 15, 7th Street Water Distribution Pumping Station

1.2.2.1 Payment

Payment includes all excavation, grading, compacting, surface restoration, hydrostatic pressure testing, and the furnishing and placing of backfill, structural fill, piping, intake flume, fittings, and appurtenances, prefabricated pumping station, screen, concrete, pipe supports, reinforcing steel, chain link fence roof, screen cloth, hatches, chain link gates, masonry blocks, radio tower, electrical equipment and service for pumping station instrumentation and control, and all other miscellaneous items required to complete the Water Distribution Pumping Station as shown on the Drawings and as specified.

1.2.2.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.3 Item No. 16, 7TH Ave. Water Distribution Pumping Station

1.2.3.1 Payment

Payment includes all excavation, grading, compacting, surface restoration, hydrostatic pressure testing, and the furnishing and placing of backfill, structural fill, piping, intake flume, fittings, and appurtenances, prefabricated pumping station, screen, concrete, pipe supports, reinforcing steel, hatches, chain link gates, chain link fence, radio tower, electrical equipment and service for pumping station instrumentation and control, and all other miscellaneous items required to complete the Water Distribution Pumping Station as shown on the Drawings and as specified.

1.2.3.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.4 Item No. 17, Electrical and Controls Conduit and Wiring

1.2.4.1 Payment

Payment includes all labor and equipment required for trench excavation, processing of on-site material or importing of material required for backfill, grading, compacting, surface restoration, bridge supports for the buried and bridge crossing electric conduits and control conduits.

1.2.4.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.5 Item No. 18, Reservoir Liner and Edge Treatment

1.2.5.1 Payment

Payment includes all labor and equipment required for excavation, backfilling and the furnishing and placement of the LLDPE liner, retaining wall, mortar, river rock, sand protective fill over liner, structural backfill, shotcrete and all miscellaneous items required for a reservoir, as shown on the Drawings and as specified.

1.2.5.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.6 Item No. 22, 11th Ave. Maintenance Road Bridge (North Bank)

1.2.6.1 Payment

Payment includes all labor and equipment required for the excavation, backfilling, compacting, and grading, and the furnishing and placement of the concrete, reinforcing steel, bridge deck, steel, boulders, and all miscellaneous items required for a complete bridge, as shown on the Drawings.

1.2.6.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.7 Item No. 23, Central Ave. Maintenance Road Bridge (North Bank)

1.2.7.1 Payment

Payment includes all labor and equipment required for the excavation, backfilling, compacting, and grading, and the furnishing and placement of the concrete, reinforcing steel, bridge deck, steel, boulders, and all miscellaneous items required for a complete bridge, as shown on the Drawings.

1.2.7.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.8 Item No. 8 and 9, Low Flow Channel Feed Conveyance

1.2.8.1 Payment

Payment includes all labor and equipment required for trench excavation, processing of on-site material or importing material required for backfill, grading, compacting, leak testing, and the furnishing and placing of concrete, backfill, piping and appurtenances, valves, valve boxes, flow meters, and pipe zone material.

1.2.8.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.9 Item No. 6, Fencing and Gates

1.2.9.1 Payment

Payment includes all labor and equipment required for the excavation, backfilling, and grading and the furnishing and placement of the fencing and gates.

1.2.9.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.10 Item No. 10, LLDPE Lined Canal

1.2.10.1 Payment

Payment includes all labor and equipment required for excavation,

backfilling, compacting, grading, and the furnishing and placement of the linear low-density polyethylene (LLDPE) liner, protective layer, geotextile fabric, and rounded river rock.

1.2.10.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.11 Item No. 7, Storm Drainage

1.2.11.1 Payment

Payment includes all labor and equipment for the excavation, backfilling, compacting surface restoration, furnishing and placement of stormwater outfall headwalls and culverts, and end sections.

1.2.11.2 Unit of Measure

Unit of Measure: Lump sum.

1.2.12 Item No. 21, Soft Trail

1.2.12.1 Payment

Payment includes all labor and equipment for grading/shaping the soft trail system. Payment also includes all labor and equipment for the excavation, backfilling, compacting and furnishing and placement of the soft trail handrail and accessories.

1.2.12.2 Unit of Measure

Unit of Measure: Lump sum.

1.3 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.3.1 Items No. 2a and 2b, General Site Excavation for Project Facilities

1.3.1.1 Payment

Payment includes all labor and equipment, including excavation and disposition of excess excavated material and unsuitable material, required for excavation for the bridge undercrossings, paved maintenance roads, and other features on the project site. Specifically excluded from this item is any excavation below finish grade required to install liners, piping, structures, and conduits.

1.3.1.2 Measurement

The total quantity of excavated material for which payment will be made will be the theoretical quantity between the ground surface as determined

by a survey and the grade and slope of the theoretical cross sections indicated. No allowance will be made for overdepth excavation or for the removal of any material outside the required slope lines unless authorized.

1.3.1.3 Unit of Measure

Unit of measure: Cubic yard.

1.3.2 Items No. 3a and 3b, General Site Fills and Embankments for Project Facilities

1.3.2.1 Payment

Payment includes all labor and equipment required for processing of on-site material, placement of fill, compacting, grading, and water required for the furnishing and placement of any fills and embankments for the canal, paved maintenance roads and other features on the project site.

1.3.2.2 Measurement

The total quantity of fill material for which payment will be made will be the theoretical quantity between the ground surface as determined by a survey and the grade and slope of the theoretical cross sections indicated. No allowance will be made for additional fill provided outside the required slope lines unless authorized.

1.3.2.3 Unit of Measure

Unit of measure: Cubic yard.

1.3.3 Items No. 4a and 4b, Excavation and Disposal of Construction Debris, Household Waste, Inert Material, and Mixed Waste

1.3.3.1 Payment

Payment includes all labor and equipment required for excavation and disposition of all construction debris, household waste, inert material, and mixed waste.

1.3.3.2 Measurement

The total quantity of excavated material for which payment will be made will be based on the measurements of the stockpile of construction debris, household waste, inert material, and mixed waste that has been segregated from the other excavated material.

1.3.3.3 Unit of Measure

Unit of measure: Cubic yard.

1.3.4 Item No. 5a, Gabion Basket Slope Protection

1.3.4.1 Payment

Payment includes all labor and equipment required for furnishing and placing the reinforcement mat, geotextile filter fabric, gabion baskets, and rock for filling the gabion baskets.

1.3.4.2 Measurement

Gabion blanket slope protection will be measured based on the amount of gabion blanket slope protection installed in the accepted work.

1.3.4.3 Unit of Measure

Unit of Measure: Square foot.

1.3.5 Item No. 5b, Gabion Mattress Slope Protection

1.3.5.1 Payment

Payment includes all labor and equipment required for furnishing and placing the reinforcement mat, geotextile filter fabric, gabion mattress, and rock for filling the gabion mattress.

1.3.5.2 Measurement

Gabion mattress slope protection will be measured based on the amount of gabion mattress slope protection installed in the accepted work.

1.3.5.3 Unit of Measure

Unit of Measure: Cubic Yard.

1.3.6 Item No. 11, Pressurized Distribution Supply Water Piping (10" HDPE)

1.3.6.1 Payment

Payment includes all labor and equipment required for trench excavation, processing of on-site material or importing material required for backfill, grading, compacting, hydrostatic pressure testing, surface restoration, and the furnishing and placing of concrete for thrust blocks, backfill, piping and appurtenances, restrained joints, air valves, valves, valve boxes, blind flanges, pipe zone material, and detectable tape.

1.3.6.2 Measurement

Pressurized Distribution Water Supply Piping will be measured based on the amount of pressurized water distribution pipe installed in the accepted work.

1.3.6.3 Unit of Measure

Unit of measure: Linear foot.

1.3.7 Item No. 12, Pressurized Distribution Water Supply Piping Connected to Bridge (8" DIP)

1.3.7.1 Payment

Payment includes all labor and equipment required for connecting to bridge, corrosion protection, hydrostatic pressure testing, and the furnishing and placing of pipe, fittings and appurtenances, pipe supports, and restrained joints.

1.3.7.2 Measurement

Pressurized Distribution Water Supply Piping Connected to Bridge (8" DIP)

will be measured based on the amount of pressurized distribution water supply piping connected to bridge installed in the accepted work.

1.3.7.3 Unit of Measure

Unit of measure: Linear foot.

1.3.8 Item No. 13, Raw Water Supply Piping (14" HDPE)

1.3.8.1 Payment

Payment includes all labor and equipment required for trench excavation, processing of on-site material or importing material required for backfill, grading, compacting, hydrostatic pressure testing, surface restoration, and the furnishing and placing of concrete for thrust blocks, backfill, piping and appurtenances, restrained joints, air valves, valves, valve boxes, blind flanges, pipe zone material, and detectable tape.

1.3.8.2 Measurement

Raw Water Supply Piping (14" HDPE) will be measured based on the amount of raw water supply pipe installed in the accepted work.

1.3.8.3 Unit of Measure

Unit of measure: Linear foot.

1.3.9 Item No. 14, Raw Water Supply Piping Connected to Bridge (12" DIP)

1.3.9.1 Payment

Payment includes all labor and equipment required for connecting to bridge, corrosion protection, hydrostatic pressure testing, and the furnishing and placing of pipe, fittings and appurtenances, pipe supports, and restrained joints.

1.3.9.2 Measurement

Raw water supply piping connected to bridge (12" DIP) will be measured based on the amount of raw water supply piping connected to the bridge in the accepted work.

1.3.9.3 Unit of Measure

Unit of measure: Linear foot.

1.3.10 Item No. 19, Maintenance Roads Base Course

1.3.10.1 Payment

Payment includes all labor and equipment required for compacting, grading, testing, and furnishing and placing of the base course for the maintenance road.

1.3.10.2 Measurement

Maintenance Roads Base Course will be measured based upon the number of cubic yards of base course material used in the accepted work.

1.3.10.3 Unit of Measure

Unit of Measure: Square yards.

1.3.11 Item No. 20, Maintenance Roads Asphaltic Concrete

1.3.11.1 Payment

Payment includes all labor and equipment required preparation of the hot mix, compaction, grading, testing, and furnishing and placing the aggregate, asphalt cement, joints for the access road.

1.3.11.2 Measurement

Maintenance Roads Asphaltic Concrete will be measured based on the number of tons of asphalt concrete mixture used in the accepted work. Asphalt concrete shall be weighed after mixing, and no separate payment will be made for weight of asphalt cement material incorporated herein. The Contracting Officer may elect to accept certified weight certificates furnished by a public weighmaster in lieu of scale weights at the jobsite.

1.3.11.3 Unit of Measure

Unit of measure: Ton (2,000 pounds).

1.3.12 Item No. 24, Tire Removal

1.3.12.1 Payment

Payment for Tire Removal will be made at the applicable contract price per ton, which payment shall constitute full payment for removal, separation, cleaning if necessary, loading, hauling, and proper disposal of tires at an approved facility.

1.3.12.2 Measurement

Measurement for Tire Removal will be by the ton as determined by the weight tickets from certified scales at the disposal facility.

1.3.12.3 Unit of Measure

Unit of measure: Ton (2,000 pounds).

1.3.13 Item No. 25, Double Containment for 10" Pressure Water Distribution Supply Water Piping

1.3.13.1 Payment

Payment includes all labor and equipment required for furnishing and installing the double containment piping.

1.3.13.2 Measurement

Measurement for dual contained piping will be based on the amount of double containment piping installed in the accepted work.

1.3.13.3 Unit of Measure

Unit of measure: Linear foot.

1.3.14 Item No. 26, Double Containment for 14" Raw Water Supply Piping

1.3.14.1 Payment

Payment includes all labor and equipment required for furnishing and installing the double containment piping.

1.3.14.2 Measurement

Measurement for dual contained piping will be based on the amount of double containment piping installed in the accepted work.

1.3.14.3 Unit of Measure

Unit of measure: Linear foot.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02300

EARTHWORK

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 DEFINITIONS
 - 1.2.1 Satisfactory Materials
 - 1.2.2 Unsatisfactory Materials
 - 1.2.3 Cohesionless and Cohesive Materials
 - 1.2.4 Degree of Compaction
 - 1.2.5 Prepared Ground Surface
 - 1.2.6 Completed Course
 - 1.2.7 Lift
 - 1.2.8 Geosynthetics
 - 1.2.9 Well-Graded
 - 1.2.10 Influence Area
 - 1.2.11 Borrow Material
 - 1.2.12 Imported Material
 - 1.2.13 Waste
 - 1.2.14 Topsoil
- 1.3 SUBMITTALS
- 1.4 SEQUENCE OF WORK
- 1.5 SUBSURFACE DATA
- 1.6 CLASSIFICATION OF EXCAVATION
- 1.7 BLASTING
- 1.8 UTILIZATION OF EXCAVATED MATERIALS
- 1.9 SOURCE INSPECTION
- 1.10 DELIVERY, INSPECTION, STORAGE, AND HANDLING
 - 1.10.1 Delivery
 - 1.10.1.1 Delivered Topsoil
 - 1.10.1.2 Soil Amendments
 - 1.10.2 Inspection
 - 1.10.3 Storage
 - 1.10.4 Handling

PART 2 PRODUCTS

- 2.1 EARTHFILL
- 2.2 STRUCTURAL FILL
- 2.3 PROTECTIVE FILL FOR GEOMEMBRANE LININGS
- 2.4 GRANULAR DRAIN MATERIAL
- 2.5 GRANULAR FILTER MATERIAL
- 2.6 WATER FOR MOISTURE CONDITIONING
- 2.7 BASE COURSE ROCK
- 2.8 FOUNDATION STABILIZATION ROCK
- 2.9 RIVER ROCK
- 2.10 AGGREGATE RIPRAP BEDDING
- 2.11 RIPRAP
- 2.12 TOPSOIL
- 2.13 SOIL AMENDMENTS
 - 2.13.1 pH Adjuster
 - 2.13.2 Fertilizer

- 2.13.3 Nitrogen Carrier Fertilizer
- 2.13.4 Reconstruct Landfill Cover Material

PART 3 EXECUTION

- 3.1 GENERAL EXCAVATION
 - 3.1.1 Ditches, Gutters, and Channel Changes
 - 3.1.2 Structures
- 3.2 EXCAVATION OF WASTE
- 3.3 TIRE REMOVAL
- 3.4 SPECIAL OR HAZARDOUS WASTE
- 3.5 SELECTION OF BORROW MATERIAL
- 3.6 BACKFILL
 - 3.6.1 GENERAL
 - 3.6.2 Backfill Under and Around Structures
- 3.7 PREPARATION OF GROUND SURFACE FOR EMBANKMENTS
 - 3.7.1 General Requirements
- 3.8 EMBANKMENTS
 - 3.8.1 Earth Embankments
- 3.9 SUBGRADE PREPARATION
 - 3.9.1 Construction
 - 3.9.2 Compaction
- 3.10 FINISHING
- 3.11 PLACING FILL OVER GEOSYNTHETICS
 - 3.11.1 General
 - 3.11.2 Hauling
 - 3.11.3 Spreading
 - 3.11.4 Compaction
 - 3.11.5 Geosynthetic Damage
- 3.12 PLACING RIPRAP BEDDING
- 3.13 PLACING RIPRAP OR RIVER ROCK
- 3.14 TESTING
 - 3.14.1 Fill and Backfill Material Gradation
 - 3.14.2 In-Place Densities
 - 3.14.3 Moisture Contents
 - 3.14.4 Optimum Moisture and Laboratory Maximum Density
 - 3.14.5 Tolerance Tests for Subgrades
- 3.15 SUBGRADE AND EMBANKMENT PROTECTION
- 3.16 FINISHED GRADE AND TOPSOIL
 - 3.16.1 Application of Soil Amendments
 - 3.16.1.1 Applying pH Adjuster
 - 3.16.1.2 Applying Fertilizer
 - 3.16.2 Tillage
- 3.17 LANDFILL COVERS AND LINERS

-- End of Section Table of Contents --

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 90	(2000) Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T 180	(1997) Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457 mm (18-in) Drop
AASHTO T 224	(1996) Correction for Coarse Particles in the Soil Compaction Test

ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT)

ARIZ 237	pH and Soluble Salts of Soils
ARIZ 201	Sieving of Course and Fine Graded Soils and Aggregates
ARIZ 238	Percent Carbonates in Aggregate

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 535	(2001) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1140	(2000) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(2001) Density and Unit Weight of Soil in Place By the Rubber Balloon Method
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(2001) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	(2000) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(2001) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 5268	(1992; R 1997) Topsoil Used for Landscaping Purposes

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, SW, SP, SM, SW-SM. Satisfactory materials for grading shall be comprised of stones less than 3 inches, except as otherwise specified in Part 2 PRODUCTS of this specification section.

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter. The Contracting Officer shall be notified of any waste materials as specified in Section 01355, ENVIRONMENTAL PROTECTION.

1.2.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Testing required for classifying materials shall be in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.

1.2.4 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test

procedure presented in ASTM D 1557 abbreviated as a percent of laboratory maximum density. Since ASTM D 1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve shall be expressed as a percentage of the maximum density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224. To maintain the same percentage of coarse material, the "remove and replace" procedure as described in the NOTE 8 in Paragraph 7.2 of AASHTO T 180 shall be used.

1.2.5 Prepared Ground Surface

Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.

1.2.6 Completed Course

A course or layer that is ready for next layer or next phase of Work.

1.2.7 Lift

Loose (uncompacted) layer of material.

1.2.8 Geosynthetics

Geotextiles, geogrids, or geomembranes.

1.2.9 Well-Graded

- a. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
- b. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
- c. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

1.2.10 Influence Area

Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:

- a. 1 foot outside outermost edge at base of foundations or slabs.
- b. 1 foot outside outermost edge at surface of roadways or shoulder.
- c. 0.5 foot outside exterior at spring line of pipes or culverts.

1.2.11 Borrow Material

Material from required excavations on site.

1.2.12 Imported Material

Materials obtained from sources offsite, suitable for specified use.

1.2.13 Waste

Tires, inert debris, construction debris, metal, hazardous waste, and other waste material identified in Article 1.2.8 of Section 01355, ENVIRONMENTAL PROTECTION.

1.2.14 Topsoil

Material suitable for topsoils obtained from areas on or offsite.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Plan

SD-03 Product Data

Topsoil

Availability of topsoil from the stripping and stock piling operation.

SD-04 Samples

Delivered Topsoil

Samples taken from several locations at the source. The work under this section shall consist of furnishing, hauling and placing topsoil in accordance with the details shown on the project Drawings and the requirements of these specifications.

Soil Amendments

A 10 pound sample.

SD-06 Test Reports

Testing

Within 24 hours of conclusion of physical tests, two copies of test results, including calibration curves and results of calibration tests.

Soil tests that have been performed by the USACE will be made available to the Contractor to review.

Top Soil

Certified reports of inspections and laboratory tests, prepared by an independent testing agency including analysis and interpretation of test results. Each report shall be properly

identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Testing

Qualifications of the commercial testing laboratory or Contractor's testing facilities.

Contractor shall submit the required certificates to the USACE for approval.

Topsoil

pH Adjuster

Fertilizer

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

- a. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.
- b. pH Adjuster. Calcium carbonate equivalent and sieve analysis.
- c. Fertilizer. Chemical analysis and composition percent.

1.4 SEQUENCE OF WORK

Earth work shall not begin until all Environmental Protection measures are in place as specified in Section 01355, ENVIRONMENTAL PROTECTION and Section 01356, STORMWATER POLLUTION PREVENTION MEASURES.

1.5 SUBSURFACE DATA

Subsurface soil boring logs are shown on the Drawings. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.6 CLASSIFICATION OF EXCAVATION

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.7 BLASTING

Blasting will not be permitted.

1.8 UTILIZATION OF EXCAVATED MATERIALS

Unsatisfactory materials removed from excavations shall be disposed of as specified in Section 01355, ENVIRONMENTAL PROTECTION. Satisfactory material removed from excavations shall be used, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding, and for similar purposes. No satisfactory excavated material shall be wasted

without specific written authorization. Satisfactory material authorized to be wasted shall be disposed of in designated areas approved for surplus material storage or designated waste areas as directed. No excavated material shall be disposed of to obstruct the flow of the low flow channel or any side drainages, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

1.9 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.10 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.10.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.10.1.1 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site. All topsoil shall comply with "Arizona Residential Soil Cleanup" levels and standards.

1.10.1.2 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.10.2 Inspection

Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.10.3 Storage

Materials shall be stored in designated areas. Fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored and protected according to all Federal, State and local regulations and manufacturer's instructions and not with seeding operation materials.

1.10.4 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

PART 2 PRODUCTS

2.1 EARTHFILL

- a. Excavated satisfactory material from required excavations free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.
- b. Provide imported material of equivalent quality, if required to accomplish Work.
- c. The Contractor may elect to crush and use onsite concrete debris as earthfill for the project. The crushed material must meet the above gradation requirement. Imported crushed concrete material will not be allowed.

2.2 STRUCTURAL FILL

- a. 1-inch minus crushed gravel or crushed rock.
- b. Free from dirt, clay balls, and organic material.
- c. Well-graded from coarse to fine and containing sufficient fines to bind material when compacted, but with maximum 8 percent by weight passing No. 200 sieve.
- d. Structural fill used in conjunction with gabion soil reinforcing mats should contain a maximum of 12 percent by weight passing the No. 200 sieve and a maximum size of 1/4-inch. This material shall be non-corrosive to steel with a resistivity of not less than 2000 ohm-centimeters and a pH value between 6.0 and 10.0.

2.3 PROTECTIVE FILL FOR GEOMEMBRANE LININGS

- a. Rounded satisfactory materials free from clay, organic matter, or other deleterious material.
- b. Gradation as determined in accordance with ASTM C 117 and ASTM C 136:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1/4-inch	100
No. 4	95-100
No. 200	0-5

2.4 GRANULAR DRAIN MATERIAL

As specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

2.5 GRANULAR FILTER MATERIAL

- a. Clean, hard, durable gravel, free from foreign materials and washed.
- b. Gradation as determined in accordance with ASTM C 117 and ASTM C 136:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>	
	<u>Adjacent to Soil Bentonite</u>	<u>Adjacent to Natural Clay</u>
3-inch	100	100
1-inch	60 to 100	90 to 100
½-inch	25 to 60	80 to 100

No. 4	0 to 20	70 to 90
No. 50		0 to 35
No. 200	0 to 5	0 to 5

2.6 WATER FOR MOISTURE CONDITIONING

Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

2.7 BASE COURSE ROCK

As specified in Section 02722 AGGREGATE BASE COURSE.

2.8 FOUNDATION STABILIZATION ROCK

- a. Crushed rock or pit run rock.
- b. Uniformly graded from coarse to fine.
- c. Free from excessive dirt and other organic material.
- d. Maximum 2-1/2 inch particle size.

2.9 RIVER ROCK

Processed rounded material from excavations. Provide imported material as required to meet the needs of the project.

<u>Rock Size</u>	<u>Percent Smaller by Weight</u>
12-inch	95
6-inch	85
4-inch	50
3-inch	10
1-inch	2 to 10

2.10 AGGREGATE RIPRAP BEDDING

- a. Gravel with Cobbles or Crushed Rock with Cobble-Sized Pieces:
 1. Gradation, as determined in accordance with ASTM C 136:
 - a. Well-graded from coarse to fine.
 - b. All pieces pass a 6-inch square opening.
 - c. Minimum 85 percent by weight passes 4-inch square opening.
 - d. Minimum 10 percent by weight passes No. 4 U.S. standard sieve.
 2. Abrasion Resistance: Maximum 35 percent wear when tested in accordance with ASTM C 535.
- b. Free of roots and other organic or deleterious matter.
- c. Bedding material shall be free of plates and columns. Maximum to minimum dimension ratio for particles should be 2:1 maximum.

2.11 RIPRAP

- a. Hard and durable quarry stone free from fractures, bedding planes, pronounced weathering, and earth or other adherent coatings.

- b. Minimum Dimension of Individual Pieces: Not less than 1/3 maximum dimension.
- c. Abrasion Resistance: Maximum 35 percent wear as determined in accordance with ASTM C 535.
- d. Bulk Density: Minimum 160 pounds per dry cubic foot.
- e. Gradation: Smaller pieces shall generally fill voids between larger pieces without either excess or deficiency of one or more sizes of stone.

<u>Rock Size</u>	<u>Percent Smaller by Weight</u>	
	<u>D50 = 6-inch</u>	<u>D50 = 18-inch</u>
36-inch	100	95
24-inch	100	85
18-inch	95	50
12-inch	85	
6-inch	50	15
4-inch	15	
3-inch	0 to 5	0 to 5

2.12 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with this Section. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the seed specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

When a source of topsoil is not designated, the Contractor shall furnish a source in accordance with the requirements herein and the requirements of "Arizona Residential Soil Cleanup" levels and standards. Topsoil from sources furnished by the Contractor shall conform to the following requirements:

Prior to hauling any topsoil to the project site, the Contractor shall furnish a written soil analysis, prepared by a laboratory approved by the Contracting Officer, for each source of topsoil proposed for use. The soil analysis shall indicate the pH, soluble salts, percent calcium carbonate, exchangeable sodium in percent and parts per million, plasticity index and size gradation. A minimum of three samples per each 10,000 cubic yards, with at least three samples per source, shall be tested. All tests shall be performed in accordance with the following requirements and test procedures listed in the Table below. At the Contractor's option, the Contracting Officer will test these topsoil samples. The Contractor shall bear the expense of any topsoil testing from proposed sources.

Topsoil shall be fertile, friable soil obtained from well drained arable land which has or is producing healthy crops, grasses or other vegetation. It shall be free draining, non-toxic and capable

of sustaining healthy plant growth.

Topsoil shall be reasonably free of subsoil, refuse, roots, heavy clay, clods, noxious weed seeds, phytotoxic materials, coarse sand, large rocks, sticks, brush, litter and other deleterious substances.

For acceptance purposes, each approximate 20,000 cubic yards or topsoil material delivered from a given source to the project site shall be considered a lot. For each lot of topsoil, six representative samples shall be taken at random locations designated by the Contracting Officer. Topsoil shall be sampled after final placement. Each source of topsoil shall be tested separately. The samples from each lot shall be tested by the Contracting Officer for pH, soluble salts, calcium carbonate, P.I., and gradation in accordance with the test procedures listed in the Table below.

The average test result obtained for each characteristic from each lot shall meet the following requirements:

<u>Characteristics</u>	<u>Test Method</u>	<u>Requirement Average of 6 Samples</u>
pH	ARIZ 237	6.0 - 8.3
Soluble Salts: (PPM)	ARIZ 237	2000 Maximum
Calcium Carbonate	ARIZ 238	8% Maximum
P.I.	AASHTO T 90	5 - 20
Gradation:	ARIZ 201	% Passing
2 inch		100
1/2 inch		85 - 100
No. 40		35 - 100

If the average test result for a lot fails to meet all the specifications listed above, the material from that lot shall be rejected. In lieu of removal and replacement, the Contractor may propose for the Contracting Officer's consideration a method of treatment of the in-place material to obtain specification compliance. Provided the Contracting Officer approves, the topsoil shall be treated at no additional cost to the Government.

The lot shall then be resampled and tested for specification compliance by the Contracting Officer.

If the pH of the topsoil for a lot exceeds 8.3, the topsoil shall either be removed and replaced, or be treated as provided for in the preceding paragraph. Any treatment for pH shall be sufficient to obtain an average pH between 6.0 and 8.0, inclusive. The treatment for pH shall follow the recommendations of a recognized soil analyst and shall be subject to the approval of the Contracting Officer. Any treatment for pH shall be at no additional cost to the Government. Additional acceptance testing after treatment for pH will not be required.

2.13 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material and soil conditioners meeting the following requirements. Vermiculite shall not be used.

Amendments shall be applied per the directions and application rates

recommended by the manufacturer. Prepared soil shall be prepared using a mixture of 70% excavated site soil and 30% soil conditioner and amendments.

Clods or stones exceeding 2 inches in diameter and foreign matter deemed objectionable by the Contracting Officer will not be allowed. All excess soil excavated from the plant pits that has clods or stones 2 inches and larger shall be disposed of on the project site as directed by the Contracting Officer. Amendments shall be mixed with the soil conditioner after they are delivered to the project site under the supervision of the Contracting Officer. No pre-mixing will be allowed prior to delivery to the project. No additional payment will be made for this work and is considered as part of the planting operation.

2.13.1 pH Adjuster

The pH adjuster shall be agricultural grade soil sulfur material. These materials shall be 99% pure, granular or pelletized and flowable. The pH adjuster shall be used to create a favorable soil pH for the plant materials specified.

2.13.2 Fertilizer

It shall be as recommended by the soil test.

2.13.3 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test.

2.13.4 Reconstruct Landfill Cover Material

The Contractor shall save and segregate existing landfill cover material for use in reconstructing the landfill cover. Provide additional imported cover soil material as required to complete the work. Imported material shall be similar gradation to the existing cover material and meet the design permeability of 1×10^{-5} cm/sec.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

The Contractor shall perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Grading shall be in conformity with the typical sections shown and the tolerances specified in paragraph FINISHING. Satisfactory excavated materials shall be transported to and placed in fill or embankment within the limits of the work. Unsatisfactory materials encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials as specified in Article 3.2, EXCAVATION OF WASTE, or as directed. Such excavated material and the satisfactory material ordered as replacement shall be included in excavation. Surplus satisfactory excavated material not required for fill or embankment shall be disposed of in areas approved for surplus material storage or designated waste areas. Unsatisfactory excavated material shall be disposed of in designated waste or spoil areas as specified in Section 01355, ENVIRONMENTAL PROTECTION. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. **Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be imported from an off-site source selected by the Contractor.**

The Contractor shall prepare an Excavation Plan, Detailing:

- a. Methods and sequencing of excavation.
- b. Proposed locations of stockpiled excavated material.
- c. Proposed onsite and offsite spoil disposal sites.
- d. Numbers, types, and sizes of equipment proposed to perform excavations.

3.1.1 Ditches, Gutters, and Channel Changes

Excavation of ditches, gutters, and channel changes shall be accomplished by cutting accurately to the cross sections, grades, and elevations shown. Ditches and gutters shall not be excavated below grades shown. Excessive open ditch or gutter excavation shall be backfilled with satisfactory, thoroughly compacted earthfill. Material excavated shall be disposed of as shown or as directed, except that in no case shall material be deposited less than 4 feet from the edge of a ditch. The Contractor shall maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.1.2 Structures

Excavations shall be made to the lines, grades, and elevations shown, or as directed. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. When concrete or masonry is to be placed in an excavated area, the bottom of the excavation shall not be disturbed. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed. Do not overexcavate without permission of the Contracting Officer.

3.2 EXCAVATION OF WASTE

The Contractor shall immediately notify the Contracting Officer if waste as defined in Article 1.2.8 of Section 01355 ENVIRONMENTAL PROTECTION is encountered during excavation. Excavation and disposal will be in accordance with requirements in Section 01355, ENVIRONMENTAL PROTECTION. Over excavation of known waste material at structures, reservoirs, and pipelines shall be as shown on the plans. The Contractor shall use the water supply and distribution pipe trench excavation to identify additional areas of waste material. Should waste extend below bottom or beyond the sides of the planned excavation the Contractor shall over excavate within the influence area to the following, or as directed.

<u>Facility</u>	<u>Depth of Over Excavation Below Base (feet)</u>	
	<u>Inert Material</u>	<u>or Construction Debris</u>
	<u>Mixed, Household Waste, or Tires</u>	
Structures	5	Depth equal to twice foundation width
Roads	3	3
Reservoirs	3	5
Overbank Canals	2	3
Pipelines	2	3

All overexcavations at inert material, construction debris, or mixed waste

locations shall be backfilled as specified for earth embankments fill unless otherwise directed by the Contracting Officer. Overexcavations at household waste locations shall be backfilled with liner material then embankment fill as specified in Section 01355, ENVIRONMENTAL PROTECTION, unless otherwise directed by the Contracting Officer.

3.3 TIRE REMOVAL

All tires and pieces of tires greater than 6 inches in size shall be removed from within the excavation limits and disposed offsite.

All tires removed during excavation activities or recovered from the ground surface shall be handled, stored, transported, and disposed of in accordance with applicable federal, state, and local regulations. Applicable state regulations include: Arizona Revised Statutes (ARS) §§44-1301 et seq: §44-1301; §44-1302; §44-1303; §44-1304.01; §44-1305; §44-1306; §44-1307.

Tires shall be cleaned of all soil and other debris prior to removal from site.

3.4 SPECIAL OR HAZARDOUS WASTE

Special or Hazardous Waste: In the event that the Contractor encounters any suspected special or hazardous waste materials are encountered, The Contractor will immediately notify the Contracting Officer. The Contracting Officer will direct the Contractor to implement the Special and Hazardous Waste Contingency Plan as specified in Section 01355, Environmental Protection.

3.5 SELECTION OF BORROW MATERIAL

Borrow material shall be satisfactory material selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be obtained from excavation areas within the limits of the project site, selected by the Contractor or from approved private sources. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval. Necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon shall be considered related operations to the borrow excavation.

3.6 BACKFILL

3.6.1 GENERAL

- a. Keep placement surfaces free of water, waste, and foreign material during placement and compaction of fill and backfill materials.
- b. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- c. During filling and backfilling, keep level of fill and backfill

around each structure and buried tank even.

- d. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
 - 1. Fill or backfill to an elevation 2 feet above top of item to be laid.
 - 2. Excavate trench for installation of item.
 - 3. Install bedding, if applicable, as specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.
 - 4. Install item.
 - 5. Backfill envelope zone and remaining trench, as specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, before resuming filling or backfilling specified in this section.
- e. Tolerances:
 - 1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
 - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.
- f. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

Moisture content of backfill shall be plus 2 to minus 4 percent optimum moisture.

3.6.2 Backfill Under and Around Structures

- a. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place structural fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent relative compaction.
- b. Subsurface Drainage: Backfill with granular drain material, where shown. Place granular drain material in lifts of 8-inch maximum thickness and compact each lift to minimum of 90 percent relative compaction.

3.7 PREPARATION OF GROUND SURFACE FOR EMBANKMENTS

3.7.1 General Requirements

Ground surface on which fill is to be placed shall be stripped of live, dead, or decayed vegetation, rubbish, waste, and other unsatisfactory material; plowed, disked, or otherwise broken up to a depth of 12 inches; pulverized; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 95 percent laboratory maximum density. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. The prepared ground surface shall be scarified and moistened or aerated as

required just prior to placement of embankment materials to assure adequate bond between embankment material and the prepared ground surface.

3.8 EMBANKMENTS

3.8.1 Earth Embankments

Earth embankments shall be constructed from satisfactory material meeting the requirements of earthfill free of organic material and rocks with any dimension greater than 3 inches. The material shall be placed in successive horizontal layers of loose material not more than 8 inches in depth. Each layer shall be spread uniformly on a soil surface that has been moistened or aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, each layer shall be plowed, disked, or otherwise broken up; moistened or aerated as necessary; thoroughly mixed; 95 percent laboratory maximum density. Compaction requirements for the upper portion of earth embankments forming subgrade for pavements shall be identical with those requirements specified in paragraph SUBGRADE PREPARATION. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.9 SUBGRADE PREPARATION

3.9.1 Construction

Subgrade shall be shaped to line, grade, and cross section, and compacted as specified. This operation shall include plowing, disking, and any moistening or aerating required to obtain specified compaction. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Low areas resulting from removal of unsatisfactory material shall be brought up to required grade with earthfill materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified. The elevation of the finish subgrade shall not vary more than 0.05 foot from the established grade and cross section.

3.9.2 Compaction

Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.10 FINISHING

The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. The degree of finish for graded areas shall be within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades shall be specified in paragraph SUBGRADE PREPARATION. Gutters and ditches shall be finished in a manner that will result in effective drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials.

3.11 PLACING FILL OVER GEOSYNTHETICS

3.11.1 General

- a. Place fill over geosynthetics with sufficient care so as not to

damage them.

- b. Place fill only by back dumping and spreading only.
- c. Dump fill only on previously placed fill.
- d. While operating equipment, avoid sharp turns, sudden starts or stops that could damage geosynthetics.

3.11.2 Hauling

Operate hauling equipment on minimum of 3 feet of covering.

3.11.3 Spreading

- a. Spreading equipment shall be track mounted, low ground pressure, equipment.
- b. Operate spreading equipment on minimum of 12 inches of fill over geosynthetics.
- c. Spread fill in same direction as unseamed overlaps to avoid separation of seams and joints.
- d. Never push fill downslope. Spread fill over sideslopes by pushing up from slope bottom.
- e. Flatten wrinkles of geotextiles, in direction of spreading. Correct wrinkles in geotextiles as specified in Section 02373 GEOTEXTILE.
- f. Correct wrinkles in geomembranes as specified in Section 02661 POND AND RESERVOIR LINERS - LLDPE
- g. Maintain proper overlap of unseamed geosynthetics.
- h. Avoid overstressing geosynthetics and seams.

3.11.4 Compaction

Compact fill only after uniformly spread to full thickness shown.

3.11.5 Geosynthetic Damage

- a. Mark punctures, tears, or other damage to geosynthetics, so repairs may be made.
- b. Clear overlying fill as necessary to repair damage.
- c. Repairs to geosynthetics shall be made by respective installers as specified in respective specification section for each geosynthetic.

3.12 PLACING RIPRAP BEDDING

- a. Place riprap bedding over prepared subgrade to uniform thickness shown.
- b. No mechanical compaction of riprap is required; however, work riprap bedding as necessary to distribute it and to eliminate detrimental voids. Avoid overworking or long pushes that result in

segregation of particle sizes.

- c. Grade surface of riprap bedding free from irregularities and to tolerances of 0.2 feet from established grade.
- d. Place and grade riprap bedding in a manner that avoids subgrade disturbance displacement or damage to geotextile. Do not push riprap bedding down slope. If wrinkles form in geotextile as riprap bedding is placed, correct them as specified in Section 02373 GEOTEXTILE.

3.13 PLACING RIPRAP OR RIVER ROCK

- a. Place riprap or river rock bedding to uniform thickness shown.
- b. Intermix different sizes of pieces to eliminate segregation and to fill voids between larger pieces with smaller pieces and work surface free from irregularities.
- c. Use placement and intermixing methods that avoid disturbing riprap bedding or damaging existing facilities, completed work, or adjacent property.
- d. When placing river rock over shotcrete it shall be placed in a manner and at the locations shown on the Drawings. The surface to receive the rock shall be free of obstructions and debris. The shotcrete shall be protected from damage during the placement of materials.

3.14 TESTING

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. If the Contractor elects to establish testing facilities, no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved by the Contracting Officer. Field in-place density shall be determined in accordance with ASTM D 1556, ASTM D 2167 or ASTM D 2922. When ASTM D 2922 is used, ten percent of the test and the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017; the calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer. ASTM D 2937, Drive Cylinder Method shall be used only for soft, fine-grained, cohesive soils. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements. Tests on recompacted areas shall be performed to determine conformance with specification requirements. Inspections and test results shall be certified by a registered professional civil engineer. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.14.1 Fill and Backfill Material Gradation

One test per 1,000 cubic yards stockpiled or in-place source material. Gradation of fill and backfill material shall be determined in accordance with ASTM C 136 ASTM D 422 ASTM D 1140.

3.14.2 In-Place Densities

- a. One test per 500 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines.
- b. One test per 150 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.
- c. One test per 100 linear feet, or fraction thereof, of each lift of embankment or backfill for roads.

3.14.3 Moisture Contents

In the stockpile, excavation, or borrow areas, a minimum of two tests per day per type of material or source of material being placed during stable weather conditions shall be performed. During unstable weather, tests shall be made as dictated by local conditions and approved by the Contracting Officer.

3.14.4 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 1500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.14.5 Tolerance Tests for Subgrades

Continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION shall be made during construction of the subgrades.

3.15 SUBGRADE AND EMBANKMENT PROTECTION

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained to drain effectively at all times. The finished subgrade shall not be disturbed by traffic or other operation and shall be protected and maintained by the Contractor in a satisfactory condition until ballast, subbase, base, or pavement is placed. The storage or stockpiling of materials on the finished subgrade will not be permitted. No subbase, base course, ballast, or pavement shall be laid until the subgrade has been checked and approved, and in no case shall subbase, base, surfacing, pavement, or ballast be placed on a muddy, spongy, or frozen subgrade.

3.16 FINISHED GRADE AND TOPSOIL

The Contractor shall verify that finished grades are as indicated on Drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with this Section, prior to the commencement of the seeding operation.

3.16.1 Application of Soil Amendments

3.16.1.1 Applying pH Adjuster

The pH adjuster shall be applied as recommended by the soil test.

3.16.1.2 Applying Fertilizer

The fertilizer shall be applied as recommended by the soil test.

3.16.2 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 6 inch depth. Ripper shanks or approved equal shall be placed from 10-36 inches apart to give maximum effective contour furrow berms. The Contractor shall take all necessary precautions to minimize the turning or plowing of the soil bed. The Contractor shall either Cultipack or lightly harrow bed to break up large clods or fill soil voids these efforts will be applied only if necessary or if directed by Contracting Officer. Contractor shall leave the contour furrows. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 1 inch depth by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on Drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Areas that are compacted within predominantly cobble areas shall not require tillage but shall be ripped or use of another approved method to return the soil to its original compaction. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster and fertilizer may be applied during this procedure.

3.17 LANDFILL COVERS AND LINERS

Landfill replacement covers or new permanent liners shall be installed as specified in Section 01355, ENVIRONMENTAL PROTECTION.

-- End of Section --