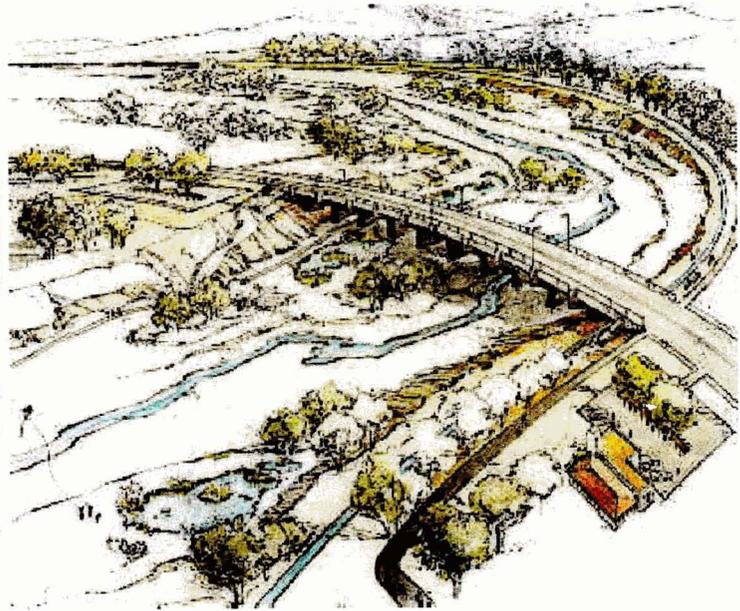


**US ARMY CORPS  
OF ENGINEERS**  
Los Angeles District



**General Provisions  
Supplementary General Conditions  
Engineers Cost Estimate  
Estimated Construction Schedule**

**Salt River, Arizona**



**Low Flow Channel, Phoenix Reach**

**90% NOT FOR  
CONSTRUCTION**

Prepared By:



**SPECIAL PROVISIONS**

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY**

**RIO SALADO – PHOENIX REACH  
LOW FLOW CHANNEL PROJECT – PHASE 2**

**CONTRACT NO. FCD 2000C014  
PCN 124-01-31**

**SPECIAL PROVISIONS**

**SECTION 201 - CLEARING AND GRUBBING**

Clearing and grubbing shall conform to Section 201 of the MAG Uniform Standard Specifications except as modified herein.

**Subsection 201.1 – Description**

Add the following:

The work consists of the removal and disposal of all vegetation, including shrubs, trees of all sizes, and other objectionable plant material within the construction limits of the low flow channel, guide dike structures, grade control structures, the scour protection apron, and conveyance side drain channel, as necessary for the construction of these project features, unless otherwise directed by the Engineer. Removal of vegetation outside the limits of any excavation shall be done only with the approval of the Engineer. Prior to starting this work, the Contractor must verify the location of existing utilities which may be damaged during this work. The work also includes clearing and grubbing for areas to be used for the stockpiling of silty clay soils. This clearing and grubbing will be done only as required to support the stockpiling activities.

The Contractor will minimize damage to and the removal of existing vegetation within the project area that exists beyond required excavation limits. Haul roads and other construction access routes will be created in such a way to minimize such damage and removal whenever possible, and must be approved by the Engineer before vegetation is removed.

**Subsection 201.7 – Payment**

Payment for clearing and grubbing will be made on the basis of the lump sum price bid, including all labor, equipment and materials required for clearing and grubbing of the construction limits.

**ITEM 201-1 – CLEARING AND GRUBBING**

Payment for clearing and grubbing of silty clay stockpile areas will be made on the basis of the price bid per acre, including all labor, equipment and materials required for clearing and grubbing of the stockpile areas.

**ITEM 201-2 – STOCKPILE AREA CLEARING AND GRUBBING**

## **SECTION 202 – MOBILIZATION**

Add the following Section.

### **Subsection 202.1 - Description**

The work under this section shall consist of preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies and incidentals to the project site; the establishment of all offices, buildings and other facilities necessary for work on the project, permits and licenses, and for all other work and operations that must be performed, and costs incurred prior to beginning work on various items on the project site.

### **Field Office:**

This work shall consist of providing and maintaining a furnished Field Office for the exclusive use of and occupancy by the Engineer and the Engineer's staff.

The office shall be a building or mobile trailer erected at a location convenient to the project. The Contractor's and the Engineer's offices shall not be in the same building or mobile trailer although the offices shall be located next to each other or within reasonable walking distance.

The Contractor must provide the Engineer's field office construction trailer area outside of the river bottom. City of Phoenix right-of-way is available along the west side of Central Avenue on the south side of the river for such field office use and as a possible site for Contractor construction trailers and general parking. This site is out of the river bottom and is accessed from the east side of Central Avenue and going under the bridge via an existing high clearance box culvert.

The Contractor may furnish equivalent facilities in an existing building provided such facilities and building are located to provide convenient service.

The field office shall be an approved and weatherproof building or mobile trailer providing a minimum of 600 square feet of clear floor space, not including the toilet area. The structure shall have a minimum ceiling height of seven (7) feet and shall be provided with weatherproof doors equipped with adequate locking devices. Windows shall also be provided with adequate locking devices. The Contractor shall also provide the following:

- a. Lighting - Electric light, non-glare type luminaires to provide a minimum illumination level at desk height level.
- b. Heating & Cooling - Adequate electrically powered equipment to maintain an ambient air temperature of 72 degrees F plus or minus 8 degrees.
- c. Telephone, answering, plain paper FAX machine, and copying machine - Two (2) telephones with two (2) outside lines for the exclusive use of the Engineer. The Contractor will pay for the cost of the line and local calling charges. The District will pay for long distance charges made on these lines.
- d. Toilet - A commode and wash sink in a separately enclosed room within the building or mobile trailer, properly ventilated and complying with applicable sanitary codes. Contractor shall provide water and sewer service.
- e. Maintenance - The Contractor shall maintain all facilities and furnished equipment in good working condition, and the office shall be cleaned weekly.

- f. Fire Extinguisher - Two non-toxic, dry chemical, fire extinguishers meeting Underwriters Laboratories, Inc. approval for Class A, Class B, and Class C fires with a minimum rating of 2A: 20B: 10C.
- g. Electricity - Contractor shall provide electric power and pay for all electric services.
- h. Furnishings - Three office desks with drawers, five office chairs (padded, swivel type), one drafting table (adjustable height) 3 feet by 6 feet with Mayline straight edge attached, two eight foot conference table, twelve folding chairs, two four drawer legal size file cabinets, and one draftsman's stool. All furnishings shall be in good working order.
- i. First Aid Kit
- j. Potable water supply or service
- k. Parking space for ten vehicles with dust proof surface.

The office shall be fully equipped and made available for the Engineer's use and occupancy prior to the start of any Contract work and not later than 10 days after the date of Notice to Proceed. The Engineer will notify the Contractor, in writing, of the acceptability of the Field Office provided. The Contractor shall maintain the field office in operating condition until seven (7) days after acceptance of the Contract work.

All facilities shall be maintained in good operating condition and appearance by the Contractor for the designated period, after which all portable buildings or trailers, fencing, surfacing, and utilities shall be removed from the site, the areas cleaned and seeded, if required, with a native seed mix approved by the Engineer, and left in a neat and acceptable condition.

#### **Subsection 202.1 - Payment**

Payment shall be made on the basis of the lump sum price bid and shall be full compensation for supplying and furnishing all materials, facilities, and services and performing all work involved as specified herein. The lump sum price bid shall not exceed three (3%) percent of the total project bid amount exclusive of mobilization and permits and licenses. No additional payment will be made for occupancy and services during periods of contract extension of time due to engineering changes or shutdowns.

#### **ITEM 202-1 - MOBILIZATION**

#### **SECTION 211 - FILL CONSTRUCTION**

Fill construction shall conform to Section 211 of the MAG Uniform Standard Specifications except as modified herein.

#### **Subsection 211.1 - Description**

Add the following:

Fill construction shall consist of the placing and compacting of fill material for the backfilling of the guide dike structures (GDS), scour protection apron, and grade control structures (GCS). The work will also include backfilling of over-excavated areas where waste materials have been removed in accordance with Section 350. The work also includes placement of fill for the low flow channel (LFC) and conveyance side drain channel as shown in the plans.

#### **Subsection 211.2 - Placing**

Add the following:

Water settling or jetting for compaction purposes will not be permitted.

**Subsection 211.3 - Compacting**

Add the following:

Compaction shall meet the following density criteria:

BACKFILL MATERIAL	MINIMUM PERCENT OF MAX. DRY DENSITY BY STANDARD PROCTOR ASTM D 698 (%)	MINIMUM RELATIVE DENSITY FOR GRANULAR MATERIALS ASTM D 4253/4254 (%)
Below RCC Structures	95	75
Below Gabion Baskets and Mattresses	95	75
Within Limits of LFC	90	70
For side drain channel	85	70
Within Backfill Limits of RCC Structures	85	70

Backfill placed against the gabions shall meet the requirements of Section 222. These requirements include a maximum particle size of 3-inches. For all other materials the maximum particle size is limited to ¾ of the lift thickness except for miscellaneous fill for which the maximum particle size is 24-inches.

Compaction of on site soils in new fills shall have a moisture content between optimum and optimum plus 2 percent.

**Subsection 211.5 - Measurement**

Measurement in cubic yards shall be made for the placement and compaction of fill material for the backfilling of over-excavated areas where waste materials have been removed in accordance with Section 350. No measurement will be made for the placement of fill material for the purpose of backfilling the RCC structures, such backfill placement being incidental to the construction of the RCC structures, gabion mattresses, or along the conveyance side drain channel.

**Subsection 211.6 - Payment**

No separate payment will be made for placement of fill material for the purpose of backfilling RCC structures, gabions, or the conveyance side drain channel. The cost of such backfill placement being incidental to the construction of the RCC structures, gabions or channels.

Payment for the placement of fill material for the purpose of backfilling over-excavated areas where waste materials have been removed shall be made on the basis of the price bid per cubic yard, and shall include all labor, material, and equipment necessary for placing and compacting the fill material.

**ITEM 211-1 - BACKFILL OF OVER-EXCAVATED AREAS**

Payment for the placement of fill material for the purpose of backfilling over-excavated areas where waste materials have been removed in excess of the bid quantities provided in bid item 211-1 shall be made on the basis of the price bid per cubic yard for bid item 211-1, using the allowance provided, and shall include all labor, materials and equipment necessary for placing and compacting the fill material.

**ITEM 211-2 - BACKFILL OF OVER-EXCAVATED AREAS ALLOWANCE**

## **SECTION 215 - EARTHWORK FOR DRAINAGE CHANNELS**

Earthwork shall conform to Section 215 of the MAG Uniform Standard Specifications except as modified herein.

### **Subsection 215.1 - Description**

Add the following:

The work consists of excavation of the low flow channel and conveyance side drain channel as shown on the plans. The Contractor is encouraged to review the geotechnical report for the project, which is available from the Owner, as well as review the borings logs included in the plans. It is likely that construction rubble and debris, tires, and possibly municipal solid waste will be encountered during excavation of these project features. The excavation, removal and disposal of these materials will be accomplished in accordance with Section 350. If the fine grain silty clay soils (70% to 80% passing the 1" sieve, and free of rubble and debris) are encountered during excavation of the Low Flow Channel (LFC), and if such soils can be separately excavated and stockpiled, then at the direction of the Engineer, such soils shall be excavated and stockpiled as follows:

1. Soil stockpiles placed in the river must be placed such that the long axis of the stockpile is parallel to river flows. Stockpile side slopes cannot be steeper than 2H:1V. Stockpiles in the river must be placed so that they do not block side drain flows into the river.
2. Soil stockpiles placed outside of the river must have side slopes no steeper than 4H:1V.
3. Whenever possible the soils will be placed at the nearest stockpile location to the source of the soils, as listed below:
  - a. 300 feet South of the LFC centerline at between stations 156+00 and 165+00, as indicated on the plans.
  - b. 300 feet North of the LFC centerline between stations 141+00 and 154+00, as indicated on the plans.
  - c. 500 feet South of the LFC centerline between stations 109+00 to 120+00, as indicated on the plans.
4. The excavation and stockpiling of these soils shall be considered incidental to and included in the bid quantity for ITEM 215-1 – Earthwork for Drainage Channels.

The work shall also include the removal and disposal of any buried utilities and utility services encountered during excavation, which have been abandoned.

### **Subsection 215.7 - Measurement**

Add the following:

Measurement for payment for excavation of the low flow channel and conveyance side drain channel will be made according to the quantity of material excavated from natural ground to finished grade as shown in the plans and computed using the average end area method as follows:

- A. Contractor shall obtain cross sections after clearing and grubbing and prior to any excavation.
- B. Cross sections shall be taken perpendicular to the construction control line, and with a sufficient number of points to describe the existing ground surface.
- C. Cross sections shall be taken at a minimum of 100-foot stations, and angle points and the beginning and ending of curves, and the beginning, middle and end of sections containing waste

- that are less than 100 feet long
- D. After excavation the Contractor shall obtain new cross sections at the same locations as the existing ground cross sections were taken.

The pay quantity for ITEM 215-1 – Earthwork for Drainage Channels will be reduced by an equivalent quantity of materials removed under ITEMS 350-1 through 350-6 using one ton of removed material to one cubic yard of excavation.

The low flow channel and conveyance side drain channel shall be excavated to the lines, grades and cross sections shown on the plans. The excavation tolerance shall be plus or minus three inches (3”).

**Subsection 215.8 – Payment**

Payment for excavation of the low flow channel and conveyance side drain channel shall be made on the basis of the price bid per cubic yard to the neat lines shown in the plans. Price bid shall include all labor, material, and equipment necessary for excavation, grading, compacting and disposal of excess materials in accordance with the plans.

**ITEM 215-1 – EARTHWORK FOR DRAINAGE CHANNELS**

**SECTION 220 - RIPRAP CONSTRUCTION**

Riprap construction shall conform to Section 220 of the MAG Uniform Standard Specifications except as modified herein.

**Subsection 220.1 - Description**

Add the following:

Riprap construction for this project shall consist of furnishing and installing plain riprap with filter fabric at the conveyance side drain channel inlet and outlet as shown on the plans. Sacked concrete riprap shall not be permitted.

The work also includes the replacement of existing plain riprap near the 24<sup>th</sup> Street bridge abutment protection required for the construction of the RCC grade control structure (GCS). The Contractor must also remove existing gabions located between the abutment protection grouted riprap and the upstream side of the existing ADOT storm drain outlet structure, as shown on the plans. The Contractor shall replace the removed grouted riprap and gabions with gabion materials as shown on the plans. And, the Contractor shall replace the plain riprap as indicated on the plans.

**Subsection 220.3 - Preparation of Ground Surfaces**

Plain riprap shall be installed using a filter fabric as shown on the plans meeting the following requirements:

Geotextile filter fabric shall be used under the riprap and shall be a non-woven fabric consisting only of long chain polymeric filaments such as polypropylene or polyester formed into a stable network such that the filaments retain their relative position to each other. The fabric shall be inert to commonly encountered chemicals, which adversely affect or alter its physical properties. The physical requirements for the geotextile fabric shall meet the following minimum average roll values:

<b>PROPERTY</b>	<b>REQUIREMENT</b>	<b>TEST METHOD</b>
Grab tensile strength, lbs.	200	ASTM D4632-86
Grab elongation at break, %	45 min., 115 max.	ASTM D4632-86
Puncture strength, psi	80	ASTM D3787
Burst strength, lbs.	475	ASTM D3786
Trapezoidal tear strength, lbs.	50	ASTM D4533-85

Permittivity, cm/sec – 1	.48 max	ASTM D4491-85
Apparent opening size, U.S. Standard sieve size	150-200	ASTM D4751-87
UV stability, %	70	ASTM D4355-84

Minimum average roll values represent the average test results for a lot in the weaker direction when sampled according to ASTM D4354 and tested according to the test method specified above.

The identification, packaging, handling and storage of the geotextile fabric shall be in accordance with ASTM D4873. Fabric rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide product identification, sufficient to determine the product type, manufacturer, quantity, lot number, roll number, date of manufacture, shipping date, and the project number and name to which it is assigned. Rolls will be stored on the site or at another identified storage location in a manner that protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof, light colored, opaque cover. At no time, shall the fabric be exposed to sunlight for a period exceeding 14 days.

**Subsection 220.4 – Plain Riprap**

Plain riprap shall be placed at the conveyance side drain channel and placed for the abutments of the Grade Control Structures (GCS) where shown on the plans. The stone shall conform to Section 703 of these Special Provisions and as shown on the plans. The riprap shall be dumped and spread to the lines and grades shown in the plans.

**Subsection 220.7 - Measurement**

Riprap shall be measured per cubic yard in place to the neat lines shown on the plans.

**Subsection 220.8 - Payment**

Payment for riprap construction for the conveyance side drain channel and the 24<sup>th</sup> Street bridge abutment shall be made on the basis of the price bid per cubic yard to the neat lines shown on the plans, and shall include all labor, materials, tools and equipment, and including excavation and backfill, subgrade preparation and placement of filter fabric as required to install the riprap.

**ITEM 220-1 - PLAIN RIPRAP**

**SECTION 221 – ROLLER COMPACTED CONCRETE CONSTRUCTION**

Add this section to the MAG Uniform Standard Specifications

**Subsection 221.1 - Description:**

The work shall consist of furnishing all labor, equipment and materials and constructing Roller Compacted Concrete (RCC) guide dike structures (GDS), and grade control structures (GCS) with Scour Protection Apron at the 24<sup>th</sup> Street Bridge as shown on the plans, and including all excavation and backfilling of the RCC structures.

The Contractor shall submit a Quality Control Program showing his intended method of constructing the RCC at least two weeks prior to the start of RCC production. The plan shall be sufficient in detail to clearly describe the planned execution of the work. Such a Quality Control Program shall include, but not necessarily be limited to, mixing plant, transport equipment, spreading equipment, and compacting equipment, indicating number and capacities of each type of equipment.

The Contractor shall have full responsibility for administration of a Quality Control Program for RCC, which shall meet the same quality control requirements as Section 105 of the MAG Standard

Specifications and these Special Provisions.

The plan shall also show the access planned for performing the work.

The Contractor is responsible for protecting in place the 24th Street Bridge. Because the construction of the Grade Control Structure (GCS) and Scour Protection Apron at 24th Street requires excavating into the river banks in close proximity to the bridge abutments, and adjacent to the shallow bridge spread footings, and because of the potential for significant flows in the river, the Contractor is cautioned about constructing the GCS and apron should this activity occur between December and March.

**Subsection 221.2 - Materials:**

**221.2.1 - Portland Cement**

Portland Cement shall conform to the requirements of Subsection 725.2 of the MAG Standard Specifications.

**221.2.2 - Water**

Water shall be clear and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. Water shall contain not more than 1,000 parts per million of chlorides as Cl or of sulfates as SO<sub>4</sub>. Water shall be sampled and tested in accordance with the requirements of AASHTO T-26.

**221.2.3 - Aggregates**

It is anticipated that in order to meet the specified gradation of aggregates for use in RCC, the Contractor will have to crush, screen, wash, and/or blend material obtained from the required excavations. As an alternative, aggregates may be supplied from a Contractor supplied source. Aggregates for RCC shall contain no deleterious material. Before mixing as RCC the aggregates shall be stockpiled and sampled, and shall be approved by the Engineer, in accordance with the requirements of Section 221.9 of these Special Provisions. The distribution and gradation of materials in the RCC lining shall not result in lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from surrounding material. The contractor may elect to supply the aggregates as one composite material, in conformance with the following gradation or may supply the aggregate as two or more materials to be blended, to meet the following gradation, during the batching or mixing operation.

The composite aggregate gradation supplied to the mixer for production of RCC shall conform to the following gradation requirements when tested in accordance with ASTM C-136 and C-117:

Sieve #	Percent Passing, By Dry Weight
1-1/2"	100
1"	80-95
3/4"	65-80
No. 4	35-50
No. 30	15-30
No. 50	5-20
No. 100	0-10
No. 200	0-5

Aggregates for RCC shall be non-plastic when tested in accordance with AASHTO T-90.

7. The proposed size and number of aggregate stockpiles.

#### 221.4.2 - Preparation

Before RCC processing begins, the area on which RCC will be placed shall be graded and shaped to lines and grades as shown on the Plans or as directed by the Engineer.

The subgrade shall be compacted to a minimum of 95% of the maximum density or equivalent relative density. Optimum moisture and maximum density shall be determined in accordance with ASTM D-698 or AASHTO T-99. Field density tests shall be performed in accordance with ASTM D-1556 "Sand Cone Method". Moisture contents shall be measured and reported to the nearest 0.1%.

Immediately prior to placement of the RCC mixture, the subgrade shall be moistened. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.

Excavation and backfill, and any dewatering necessary to construct RCC below the channel bed profile elevations shown on the plans shall be considered incidental to the construction of the RCC and included in the cost of Bid Item 221-1 – RCC GUIDE DIKE STRUCTURE and Bid Item 221-2 – RCC GRADE CONTROL STRUCTURE.

#### 221.4.3 - Mixing

RCC shall be mixed in an approved central-type plant having a stationary twin shaft pugmill mixer of the continuous-mixing type or an approved batch-type pugmill. The mixing plant shall be designed, coordinated, and operated to produce a RCC mixture of the proportions specified within the required tolerances. The plant shall be equipped with positive means for controlling and maintaining a constant time of mixing. Twin shaft pugmills shall also be equipped with a positive means for maintaining a constant speed of rotation of the shafts. The plant shall be equipped with screening, feeding, weighing, metering, and measuring devices that will add the aggregates, cementitious materials and water into the mixer in the specified quantities.

When the quantity of water is controlled by metering, the Contractor shall make provisions whereby the quantity of water delivered through the meter can be readily converted to weight. A water storage tank may be required to prevent the adverse effects created by surge drawdown.

A variable speed belt or a remotely operated gate, calibrated to accurately deliver any specified quantity of material shall control the aggregate feed rate. The feed rate shall be readily adjustable from the control panel to compensate for changes in the moisture content of the aggregates or to change aggregate proportions when blending is required and separate bins are utilized. The combined aggregate belt feeding the mixer shall be equipped with an approved belt scale. The belt scale shall operate automatic controls, which will govern the proportions of cementitious material and water as ratios of the total aggregates entering the mixer. Provisions for readily and frequently changing mixture proportions will be supplied.

When a continuous mixing plant with a fixed aggregate feed rate system is used, the belt shall travel at a constant speed. The feed system shall continuously deliver aggregate to the mixer at a constant feed rate, calculated on a dry weight basis, at any locked gate setting. The feed system shall be mechanically interlocked with all other feed devices. The aggregate feed monitoring system shall provide and record the rate of and total quantity of aggregates fed into the mixture.

The accuracy of the plant dispensing systems shall be within the following limits:

Blending of aggregates by combining aggregates from separate stockpiles shall be performed by utilization of separate storage feed bins at the plant, to the satisfaction of the Engineer.

#### 221.2.4 - Fly Ash

Fly ash shall conform to the requirements of ASTM C 618, with the loss on ignition limited to 6 percent. Fly ash shall be delivered to the project site separately from cement. Flyash shall be Class F.

#### **Subsection 221.3 - Equipment:**

The RCC structures may be constructed with any combination of machines and/or equipment, except as noted herein, that will produce completed RCC meeting the requirements for pulverization aggregate quality, cement, fly ash, water introduction, mixing, saw cutting, excavating, transporting, placing, compacting, finishing, and curing as provided in these Specifications

Compaction equipment shall be capable of obtaining the specified compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units meeting the requirements of this section. Rollers shall be the self-propelled drum drive vibratory type which will be capable of transmitting dynamic impact to the surface to be compacted through a steel drum by means of revolving weights, eccentric shafts, or other equivalent methods. The compactor shall have a gross weight of not less than 21,000 pounds and shall produce a dynamic force of at least 400 pounds per lineal inch of drum width at the operating frequency, which is used during construction. The roller shall have a vibrating frequency of at least 1,800 CPM (cycles per minute). The roller shall have a smooth drum or drums with a drum diameter between 4 and 5.5 feet and a width of between 5.5 and 8 feet. The engine driving the eccentric mass shall have a rating of not less than 125 horsepower. Heavier compacting equipment may be required to achieve the RCC density requirements.

#### **Subsection 221.4 - Construction Requirements:**

##### 221.4.1 - Required Contractor Submittals

Approval by the Engineer shall not relieve the Contractor of the responsibility for achieving the desired result of constructing sound RCC, free from defects, according to the specifications and plans, or as directed by the Engineer.

Prior to the start of construction, the Contractor shall submit, in writing, for approval, the following items:

1. The approximate dimensions of RCC to be placed prior to starting compaction operations.
2. The number and type of transporting, spreading, and compaction equipment to be used.
3. The number and type of watering equipment to be used.
4. The method to be used to keep surfaces continually moist until subsequent layers of RCC are placed.
5. The method to be used to cure permanently exposed RCC surfaces.
6. The proposed source(s) of materials to be used in RCC aggregate production.

Cement and Pozzolan .....	0 to +2 percent
Water .....	± 1 percent
Aggregates .....	± 2 percent
Admixtures .....	0 to +6 percent

The plant shall be equipped with a hydraulically or mechanically operated discharge holding bin having a minimum capacity of twenty (20) tons of RCC mixture.

Mixing plant(s) shall be capable of producing RCC of a uniform quality and uniformity as would be produced in a conventional batch plant and shall be capable of producing a uniform continuous product (at both maximum and minimum production rates) that is mixed so that complete intermingling of all ingredients occurs without balling, segregation, and wet or dry portions.

Mixing shall not proceed when the aggregates or the area on which the RCC is to be placed is frozen. RCC shall not be mixed or placed when the air temperature is below 45 degrees, unless the air temperature is at least 40 degrees and rising.

Silos and feeders shall be equipped and operated so as to provide uniform rates of feed and prevent caking. Provisions shall be made to allow for ready, safe sampling of the cementitious material(s).

The weighing and metering systems shall include digital readouts, which continuously display, and provide an hourly printed record of, the following information:

1. The total discharged quantity per hour of each weighed or metered material.
2. The cumulative total discharged quantity of each weighed or metered material.
3. The moisture content of the combined aggregates currently entering the mixer.

The Contractor shall give copies of the hourly printed records of discharged quantities and aggregate moisture information to the Engineer at the end of each day of RCC production.

Measuring devices shall be calibrated prior to production of RCC and as deemed necessary by the Engineer. All measuring device calibration shall be approved by the Engineer and performed at the Contractor's expense.

Each measuring device shall be calibrated throughout its range to within an accuracy of 0.2 percent of scale capacity and shall be inspected and calibrated as often as the Engineer deems necessary to assure their accuracy. A certified lab shall perform all calibrations.

The Contractor shall notify the Engineer at least 48 hours in advance of the initial plant calibration. Prior to or at the time of this notification, the Contractor shall provide a Plant Operating Manual to the Engineer.

**221.4.4 - Required Moisture**

At the time of compaction, the moisture content of the RCC shall be in the range of optimum to optimum plus 2.0 percent when the mean air temperature during construction hours does not exceed 90 degrees F. The relationship between the RCC moisture content and its optimum moisture content will be determined in accordance with ASTM D-558 or AASHTO T-134. When the mean air temperature does exceed 90 degrees F, or there is a breeze or wind which promotes the rapid drying of the RCC mixtures, the moisture

content of said mix shall be increased as needed at the direction of the Engineer, but shall be less than that quantity that will cause the RCC to become unstable during compaction and finishing operations.

#### 221.4.5 - Sampling Facilities

Free and safe access to the plant must be provided to the Engineer at all times for inspection of the plant's operation.

The Contractor shall provide suitable facilities and shall take representative samples of materials as they enter the mixer, are discharged from the mixer, and are discharged from the gob hopper. The frequency of the sampling of the combined aggregate feed shall be at the discretion of the Engineer, but will not be less than once a day or once for each 500 cubic yards of RCC produced. These samples shall be used for the Contractors Quality Control and the Engineers Quality Assurance. The Contractor shall furnish all necessary platforms, tools, equipment and trained personnel for obtaining samples.

#### 221.4.6 - Handling

The RCC mixture shall be transported from the mixing area to the placement location in clean equipment provided with suitable protective devices in unfavorable weather. The total elapsed time between the addition of water to the mixture and the start of compaction shall not exceed thirty (30) minutes. This time may be reduced by the Engineer when the air temperature exceeds 90 degrees F or when there is a breeze or wind, which promotes rapid drying of the RCC mixtures. Compaction shall start as soon as possible after spreading.

The Contractor shall take all necessary precautions to prevent damage to completed RCC by the equipment and to prevent the deposition of raw earth or foreign materials between layers of RCC. Earth ramps crossing completed RCC must have at least two (2) feet compacted thickness. Where ramps are constructed over RCC that is not to grade, all foreign materials and the uppermost one (1) inch of the previously placed RCC mixture must be removed prior to continuation of the RCC construction.

#### 221.4.7 - Placing

The mixture shall be placed on the moistened subgrade, embankment, or previously completed RCC with spreading equipment that will produce layers of nine (9) feet in width with a thickness as is necessary for compaction to the required dimensions of the completed RCC layers. The nine (9) feet dimension is to allow for full compaction of the design width of eight (8) feet with one (1) foot of excess that will not be trimmed. The compacted layers of RCC shall not exceed eight (8) inches in thickness nor be less than four (4) inches in thickness.

In areas where the design width exceeds nine feet the RCC will be deposited as close as possible to the final position. Vehicles transporting RCC on the previously placed surfaces shall be operated to prevent sudden stops, sharp turns, or other operations that damage the surface of the previously compacted lift. RCC shall not free fall more than 4 feet during dumping or be piled higher than 4 feet during spreading and shall not be spread more than 15 feet from the point of deposit. Segregated RCC aggregates shall be removed or where approved remixed into the fresh RCC.

Each successive layer shall be placed as soon as practicable after the compaction of the preceding layer has been verified by the Contractor's Quality Control.

The Contractor shall schedule placement of all RCC above channel bottom such that the placement of

RCC protection at each location will be completed from channel bottom to plan top of RCC within five (5) calendar days, unless otherwise approved by the Engineer, or unless prevented by inclement weather.

All RCC surfaces that will be in contact with succeeding layers of RCC shall be kept continuously moist by fog spraying until placement of the subsequent layer, except that the Contractor will not be required to keep such surfaces continuously moist for a period longer than seven (7) days.

Mixing shall not proceed when the aggregate or the area on which the soil-cement is to be placed is frozen. RCC shall not be mixed or placed when the air temperature is below 45 degrees F, unless the air temperature is at least 40 degrees F and rising.

#### 221.4.8 - Compaction

The running average of five consecutive in-place density tests shall not be less than 98% of the maximum density obtained by ASTM D-558, with no individual test less than 95%. The Contractor shall remove and replace all RCC not meeting these requirements at no cost to the Owner. Optimum moisture and maximum density shall be determined in accordance with ASTM D-558. Field density tests shall be continually monitored by the Contractor's Quality Control and shall be performed in accordance with ASTM C-1040 "Density of Unhardened and Hardened Concrete in Place By Nuclear Methods", Method A. Moisture contents shall be measured and reported to the nearest 0.1%.

Wheel rolling with hauling, grading, spreading, or watering equipment, shall not be an acceptable method of compaction. Vibratory compaction methods or equipment shall not be used when their use contributes to sloughing or caving of soils which the RCC is to be placed against.

At the start of compaction, the mixture shall be in a uniform, loose condition throughout its full depth. Its moisture content shall be as specified in Subsection 221.4.4 herein. No section shall be left undisturbed for longer than thirty (30) minutes during compaction operations. Compaction of each layer shall be done in such a manner as to produce a dense surface, free of compaction planes, in not longer than one (1) hour from the time water is added to the mixture.

#### 221.4.9 Lift Joints

##### 221.4.9.1 General

Lift joints shall be treated with special care as indicated hereafter.

All lifts placed within the top three (3) feet of the GCS shall be treated with the bonding layer as indicated in paragraph 221.4.9.5. The placement of the bonding layer applies to the main "north/south" GCS feature, transverse to the low flow channel centerline. It does not apply to the upstream or downstream aprons, or the low flow channel bank protection features. Where RCC is placed against pre-existing RCC, the surfaces to which new RCC will be placed will be prepared in accordance with the requirements of Paragraph 221.4.9.5.

##### 221.4.9.2 Normal Conditions

All RCC shall be placed with sufficient continuity so that it hardens and acts as one monolithic structure without discontinuous joints or potential planes of separation. All lift joints shall be kept clean, uncontaminated, free from ponded water, and continuously moist until placement of the succeeding RCC. Regular lift-joint treatment and maintenance applies to subsequent lifts placed within 2 hours of the

exceed 1/2 inch, and the average thickness determined by dividing the volume used by the area covered is approximately 1/4 inch. Bedding mortar placements shall be controlled to prevent bleeding of the mortar through the RCC. The bedding mortar shall be covered with the designated RCC mix within 15 minutes after placement of the bedding mortar. Consolidation of the bedding mortar will not be required. Serrated rakes creating small windrows of mortar or other approved devices shall be used for mortar application.

#### 221.4.10 - Finishing

After compaction, the top surface of the RCC shall be shaped to the required lines, grades, and cross-sections and rolled to a reasonably smooth surface.

#### 221.4.11 - Curing

Temporarily exposed surfaces shall be kept moist as set forth in Subsection 221.4.7.

Care shall be exercised to ensure that no curing material other than water is applied to surfaces that will be in contact with succeeding layers of RCC.

Permanently exposed surfaces of the RCC shall be kept moist during the seven (7) day cure period. Whenever atmospheric temperatures are expected to drop below 30 degrees F, RCC shall be protected from freezing for seven (7) days after its construction by a covering of loose earth, straw, or other suitable material approved by the Engineer.

#### 221.4.12 - Maintenance

The Contractor shall be required, within the limits of the Contract, to maintain the RCC in good condition until all work is completed and accepted. Maintenance shall include immediate repairs of any defects that may occur. This work shall be done by the Contractor at his own expense and repeated as often as necessary. Faulty work shall be replaced for the full depth of the layer.

#### 221.4.13 - Bridge Pier Expansion Joints

The Contractor shall install an expansion joint between the RCC apron for the GCS and the 24<sup>th</sup> Street bridge piers as shown on the plans. The cost of such expansion joints, including the polystyrene and the sealant (ASTM D3406) shall be considered incidental to the cost of the RCC apron.

#### **Subsection 221.5 - Inspection and Testing:**

The Contractor's Quality Control will perform all the tests required to insure the RCC production and placing is according to the present contract specifications.

The Engineer, with the assistance and cooperation of the Contractor, will make inspections and tests, as he deems necessary to verify the conformance of the work to the Special Provisions.

The inspections and tests performed by the Contractor's Quality Control will include, but will not be limited to: (1) the taking of test samples of the RCC and its individual components at all stages of processing and after completion, and (2) the close observation of the operation of all equipment used on the work. Only those materials, machines, and methods meeting the requirements of the Special Provisions will be approved by the Engineer.

All testing of RCC or its individual components, unless otherwise provided specifically in the Special

Contractor, providing that it is typical of materials entering the RCC.

2. Action Required:

The Engineer may test for verification any field determinations of moisture contents made by the Contractor. This verification will use the oven drying procedure. If there is a discrepancy between the Contractor's test results and the verification tests, immediate steps shall be taken to identify the source of the problem and correct it so that accurate field determinations are obtained. When moisture content determinations indicate a change in water entering the RCC with the aggregates, the placement foreman shall be contacted to see if a corresponding adjustment in water added at the RCC mixer is necessary to obtain maximum compaction at the placement site.

(C) RCC Plant Control:

When the mixing plant is operating, the measurement of all constituent materials including cement, each size of aggregate, water and admixtures, shall be continuously controlled. The aggregate weights and amount of added water to compensate for free moisture in the aggregates shall be adjusted as necessary. A daily report shall be prepared indicating the type and source of cement used during that day; the amount, type and source of admixtures used; aggregate size groups used; required mix proportions per cubic yard for each mix design used; the amount of water as free moisture in each size of aggregate; and the aggregate and water weights per cubic yard for each mix design of RCC made during plant operation.

(D) Scales for Weigh Batching:

1. Tests and Checking:

The accuracy of scales shall be checked by test weights prior to the start-up of RCC operations. Such tests shall also be made whenever there are variations in properties of the RCC that could result from batching errors. The accuracy of each batching device when weight batching procedures are used shall be routinely checked during a weighing operation by noting and recording the required weight and the weight actually batched. Rechecks shall be made at least every four shifts of operation thereafter and whenever there are variations in the properties or control of RCC that could result from batching errors.

2. Action Required:

Whenever either the weighing accuracy or batching accuracy is found not to comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made.

(E) Volumetric Feed Calibrations:

1. Tests and Checking:

The accuracy of volumetric feeds shall be checked, by collecting all material delivered during a unit of time to the mixer and also by washout tests of material exiting from the mixer. Suitable methods and equipment shall be provided for obtaining and handling samples at the mixing plant. The weight of material corresponding to a standard time interval, and the resulting proportions of materials per cubic yard, shall be determined. The accuracy of volumetric feeds shall be determined at least three times for the mixing plant prior to production operations and RCC placement. Rechecks shall be made at least every four shifts of operation thereafter and whenever there are variations in the properties of control of RCC that could result from volumetric feed errors. The sample shall be of sufficient size to give accurate

case, at least three tests shall be made in different areas of each layer of RCC placed, during each shift in which placement occurs. The placing foreman shall continuously monitor the apparent effectiveness of compaction equipment from a visual standpoint, and shall notify the mixing plant whenever the mix becomes too dry or too wet.

b. Action Required:

Whenever moisture content tests indicate a change from what has been established as the optimum batching and placing moisture for maximum density and efficiency of compaction equipment, a corresponding adjustment shall be made in the mix water added at the mixing plant and the adjustment shall be noted. Whenever the placing foreman observes a condition of moisture which begins to consistently allow the vibratory rollers to sink excessively in the mix, cause excessive paste to develop at the surface, or leave an open appearing unconsolidated surface, an adjustment shall be made in the mix water added at the plant and the adjustment shall be noted.

5. Cement Content:

The Contractor shall obtain samples of the RCC mixture at the mixing plant and/or placement area for determination of cement content using a chemical chloride titration or similar procedure daily. The test equipment shall also allow moisture content determinations to be made. The equipment shall be provided by the Contractor and all testing shall be by the Contractor, test results copies being transmitted to Engineer daily.

6. Density:

a. Testing and Checking:

Once every lift during placement, the density and moisture content of RCC after compaction shall be determined with a nuclear density gauge in accordance with ASTM C 1040, Method A, previously calibrated against sand cone densities.

Each lift of soil-cement shall be tested by the nuclear gauge in at least six separate locations for density. The direct transmission mode shall be used and readings shall be taken in each quadrant of a circle obtained by rotating the gauge 90 degrees each after each reading around the transmission probe. The probe shall be inserted into pre-driven holes of diameter recommended by the manufacturer to a depth of at least 10 inches for each reading. Density shall be as specified in Subsection 221.4.8 of this Special Provision. The vibratory roller operators shall continually monitor their "on board" compaction meters as an indicator of any areas which have not been fully compacted.

b. Action Required:

Whenever a roller operator finds that his compaction meter indicates insufficient compaction, he shall continue rolling until the required compaction meter readout is achieved. If this requires more than an estimated six passes, the Engineer shall be notified by the placing foreman, and the Contractor shall determine the actual density with a nuclear gauge. Whenever the nuclear gauge indicates compaction of less than specified in Subsection 221.4.8 of this Special Provision, a retest shall be made. If the retest indicates incomplete compaction, the Engineer shall be notified, additional rolling shall be immediately provided and a determination shall be made as to whether the lower density resulted from insufficient passes of the roller or a change in the mix properties. If the mix properties have changed, adjustments such as increasing or decreasing the moisture content shall be made at the mixing plant. If the problem persists,

(J) Construction Joints:

Vertical construction joints are to be provided at the end of each day's work or when work is halted for two hours or more. The joints shall be trimmed to a straight line and vertical to the full depth of the lift. Before resuming placement of new RCC, loose material shall be removed from the joint.

(K) Curing, Protection and Joint Surfaces:

1. Moist Curing:

The Contractor shall keep continuously moist the exposed RCC surfaces for a seven consecutive day period after placing the RCC, as stated in Subsection 221.4.11. At least once each shift around the clock, seven days per week, an inspection shall be made of all areas subject to moist curing and joint protection. The surface moisture condition shall be noted and recorded. If an isolated area has been allowed to dry, that area shall be considered as improperly cured. The Contractor shall immediately wet the surface and take positive steps to ensure that the problem does not reoccur.

2. Protection:

At least once each shift, around the clock, seven days per week, an inspection shall be made of all areas subject to cold weather protection or protection against damage. Deficiencies shall be noted. During removal of cold weather protection, measurement of RCC and ambient temperature shall be made at least every three hours.

(L) Finishing:

After compaction, the RCC shall be further shaped, if necessary, to the required lines, grades, and cross sections, and rolled to a reasonably smooth surface.

(M) Backfill:

Special care shall be taken when placing backfill against RCC. Where machine compactors are unable to reach backfill soils placed adjacent to an RCC structure, a hand operated compactor or walk behind roller may be used to achieve densities required in Section 211.3. Material placed directly over an RCC structure shall be placed in an initial lift thickness of nine inches (9") or greater depending on the penetration depth of the pad feet of the compactor, if applicable.

(N) Reports:

Mixing plant control reports and all results (both passing and failing) of tests conducted at the site shall be delivered to the Engineer daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in the preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Engineer has the right to examine all Contractor quality control records.

**Subsection 221.10 - Acceptance Sampling and Testing**

Rejection of RCC will occur due to improper temperatures, and/or density for the RCC mixture delivered to the site, placed and compacted.

(A) Sampling and Testing of RCC:

1. General:

Fresh RCC shall be sampled and tested for compliance with this Specification. Samples and tests will be made at the placing location at the time of placement. The Contractor shall provide a method of readily obtaining representative RCC samples from the placement locations.

2. Temperature:

At least one test of temperature shall be made at the placement location on a randomly selected batch of each mix design of RCC used per shift of placement. Additional tests shall be made when rapid set time or workability loss is reported or when cold weather problems occur.

3. Moisture Content:

At least once during each two hours at the placement site (immediately after compaction), the moisture content shall be determined on the RCC mix using a nuclear gauge in the direct transmission mode. The gauge shall be calibrated against oven-dry samples of each mix design used. The number of samples shall be determined by the Engineer based on field conditions and previous correlation data.

In any case, at least three moisture content tests shall be made in different areas of each layer of RCC placed.

4. Density:

At least once every two hours during placement, but not less than once every 500 cubic yards of RCC, the density and moisture content of RCC after compaction shall be determined by the Engineer with a nuclear density gauge in accordance with ASTM C-1040. Each lift of RCC shall be tested by the nuclear gauge in at least six separate locations for density. The Engineer may check densities at any time to ensure compliance with the Specification and to require more compaction or removal.

5. RCC Compressive Strength:

The Engineer shall cast, transport, and cure specimens for compressive strength tests and test the specimen for compressive strength at time intervals as directed by the Engineer, but not less than one set of three cylinders per 500 cubic yards of RCC placed. The cylinders shall be prepared and tested in accordance with the requirements of Arizona Test Method 241a.

(B) Acceptance of RCC:

Acceptance for placed RCC which meets the above requirements or is allowed to remain in place shall be determined by the results of the in-place density tests. RCC represented by density tests, which does not meet the minimum density specified, may be allowed to remain in place at the discretion of the Engineer. No payment will be made for such RCC.

**Subsection 221.11 - Control Strips:**

At least 10 days but not more than 60 days prior to construction of the roller compacted concrete pavement, a control strip shall be constructed near the job site or at the location designated on the contract plans. The Contractor shall notify the Engineer at least 5 days in advance of the date of control strip construction.

The control strip shall consist of not less than two adjacent paving lanes each approximately 50 feet long and shall be constructed to the thickness and number of lifts designated on the construction plans. The lane width of each paving lane shall be the same as that proposed for use in the project. The control strip shall contain at least one fresh longitudinal construction joint, one cold transverse joint, one longitudinal cold construction joint which has stood overnight before completion, and at least one horizontal joint showing methods for joint preparation and cleanup, including application of the bonding layer. Two separate days shall be used for construction of the control strip. The control strip will provide the Contractor the opportunity to develop and demonstrate, to the satisfaction of the Engineer, the proposed techniques of mixing, hauling, placing, compacting, finishing and curing, and the preparation of the construction joints. Additionally, the Contractor shall demonstrate the laydown method and rate, rolling pattern, joint preparation, and rolling method for both fresh and cold construction joints, start-up and finishing procedures, testing methods, and plant operations.

Each control strip, if constructed to acceptable density and surface tolerances, shall remain in place and become an integral part of the completed work. Unacceptable control strips (i.e., those that fail to meet the specified requirements for density or surface tolerances) shall be replaced at the Contractor's expense. A control strip shall have an area of not less than 200 square yards and the compacted lift thickness specified for the construction of the course, which it represents.

Compaction equipment shall be capable of obtaining the specified compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units meeting the requirements of this section.

Rollers shall be the self-propelled drum drive vibratory type which will be capable of transmitting dynamic impact to the surface to be compacted through a steel drum by means of revolving weights, eccentric shafts, or other equivalent methods. The compactor shall have a gross weight of not less than 21,000 pounds and shall produce a dynamic force of at least 400 pounds per lineal inch of drum width at the operating frequency, which is used during construction. The roller shall have a vibrating frequency of at least 1,800 CPM (cycles per minute). The roller shall have a smooth drum or drums with a drum diameter between 4 and 5.5 feet and a width of between 5.5 and 8 feet. The engine driving the eccentric mass shall have a rating of not less than 125 horsepower. Heavier compacting equipment may be required to achieve the RCC density requirements.

Variable amplitudes of the roller shall be used as approved in different areas to identify the optimum amplitude. Rolling pattern of the vibratory rollers may be varied as approved to determine the best pattern. Variations in mixture proportions other than water shall be made if directed. The control strip shall be placed in portions as directed by the Engineer. The Contractor shall vary the water content, as necessary, to arrive at the appropriate density.

The equipment used in the construction of the control strip shall be of the same type and weight to be used on the remainder of the course represented by the control strip.

The materials used in the construction of the control strip shall conform to the specification requirements. They shall be furnished from the same source and shall be of the same type used in the remainder of the course represented by the control strip. The underlying surface upon which a control strip is to be constructed shall have the prior approval of the Engineer.

The mixing plant shall be operated and calibrated prior to placing the control strip. The Contractor shall use the same equipment, materials, and construction techniques on the control strip as will be used in all

subsequent work. Base course preparation, RCC production, placing, compacting, curing, construction of joints, and all testing shall be in accordance with applicable provisions of this section. The Contractor shall construct a control strip acceptable to the Engineer in all aspects, including surface texture. Failure to construct an acceptable control strip will necessitate construction of additional control strips at no additional cost to the Owner. Control strips unacceptable to the Engineer shall be removed at the Contractor's expense. The Contractor shall provide twelve (12) 6 inch diameter cores to the Engineer from points selected in the control strip by the Engineer 5 days after completion of the control strip.

**Subsection 221.12 - Measurement:**

This work shall be measured in cubic yards of complete-in-place RCC between the limits shown by the specified lines, grades, and cross-sections shown on the Plans. The Contractor shall compute the volume of RCC placed by the average end area method from the neat line RCC cross-sections indicated on the drawings. Cement and fly ash shall be measured and paid for in tons.

**Subsection 221.13 - Payment:**

Payment for the placement of RCC for the GDS shall be made on the basis of the price bid per cubic yard for RCC. Such payment shall constitute full reimbursement for performing all work and for furnishing all equipment, labor, and materials necessary to complete the RCC construction for the GDS, all excavation and backfill to grade shown on the plans, watering, mixing, placing, compacting, curing, inspection, and testing assistance and all other incidental operations, except for cement and fly ash. Any waste of RCC by the Contractor during handling, mixing, placing, etc., operations shall not be paid for.

**ITEM 221-1 - RCC GUIDE DIKE STRUCTURE**

Payment for the placement of RCC for the GCSs including the Scour Protection Apron at 24<sup>th</sup> Street shall be made on the basis of the price bid per cubic yard for RCC. Such payment shall constitute full reimbursement for performing all work and for furnishing all equipment, labor, and materials necessary to complete the RCC construction for the GCS and apron, all excavation and backfill to grade shown on the plans, watering, mixing, placing, compacting, curing, bridge pier expansion joints, inspection, and testing assistance, and all other incidental operations, except for cement and fly ash. Any waste of RCC by the Contractor during handling, mixing, placing, etc., operations shall not be paid for.

**ITEM 221-2 - RCC GRADE CONTROL STRUCTURE**

Payment for cement furnished for the production of RCC shall be made on the basis of the price bid per ton. The cement quantity to be paid will be measured using the percentages, weights and dry-density called for in the corresponding mix design. Payment for cement is based on 100% compaction of the RCC, the required cement content, and the neat line RCC limits as measured above. Any waste of cement by the Contractor during the handling, mixing, placing, etc., operations shall not be paid for. Unbalancing of the bid below market cost shall be the basis for rejection of the bid.

**ITEM 221-3 - CEMENT FOR RCC**

Payment for fly ash furnished for the production of RCC shall be made on the basis of the price bid per ton. The fly ash quantity to be paid will be measured using the percentages, weights and dry-density called for in the corresponding mix design. Payment for fly ash is based on 100% compaction of the RCC, the required fly ash content, and the neat line RCC limits as measured above. Any waste of fly ash by the Contractor during the handling, mixing, placing, etc., operations shall not be paid for. Unbalancing of the bid below market cost shall be the basis for rejection of the bid.

**ITEM 221-4 - FLY ASH FOR RCC**

**SECTION 222 - GABION CONSTRUCTION**

Add the following Section.

### **Subsection 222.1 – Description**

The work under this section shall consist of furnishing all materials, equipment, labor and incidentals required to construct twisted wire gabion mattresses at the locations and to the line and grade as shown on the plans.

### **Subsection 222.2 – Materials**

The material used for gabion fill shall be clean, hard, well graded rock. The rock size for the 9-inch thick gabion mattresses shall range from three to six inches with D50 = 4.5 inches. Placement of stone filling shall not exceed a 12-inch vertical drop above the gabion mattress. Placement of the rock shall be done in such a manner as to minimize damage to the coating on the basket wire.

Rock shall be sound and durable, free from clay or shale seams, cracks or other structural defects. The Bulk specific Gravity (SSD) shall be determined in accordance with the requirements of AASHTO T-85 and shall be a minimum of 2.4. Rock may be rounded stones. Rock shall have a least dimension not less than one-third of its greatest dimension and a gradation in reasonable conformity with that shown herein. Control of the gradation will be by visual inspection.

The source and acceptability of the stone will be approved by the Engineer. If testing is required, suitable samples of stone shall be taken in the presence of the Engineer at least 25 days in advance of the time when its use is expected to begin. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.

Gabion mattress units shall be of non-raveling construction and fabricated from a double twist by twisting each pair of wires through three half turns developing the appearance of a triple twist per ASTM A 975-97.

The double twisted mesh shall be manufactured from zinc-5% Al coated steel wire conforming to ASTM 856 Zinc-5% Aluminum – Mismatch Alloy Coated Carbon Steel. The nominal diameter of the wire shall be 0.0866 inches for the gabion mattresses and 0.120 for the gabion baskets. The metallic-coated steel wire shall have a 3.0 mm thick zinc-5% Al coating with at least 275 g/m<sup>2</sup> per DIN 1548, as manufactured by Maccaferri Gabions, Inc. or approved equal. The metallic coated wire used shall be coated prior to weaving into mesh. All gabion diaphragms and frame wires shall equal or exceed the requirements for Style 3 in ASTM A975-97. The mesh opening shall be hexagonal in shape and uniform in size measuring not more than 3 ¼ inches by 4 ½ inches for gabion baskets and measuring not more than 2 ½ inches by 3 ¼ inches for gabion mattresses. Selvedge or perimeter basket frame wire shall be of a heavier gauge than the mesh wire with a diameter of 0.150 inches after the zinc-5% Al coating. Lacing and connecting wire shall meet the same specifications as the wire used in the gabion body except that its diameter shall be of 0.091 inches (US gauge 13) after zinc-5% Al coating. The use of alternate wire fasteners shall be permitted in lieu of tie wire providing the alternate fastener produces a four (4) wire selvedge joint with a strength of 1,400 lbs. per linear foot while remaining in a locked and closed condition. Properly formed interlocking fasteners shall be spaced from 4 to 6 inches and have a minimum ¾ square inch inside area to properly confine the required selvedge wires. The interlocking wire fastener shall meet material specification ASTM A-764, Finish 2, Class 1, Type 3. All of the above wire diameters are subject to tolerance limit of 0.004 inches in accordance with ASTM A-641.

### **Subsection 222.3 – Assembling and Placing**

The gabion bed subgrade shall be excavated to the width, line and grade as shown on the plans. The gabions shall be founded on this bed and laid to the lines and dimensions required.

Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular units of the specified sizes. Gabions are to be of single unit construction, the base, ends and sides either to be woven into a single unit or one edge or these members

connected to the base section of the unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

Gabion basket dimensions shall conform to standard manufactured sizes.

Tolerances. All gabion dimensions shall be within a tolerance limit of 5% of the manufacturer's stated sizes.

The Contractor shall submit for review by the Engineer, shop drawings prepared by a Professional Engineer registered in the State of Arizona for the gabion layout at the locations shown in the plans. Said shop drawings will be based on the layout shown on the plans and shall include, but not be limited to: plan and sections, basket sizes and locations.

Where the length of the gabion exceeds its horizontal width, the gabion is to be equally divided by diaphragms, of the same mesh and gauge as the body of the gabions, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base section in such a manner that no additional tying at this juncture will be necessary.

All perimeter edges of gabions are to be securely selvaged or bound so that the joints formed by tying the selvages have at least the same strength as the body of the mesh.

Gabions shall be placed to conform with the project plan details. Stone shall be placed in close contact in the unit so that maximum fill is obtained. The units may be filled by machine with sufficient handwork to accomplish requirements of this specification, however the stone filling shall not exceed a 12-inch vertical drop above the gabion mattress. The exposed face or faces shall be hand-placed using stones to prevent bulging of the gabion cell and to improve appearance. Each gabion mattress cell shall be filled in three lifts.

Two connecting tie wires shall be placed between each lift in each cell. Care shall be taken to protect the vertical panels and diaphragms from being bent during filling operations.

The last lift of stone in each cell shall be level with the top of the gabion in order to properly close the lid and provide an even surface for the next course.

All gabion units shall be tied together each to its neighbor along all contacting edges in order to form a continuous connecting structure.

Empty gabions stacked on filled gabions shall be laced to the filled gabion at the front, side and back.

**Backfill for Gabions** - Gabion mattresses shall be installed to the elevation and location specified in the plans. Backfill material shall then be placed and compacted to 85 percent of Standard proctor as determined by ASTM D 698 or 70% relative density for granular materials as determined by ASTM D 4253 and ASTM D 4254.

Through sections containing hard and compact material, coarse gravel, cobbles, and boulders that cannot be excavated and trimmed efficiently with excavating and trimming machinery, excavate so that there will not be less than 3 inches between any point of the excavated surface and the underside of the gabion mattress. Surfaces so excavated shall be refilled with compacted fill material.

The specified following material is for backfilling over gabion mattresses. Suitable on-site or imported granular material used for backfill as described above shall be free of vegetation, debris, organic contaminants, and fragments larger than three inches in size; and shall conform to the following requirements:

Maximum Particle size:	3 inches*
Percent Passing #4 sieve	40-100
Percent Passing #200 sieve	0-25
Plasticity Index	≤5

\* Maximum size may be reduced at the Engineer's direction to satisfy trenching requirements, etc.

Backfilling of the completed gabions will begin only after the gabions have been inspected and approved by the Engineer.

#### **Subsection 222.4 – Measurement**

The quantity of gabions shall be measured and paid for to the neat lines as shown on the plans.

#### **Subsection 222.5 – Payment**

Payment for gabion construction shall be made on the basis of the price bid per cubic yard, and shall be full compensation for all materials, equipment, labor, excavation, backfilling, preparing the ground area, rock, and all incidentals required to complete the gabion mattresses in place.

#### **ITEM 222-1 – GABION MATTRESSES**

### **SECTION 225 – WATERING**

Watering shall conform to Section 225 of the MAG Uniform Standard Specifications except as modified herein.

#### **Subsection 225.1 – Description**

Construction water availability and usage is as described below.

Construction water is available from City of Phoenix hydrants as follows:

1. There are eleven hydrants located within one-quarter to one-half mile of the river between 7<sup>th</sup> Street and 24<sup>th</sup> Street that could be used for such purposes.
2. The Contractor will obtain a permit from the City at the second floor of the City Hall Building. The Contractor should allow two weeks for the City installation of the meter.
3. A fee of \$500 will be charged for each hydrant and meter, some of this fee being refundable.
4. The charge for the water is approximately \$1.37/100 cubic feet.
5. The Contractor will contact the City for specific information regarding the use of City water and for all costs associated with its use.

The Contractor may elect to use surface water in the river for construction purposes such as dust control. Its use will not be permitted for roller compacted concrete (RCC) production.

The Contractor cannot use groundwater from dewatering activities or from within excavations for

construction purposes including dust control and RCC production.

**Subsection 225.5 – Payment**

No payment will be made for watering as such; the cost thereof shall be included in the bid price for the construction or installation to which watering is incidental or appurtenant.

**SECTION 350 - REMOVAL OF EXISTING IMPROVEMENTS**

Removal of existing improvements shall conform to Section 350 of the MAG Uniform Standard Specifications except as modified herein.

**Subsection 350.1 - Description**

Add the following:

The work includes the removal of an existing sand and gravel conveyor bridge across the river, with the bridge superstructure and foundations being removed to the limits shown in the plans.

The work includes the removal of existing plain riprap at storm drain outlet into the river in order to construct new conveyance side drain channels to convey flows to the low flow channel (LFC).

The work also includes the removal of buried plain riprap located at the existing bridge piers, within the LFC limits of excavation, indicated on the plans. As well as the removal of plain riprap near the south abutment of the 24<sup>th</sup> Street Bridge. Removal of gabion mattresses shall also be performed as required near the north abutment of the 24<sup>th</sup> Street Bridge in order to construct the RCC grade control structure (GCS) as shown on the plans. Additional gabion type mattresses need to be removed from the north riverbank at Station 176+39 in order to construct the GCS at this location.

The work required by this Section 350 in support of the excavation of the low flow channel (LFC) and conveyance side drain channels, and the construction of the roller compacted concrete (RCC) guide dike structures (GDS), grade control structures (GCS), and scour protection apron includes, but is not limited to, the following:

1. The removal and disposal offsite of inert materials and construction debris as defined in Section 107.5.4.
2. The removal and disposal offsite of tires.
3. The removal and disposal offsite of household wastes.
4. The placement of temporary and permanent liners over the exposed face of any household wastes or other wastes as directed by the Engineer.

The project construction limits within the LFC, GDS, or GCS shall be cleared of all waste materials and tires, unless otherwise described below or in Subsection 107.5.4. Any such materials encountered and disturbed during construction of haul roads, access routes and Contractor Work Areas shall also be removed and disposed of offsite. Such material as collected shall be disposed of offsite at an approved landfill site and shall be subject to landfill fees so assessed, which will be included in the unit price bid for this item.

Upon encountering any waste materials the Contractor shall immediately notify the Engineer of the location of this material and allow the Engineer and the City of Phoenix (COP) on-call environmental contractor full access to the site to inspect the wastes and recommend further procedures. The Contractor

must provide all information necessary to comply with ARS 49-701 to the Engineer. Within 14 days of the removal and disposal of any solid waste, the Contractor must, unless otherwise directed by the Engineer, provide the following information, using the form provided in Appendix "D".

1. A narrative description and map of the location where the waste materials were encountered including station points and offsets.
2. A brief written description of the wastes and removal procedures, including the nature and approximate quantity of the wastes removed, approximate dimensions of the excavation, a description of waste handling, storage, and transportation practices, and a description of the disposal method and location.
3. Supporting documentation such as load receipts, manifests, etc.

The on-call, environmental contractor for the COP, will document materials their own personnel remove. The Contractor will not be responsible for providing documentation for materials removed by the on-call environmental contractor.

All waste materials other than inert material and construction debris will be characterized by the COP (See Subsection 107.5.4 of the Supplementary General Conditions), and if necessary segregated by a COP on-call environmental contractor. Once this has been accomplished the Contractor, at the direction of the Engineer, can remove and dispose of all non-hazardous materials. This includes construction debris, inert material, special wastes and household wastes. Disposal of soils associated with the waste materials and found not to be hazardous will be considered incidental to the Special Provisions Section 215 bid items.

The limits of removal for household wastes and special wastes for placement of RCC structures shall be 3 feet beyond neat line limits and backfill and compact to neat line in accordance with Section 211.

The limits of removal for household wastes and special wastes for LFC excavation shall be as follows:

1. Waste material located below the LFC invert shall be completely removed.
2. Waste material located along the side slope of the LFC shall be overexcavated at least 10 feet horizontally from the toe and finished face of the LFC side slope. The overexcavation will be performed to a slope of 6:1 through the waste accumulation. Portions of the overexcavated slopes, which do not contain waste, can be sloped as necessary to meet existing or final grade.
3. Waste material located below the invert of the LFC, that also extends under the side slope, shall be completely removed below the channel invert for a distance of at least 10 feet horizontally from the toe of the final LFC side slope.

The limits of removal for inert material and construction debris shall be as follows:

1. At the LFC side slope, such material shall be overexcavated and removed to a horizontal distance of at least 3 feet from the side slope neat line, and to a depth of at least 8 feet below the LFC channel invert.
2. For the placement of RCC structures, such material shall be removed at least 3 feet beyond neat line limits of the structure.

In all cases where waste materials of any type have been removed, the resulting void shall be backfilled and compacted to neat line in accordance with Section 211.

The Contractor may be required to prepare graded areas for use by the COP on-call environmental

contractor for temporary storage of excavated waste material including associated soils. This will be done at the direction of the Engineer. The size of the temporary storage stockpile areas will be approximately 100 feet by 150 feet in footprint area and shall be free draining. The Contractor shall limit side-slopes of the material placed over the graded area to 3H:1V. If the graded area is constructed in proximity to a river bank, the Contractor shall limit surface water run-on to the temporary storage area by constructing a diversion berm a minimum 3 feet in height between the river bank and the pile. The berm shall freely discharge diverted flows away from the stockpiled material.

Any waste material characterized and found to be of a hazardous nature, including asbestos-containing material, will be disposed of by the COP on-call environmental contractor.

The disposal of all waste material removed under this Section 350 shall be the responsibility of the Contractor, unless otherwise removed and disposed of by the COP on-call environmental contractor. The disposal sites must be certified to accept the specific waste materials to be disposed of, and the disposal sites shall be approved by the Engineer.

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.

A Landfill Use Permit will be required for all landfill disposals. Charges will be levied for each load delivered to the landfill in accordance with the current fee schedule.

Weigh tickets from all landfill disposals must be furnished to the Engineer. The tonnage indicated on the weigh tickets will be the basis of payment. In the event off-highway equipment is used to haul waste material to the landfill, the Contractor will be required to prove an equivalent tonnage based on cubic yards per vehicle type.

In the event that waste materials are encountered, the Engineer will direct the Contractor to remove the material to a designated stockpile area indicated on the Plans, or to dispose of the material per the bid schedule. The Contractor may be directed to maintain separate and distinct stockpiles of wastes within the designated stockpile area, and to label the piles as to source location, date, and type of wastes using simple signage.

The Contractor will separate inert materials and tires from native materials or other wastes. Construction debris and inert material loads containing more than 30% native soil materials will be paid as general soil excavation per Item 215-1, Earthworks for Drainage Channels. Native materials separated from inert debris may be used as backfill in accordance with Section 211, if deemed appropriate by the Engineer, or may be disposed of offsite as excess soil material, unless this material requires special handling in accordance with Subsection 107.5.4 and Section 350.

In the event that household or special waste materials are encountered, the Engineer will direct the Contractor to remove the material to a designated stockpile area indicated on the Plans, or may be directed to dispose of the material per the bid schedule. In either case, the Contractor shall separate inert materials from these waste materials, unless otherwise directed by the Engineer.

Materials taken to a stockpile area may, at the direction of the Engineer, be segregated according to the procedures described in Appendix ---. Once segregated, the materials shall be disposed of at the applicable unit cost for the corresponding waste disposal bid item. Waste segregation must be completed within 90 days of the date the initial load of waste was placed in the stockpile area..

Alternatively, the Engineer may direct that the materials be disposed of without segregation at the applicable unit cost for the corresponding waste disposal bid item. If so directed, the Contractor must complete the disposal of the stockpile materials within 28 days. If the stockpile materials represent a mixture of wastes, the Contractor shall select the most cost-effective waste disposal option available under applicable regulatory constraints.

The bid quantities provided in the bid schedule are based on the best available information at the time of the preparation of these Special Provisions. As it was not feasible to accurately estimate the volume of waste materials, two bid items were provided for each waste material type defined in Section 107.5.4. The Contractor will be paid based on the quantity of material excavated and hauled offsite. In the event the quantity of material exceeds the total cumulative amount indicated by the two bid items for each material type, the lesser unit cost of the two bid items will be applied to quantities in excess of the two bid items.

#### **Subsection 350.1.1 – Landfill Liners**

The Contractor will be responsible for odor and vector control of any household waste or special waste that is exposed during excavation activities. To mitigate these concerns, the Contractor shall be responsible to apply a temporary liner over any exposed face of any household waste or special waste at the end of each working day. However, if the temporary liner applied by the Contractor has been removed or disturbed by the COP on-call environmental contractor, the COP contractor shall be responsible for the re-application of the temporary liner.

A temporary liner shall be applied whenever household waste or special waste remains exposed overnight. A temporary liner for exposed waste shall consist of one of the following or other pre-approved equivalent methods:

- A spray-on material such as Sanifoam®, Posi-Shell®, or pre-approved equivalent, applied in accordance with manufacturer's specifications.
- A one-foot layer of soil consisting of Unified Soil Classification System (ASTM D 2488) type GM or finer.
- A weighted tarp cover consisting of geosynthetic, cloth, or other pre-approved equal.

In addition to the use of any synthetic temporary liner, a stockpile of fine-grained soils will be maintained to provide temporary cover or fire suppression whenever excavation activities may encounter significant accumulations (more than 10 cubic yards) of decomposing or flammable waste. The soil shall consist of Unified Soil Classification System (ASTM D 2488) type SM or finer. The stockpile shall be located within one-quarter mile of excavation activities, and shall be an amount capable of covering the exposed burning or smoldering waste to a depth of at least three feet.

Prior to placement of RCC structures, placement of backfill at such structures, or construction of the final LFC cross section, any household waste or special waste remaining in place shall be completely covered with a permanent liner.

The permanent liner will consist of a single layer of soil placed over the exposed trash. The soil shall consist of Unified Soil Classification System (ASTM D 2488) type GM or finer. Prior to placement of the liner, the exposed waste will be graded smooth so that there is no flagging trash or loose materials. The liner shall extend at least 5 feet beyond the edge of the exposed waste. The soil layer will be placed and compacted to a thickness of at least two feet at 90% relative density as determined by Standard Proctor.

**Subsection 350.4 – Payment**

The Contractor will provide to the Engineer at the Pre-Construction meeting a breakdown derivation of the unit costs for the bid items 350-1 through 21

Payment for the removal and disposal of inert material shall be made on the basis of the price bid per cubic yard, and shall include all labor, materials and equipment necessary to remove and dispose of the inert wastes. Should the quantity of inert material for removal and disposal exceed 240,000 cubic yards, payment shall be made on the basis of the lesser unit cost bid for Item 350-1 or Item 350-2 using the allowance provided.

**ITEM 350-1 – INERT MATERIAL REMOVAL (up to 150,000 cubic yards)**

**ITEM 350-2 – INERT MATERIAL REMOVAL (150,001 to 240,000 cubic yards)**

**ITEM 350-3 – INERT MATERIAL ALLOWANCE (over 240,000 cubic yards)**

Payment for the removal and disposal of construction debris shall be made on the basis of the price bid per cubic yard, and shall include all labor, materials and equipment necessary to remove and dispose of the wastes. Should the quantity of construction debris for removal and disposal exceed 10,000 cubic yards, payment shall be made on the basis of the lesser unit cost bid for Item 350-4 or Item 350-5 using the allowance provided and shall include all labor, materials and equipment necessary to remove and dispose of the waste.

**ITEM 350-4 – CONSTRUCTION DEBRIS REMOVAL (up to 5,000 cubic yards)**

**ITEM 350-5 – CONSTRUCTION DEBRIS REMOVAL (5,001 to 10,000 cubic yards)**

**ITEM 350-6 – CONSTRUCTION DEBRIS ALLOWANCE (over 10,000 cubic yards)**

Payment for the removal and disposal of tires shall be made on the basis of the price bid per ton, and shall include all labor, materials and equipment necessary to remove and dispose of the tires. Should the quantity of tires for removal and disposal exceed 600 tons, payment shall be made on the basis of the lesser unit cost bid for Item 350-7 or Item 350-8 using the allowance provided and shall include all labor, materials and equipment necessary to remove and dispose of the waste.

**ITEM 350-7 – TIRE REMOVAL (up to 300 tons)**

**ITEM 350-8 – TIRE REMOVAL (301 to 600 tons)**

**ITEM 350-9 – TIRE ALLOWANCE (over 600 tons)**

Payment for the removal and disposal of household waste shall be made on the basis of the price bid per cubic yard, and shall include all labor, materials and equipment necessary to remove and dispose of the waste. Should the quantity of household waste for removal and disposal exceed 30,000 cubic yards, payment shall be made on the basis of the lesser unit cost bid for Item 350-10 or Item 350-11 using the allowance provided and shall include all labor, materials and equipment necessary to remove and dispose of the waste.

**ITEM 350-10 – HOUSEHOLD WASTE REMOVAL (up to 15,000 cubic yards)**

**ITEM 350-11 – HOUSEHOLD WASTE REMOVAL (15,001 to 30,000 cubic yards)**

**ITEM 350-12 – HOUSEHOLD WASTE ALLOWANCE (over 30,000 cubic yards)**

Payment for the removal and disposal of special waste shall be made on the basis of the price bid per cubic yard, and shall include all labor, materials and equipment necessary to remove and dispose of the contaminated soil. Should the quantity of household waste for removal and disposal exceed 30,000 cubic yards, payment shall be made on the basis of the lesser unit cost bid for Item 350-13 or Item 350-14 using the allowance provided and shall include all labor, materials and equipment necessary to remove and dispose of the waste.

- ITEM 350-13 – SPECIAL WASTE REMOVAL (up to 10,000 cubic yards)**
- ITEM 350-14 – SPECIAL WASTE REMOVAL (10,001 to 20,000 cubic yards)**
- ITEM 350-15 – SPECIAL WASTE ALLOWANCE (over 20,000 cubic yards)**

Payment for the stockpiling of waste materials shall be made on the basis of the price bid per cubic yard and shall include all labor, materials and equipment necessary to stockpile the special waste material. Should the quantity of material stockpiled exceed 75,000 cubic yards, payment shall be made on the basis of the lesser unit cost bid for Item 350-16 or Item 350-17 using the allowance provided and shall include all labor, materials and equipment necessary to remove and dispose of the waste.

- ITEM 350-16 – WASTE STOCKPILE CONSTRUCTION (up to 35,000 cubic yards)**
- ITEM 350-17 – WASTE STOCKPILE CONSTRUCTION (35,001 to 75,000 cubic yards)**
- ITEM 350-18 – WASTE STOCKPILE ALLOWANCE (over 75,000 cubic yards)**

Payment for stockpile handling and material segregation shall be paid in accordance with Appendix ?? to these Special Provisions. Byproducts of process shall be disposed of at the associated unit bid item cost for the each material.

**ITEM 350-19 – STOCKPILE HANDLING AND SEGREGATION**

Payment for the installation of the temporary liner shall be made on the basis of the price bid per square yard complete in place and shall include all labor, materials and equipment necessary to install the temporary liner.

**ITEM 350-20 – TEMPORARY LINER**

Payment for the installation of the permanent liner shall be made on the basis of the price bid per square yard complete in place and shall include all labor, materials and equipment necessary to install the permanent liner.

**ITEM 350-21 – PERMANENT LINER**

Payment for the installation of the temporary liner in excess of the bid quantities provided in bid item 350-7 shall be made on the basis of the price bid per square yard for bid item 350-7, using the allowance provided, and shall include all labor, materials and equipment necessary to install the temporary liner.

**ITEM 350-22 – TEMPORARY LINER ALLOWANCE**

Payment for the installation of the permanent liner in excess of the bid quantities provided in bid item 350-8 shall be made on the basis of the price bid per square yard for bid item 350-8, using the allowance provided, and shall include all labor, materials and equipment necessary to install the permanent liner.

**ITEM 350-23 – PERMANENT LINER ALLOWANCE**

Payment for the removal and disposal of existing sand and gravel conveyor bridge shall be made on the basis of the lump sum price bid, and shall include all labor, materials and equipment necessary to remove and dispose of the bridge.

**ITEM 350-24 – CONVEYOR BRIDGE REMOVAL**

Payment for the removal and disposal of existing plain riprap shall be made on the basis of the price bid per cubic yard, and shall include all labor, materials and equipment necessary to remove and dispose of the riprap.

**ITEM 350-25 – RIPRAP REMOVAL**

Payment for the removal and disposal of existing grouted riprap and gabion mattresses shall be made on the basis of the price bid per cubic yard, and shall include all labor, materials and equipment necessary to

remove and dispose of the riprap and gabions.

**ITEM 350-26 – GROUTED RIPRAP AND GABION REMOVAL**

**SECTION 401 - TRAFFIC CONTROL**

Traffic control shall conform to Section 401 of the MAG Uniform Standard Specifications and COP Supplements except as modified herein.

**Subsection 401.1 - Description:**

Add the following:

This work shall consist of traffic control, and use of devices and flagmen or pilot cars in accordance with Section 401 of the COP Supplements and the City of Phoenix Traffic Barricade Manual, dated 1998.

a. Traffic Control Devices

All traffic and/or traffic control devices on this project shall be provided, maintained and/or controlled as specified in the City of Phoenix Traffic Barricade Manual, dated 1998.

b. Street Closure Permits

Permission to restrict city streets, sidewalks and alleys (street closure permits) shall be requested as specified in Section III of the City of Phoenix Traffic Barricade Manual.

c. Traffic Manual

Unless otherwise provided for in the following General Traffic Regulations, all traffic on this project shall be regulated as specified in Section IV of the City of Phoenix Traffic Barricade Manual.

d. Prior Approval

No deviation to the General Traffic Regulation will be allowed or implemented unless submitted to the Engineer for review and approval two weeks prior to the proposed work.

e. City of Phoenix Coordination

The Contractor shall contact Tony Arviso, Construction Traffic Control, City of Phoenix, at 602-262-6235 to coordinate the traffic control plan.

**Subsection 401.5 - General Traffic Regulations:**

Add the following:

a. Local Access Requirements

The Contractor shall maintain local access to all side streets, access roads, driveways, alleys, and parking lots at all times unless specified to be closed herein or as shown on the traffic control plans, and shall notify residents 72 hours in advance of any restrictions which will affect their access. The Contractor shall restore the access as soon as possible. If the primary access cannot be restored in a timely manner, the Contractor shall provide an alternative which shall be predetermined with the residents prior to imposing any restrictions, and approved by the Engineer.

b. Special Sign Requirements

The Contractor shall provide, erect and maintain advance notifications, and informational and directional access signs that may be required by the Engineer.

c. Flagging of Traffic

No flagging of traffic will be permitted during the peak traffic hours of 6:00 a.m. to 8:30 a.m. and 4:00 p.m. to 7:00 p.m. weekdays. If construction requires, intermittent flagging will be allowed from 8:30 a.m. to 4:00 p.m. to facilitate access for heavy construction equipment.

d. Traffic Control Plan

The Contractor shall submit a traffic control plan which shall implement all traffic control as required in these Special Provisions for approval, showing placement of all traffic control devices, including all conflicting signs to be covered/removed or relocated, or other features that may conflict with the placement of temporary signage. The plan shall be submitted to the Engineer at the pre-construction meeting for review. The Contractor shall obtain approval from the City of Phoenix, prior to implementation. Contact Tony Arviso at 602-262-6235.

- e. At the time of the Pre-Construction conference, the Contractor shall designate an employee, other than the Project Superintendent, who is well qualified and experienced in construction traffic control and safety, to be available on the project site during all periods of construction to set up, maintain and coordinate safe barricading whenever construction restricts traffic. This individual shall be authorized to receive and fulfill instructions from the Engineer and shall supervise and direct the work. Instructions and information given by the Engineer to this individual shall be considered as having been given to the Contractor.

**Subsection 401.5.1 - Special Traffic Regulations**

Contractor access to the river bottom is available at the following locations using City of Phoenix rights-of-way:

1. On the south side of the river, east of Central Avenue (Approx. Station 122+50). There is an existing curb cut along the east side of Central Avenue south of the bridge. The curb cut gains access to an existing ramp which grades to the bottom of the Salt River at approximately Station 122+00. The Contractor may modify the ramp as necessary to provide safe access to the project site. There is also an existing high clearance box culvert crossing under Central Avenue at this location that provides access from the east side to the west side of the bridge and the river bottom.
2. On the north side of the river, west of 16<sup>th</sup> Street (Approximately Station 151+00), the COP has prearranged A Temporary Construction Easement (TCE) from East University Drive to the project area. The TCE gains access to an existing dirt road along the top of the north river bank (approx. Station 151+00 to 168+00). The road leads to an existing concrete paved ramp, which provides access to the river bottom (near Station 170+00). The Contractor may determine that this access will only be useable for pick-up trucks, or other similar light traffic loads. Any damage to the ramp, the existing dirt road along the riverbank, or within the TCE, will be repaired by the Contractor at no additional cost to the project.
3. The Contractor may elect to obtain permission on his own for the use of other access locations to the river bottom. This would include the use of other existing ramps into the river bottom. However, the Contractor will obtain prior written approval of the property owner for such access use and submit a copy of the approval to the Engineer prior to use of the property and/or ramps.
4. Left turns across traffic are acceptable only if there is a left turn center lane. If no center lane, then right turns only. Possible exceptions to this requirement may be provided by the City through an approved TCP.
5. Off duty uniformed officers shall be utilized for traffic control only as required by the City of Phoenix, and only as approved by the Engineer. An off duty officer will be required wherever multiple lanes of traffic must be crossed with construction equipment.
6. A TCP must be provided to the City for review and approval for each access location prior to implementation of the plan. The TCP must include appropriate signage for "truck crossing", etc.

**SUPPLEMENTARY GENERAL CONDITIONS**

The Contractor shall restore and regrade the areas within the Temporary Construction Easement limits to the same grade as prior to construction. All trash, large rocks, other debris, etc. shall be removed and the easement area left in a neat and clean condition acceptable to the Engineer.

**Subsection 401.7 - Payment**

Payment for the implementation of the traffic control plans, including all mobilization, flag persons, placement, storage, and removal of devices, maintenance incidental to and preparation of the approved traffic control plan, temporary pavement, signing, striping, safety fencing, coordination with the City of Phoenix and other work as required shall be made on the basis of the lump sum price bid for:

**ITEM 401-1 - TRAFFIC CONTROL**

Payment for off-duty City of Phoenix uniformed officers as mandated by the City of Phoenix will be on an as-used basis as determined by the Engineer. The Contractor shall submit documentation as required by the Engineer to support payment for this item. Payment for off-duty uniformed officers shall be made on the basis of unit price per hour for:

**ITEM 401-2 - OFF-DUTY UNIFORMED OFFICER**

**SECTION 703 - RIPRAP**

Riprap shall conform to Section 703 of the MAG Uniform Standard Specifications except as modified herein.

**Subsection 703.1 - Stone**

In addition to the requirements of Section 703.1, stone for riprap shall have a minimum apparent specific gravity of 2.4 per ASTM C-127. Waste concrete shall not be used for riprap.

The rock used for plain riprap shall be rounded stone or angular, hard, durable, resistant to weathering and to water action, free from overburden, spoil, shale, and organic material, and shall meet the gradation requirements for the type specified.

**Subsection 703.2 - Size of Stone**

Section 703.2 of the MAG Standard Specifications is replaced with the following for riprap:

Stone size for plain riprap used for the conveyance side drain channel inlet and outlet:

$D_{min}$ (in)	$D_{max}$ (in)	$D_{50}$ (in)
6	15	10

Stone size for plain riprap used for the abutment on the south side of the 24<sup>th</sup> Street Grade Control Structure (GCS) abutment shall be:

$D_{min}$ (in)	$D_{max}$ (in)	$D_{50}$ (in)
12	36	24

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY**

**RIO SALADO – PHOENIX REACH  
LOW FLOW CHANNEL PROJECT – PHASE 2**

**CONTRACT NO. FCD 2000C014  
PCN 124-01-31**

**SUPPLEMENTARY GENERAL CONDITIONS**

**SPECIFICATIONS**

Except as otherwise amended in these Supplementary General Conditions and the Construction Special Provisions, this project shall be constructed in accordance with all applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications and Uniform Standard Details, dated 1998 including all revisions through 1999, and City of Phoenix (COP) Supplement to MAG Specifications and Details (1998 Edition). *2000*

**PRECEDENCE OF CONTRACT DOCUMENTS**

This Contract and its designated documents, whether taken separately or together, are to be interpreted according to full intent, meaning, and spirit, and shall be deemed to mutually explain each other and to be descriptive of any materials to be furnished and the work to be performed under this Contract. In cases of any difference or discrepancy between the Contract documents, the order of precedence shall be a) Addendum to the Invitation for Bids, b) the Contract form, c) Supplementary General Conditions, d) Construction Special Provisions, e) Project Plans, f) COP Supplements 1998 Edition, and g) MAG Uniform Standard Specifications and Uniform Standard Details.

**Subsection 101.2 - Definitions and Terms:**

1. Change the definition of the phrase "Board of Supervisors" to being the Board of Directors acting under the authority of the laws of the State of Arizona and in their capacity of the Board of Directors of the Flood Control District of Maricopa County.
2. Change the definition of the phrase "Budget Project" to being a project financed by funds set aside in the annual budget or otherwise approved by the Flood Control District of Maricopa County Board of Directors.
3. Add to the definition of the phrase "Contract Documents," the phrase "Supplementary General Conditions."
4. Change the definition of the term "Engineer" to being the person appointed by the Flood Control District of Maricopa County Board of Directors to the office of Chief Engineer and General Manager of the Flood Control District of Maricopa County acting directly or through its authorized representative, the Chief of the Flood Control District of Maricopa County Planning and Project Management Division.
5. Change the definition for the phrase "Notice of Award" to a letter from the Flood Control District of Maricopa County advising Contractor that it is the successful bidder and the Flood Control District of Maricopa County has accepted its proposal.

6. Change the definition of the term "Owner" to the Flood Control District of Maricopa County, acting through its legally constituted officials, officers, or employees.
7. Whenever the word "District" is used in these Specifications, it shall mean the Flood Control District of Maricopa County.
8. Add the definition for Maricopa County Minority Business Office (MBO); the office responsible for administering the Maricopa County Minority and Women Owned Business Enterprise Program.
9. Add the definition for the Maricopa County Minority and Women Owned Business Enterprise Program as being the Program adopted by the Board of Supervisors effective January 1, 1992.

**Subsection 102.4 - Examination of the Plans, Special Provisions, and Site Work:** Add the following:

The soil boring logs are included in the construction plans. The Geotechnical reports including ground water conditions, are available for review at the Owner's office, and Contractors are encouraged to do so. Existing moisture conditions shall be no basis for claim for additional money or time extensions. The Contractor shall manipulate the existing soil as required to achieve stable soil conditions and the required densities, as well as safe and stable side slopes during construction activities.

The ground water information provided on the plans is for information only. The range of groundwater data used to develop the profile shown in the plans varied from approximately 10 feet to approximately 40 feet below ground surface. Groundwater levels at the Salt River can fluctuate widely in response to flow events in the river and climatic conditions. The groundwater profile provided in the plans may not be representative of the actual conditions that will be encountered during construction. The Contractor should anticipate that groundwater will infiltrate into project excavations. There may also be areas of perched groundwater in the project area. The Contractor shall investigate groundwater conditions prior to excavation activities to determine what dewatering activities will be required for construction. Pertinent information is available from the City of Phoenix Office of Environmental Programs, the Arizona Department of Water Resources, and the Arizona Department of Environmental Quality.

Surface water limits delineated on the plans is representative of such conditions at the time the base mapping was prepared for the project in 1998. Such water limits are not necessarily representative of the actual conditions that will be encountered during construction. The Contractor is encouraged to make field visits as required to determine the extent of surface water conditions.

**Subsection 102.5 - Preparation of Proposal:** Add the following:

Proposals, including the Bidding Schedule, must be legibly written in ink or typed, with all prices given in numerals. In case of a conflict between the unit bid price and the extension, the unit bid price will govern.

It shall be the responsibility of prospective bidders to determine, prior to submission of a bid, if any addenda have been issued by the Flood Control District. This may be accomplished by calling 602-506-1501. Any addendum issued, if not already bound into the Special Provisions, **must be attached and included as part of the Specifications** and any quantities on the Bidding Schedule requiring change shall be adjusted to the new figure by pen and ink. **Bids which do not have appropriate addenda attached and show appropriate changes to the Bidding Schedule, and receipt of addenda acknowledged in the Proposal shall be invalid.**

The bidder's Arizona State Contractor's License number and the classification under which it proposes to perform the work shall be shown on the proposal. An "A" **General Engineering** License is required for this contract. The two lowest bidders may be required to provide certification of prior satisfactory completion for similar construction and to furnish a copy of their license and the renewal certificate.

**Subsection 102.6 - Subcontractors' List:** Add the following:

A list of subcontractors to be employed on the project shall be submitted with the bid, on the form provided in the Proposal. Following Notice of Award, no change of the subcontractors named therein will be made unless first approved in writing by Owner.

**Subsection 102.7 - Irregular Proposals:** Add the following:

- (F) If the Maricopa County Minority and Women-Owned Business Enterprises Assurances Affidavit is not completed and submitted.
- (G) If any addenda are not acknowledged and attached.
- (H) If the Owner's bond forms are not utilized.
- (I) If the entire specifications document is not returned.
- (J) If the statement from the bidder's insurance carrier, as required by Subsection 103.6, is not included.

**Subsection 103.6 - Contractor's Insurance:** Add the following:

A statement from the bidder's insurance carrier shall be included in the proposal certifying that it will furnish the specified kind and amounts of insurance to the bidder if it is awarded the contract, and that it will execute the form of Certificate of Insurance included in the documents. As required by law, the statement will be from an insurance carrier or carriers authorized to do business in the State of Arizona, or countersigned by an agent of the carrier authorized to do business in the State of Arizona. Concurrently with the execution of the contract, Contractor shall furnish a Certificate of Insurance, using the included Certificate, that names the additional insureds as set out in the Certificate. The Certificate shall also name the additional insureds as Certificate Holders. The types of insurance and the limits of liability shall be as indicated on the included form.

**Subsection 103.6.1(D) - Contractor's Insurance:** Add the following:

Include additional insureds as indicated on the included Certificate of Insurance.

**Subsection 104.1 - Work to be Done:** Add the following to 104.1.1:

All water for construction purposes, drinking water, lighting, temporary electric power, heat and telephone service shall be arranged and provided for as per requirements of the work by Contractor at his expense.

All construction activities will occur within the bottom of the Salt River. Flows can occur at any time in the river, and nuisance flows are ever present in the river bottom. In addition to surface water flows, groundwater conditions suggest that excavation for the guide dike and grade control structure toedowns, as well as some low flow channel excavation may occur below groundwater levels.

The Contractor will remove all equipment from the river whenever flows could occur that would inundate the equipment or equipment storage areas.

The major facilities to be constructed include the excavation of an earthen low flow channel (LFC), construction of 16 roller compacted concrete (RCC) guide dike structures (GDS), three RCC grade control structures (GCS) and one local scour protection apron, the structural retrofit of the CALMAT Conveyor Bridge, and construction of a conveyance side drain channel.

The Contractor will be required to remove and dispose of inert materials, ~~such as construction rubble and~~ debris, tires, and municipal solid waste. It is also possible that hazardous materials may be encountered during excavation activities. Removal and disposal of regulated materials will be done by others. Refer to Special Provisions Section 350.

The Contractor will also be required to manage both surface water and ground water within the project limits. Groundwater dewatering must be done according to the terms of the permits for the project that

have been obtained by the City from ADWR, and will be provided to the Contractor. A form to be used by the Contractor for reporting the amount of groundwater withdrawn is provided in Appendix "C".

In accordance with the Environmental Impact Statement the Contractor **shall avoid all areas of standing or running water wherever possible**, however it may be necessary to operate equipment, including vehicles in areas of water.

No utility relocations are anticipated during construction however, all utilities near the site are to be protected in place.

**104.2.3 - Changes:**

The Owner may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in any one or more of the following:

- A) Drawings, designs, or specifications;
- B) Method or manner of performance of the work;
- C) Owner-furnished facilities, equipment, materials, services, or site;
- D) Directing acceleration in the performance of the work.

Any other written or oral order from the Owner that causes a change shall be treated as a change order under this section provided that the Contractor gives the Owner written notification within two work days after receipt of such direction stating:

- A) The date, nature, and circumstances of the conduct regarded as a change;
- B) The particular elements of the contract performance for which the Contractor is seeking an equitable adjustment under this section, including any price or schedule adjustments;
- C) The Contractor's estimate of the time by which the Owner must respond to the Contractor's notice to minimize cost, delay, or disruption of performance.

The Contractor shall diligently continue performance of this contract to the maximum extent possible in accordance with its provisions. Except as provided in this section, no order, statement, or conduct of the Owner shall be treated as a change or entitle the Contractor to an equitable adjustment. If any change under this section causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, the Owner shall make an equitable adjustment and modify the contract in writing. The equitable adjustment shall not include increased costs or time extensions for delay resulting from the Contractor's failure to provide notice or to diligently continue performance. No proposal for the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

**Subsection 104.2.4 - Cost Estimates or Price Proposals:**

The Contractor and any lower-tier subcontractors shall submit itemized cost estimates or price proposals for any owner-directed change order or Contractor-initiated claim.

Cost estimates or pricing proposals shall be itemized to include direct labor by man-hours, individual craft, hourly wage rate and verifiable labor burden. Other direct costs shall include rental and operator rates for rented or owned equipment, material trucking expenses and other costs clearly identified and directly allocable to contract performance. Material costs shall be itemized by item description, quantity for each item, unit price per item, including applicable sales tax markup, and extended total price per item. The Contractor shall provide copies of material supplier quote sheets, invoices or purchase orders, as appropriate.

Lump sum cost estimates or price proposals shall be rejected and returned to the Contractor for itemization as described above. Failure of the Contractor to submit properly itemized cost estimates or price proposals shall not constitute an excusable delay and will result in a change order being unilaterally priced at the Owner's fair estimated price.

**Subsection 104.2.6 - Value Engineering:**

A) **General.** The Contractor is encouraged to voluntarily develop, prepare, and submit value engineering change proposals (VECPs). The Contractor shall share in any instant contract savings realized from accepted VECPs, in accordance with paragraph (f) below. The Owner reserves the right to make alterations to the contract, in accordance with procedures elsewhere within this contract. Such alterations will not be eligible for inclusion in any VECP.

B) **Definitions.**

**Contractor's development and implementation costs** means those costs the Contractor incurs on a VECP in developing, testing, preparing, and submitting the VECP as well as those costs incurred by the Contractor to make the changes required by the Owner's acceptance of the VECP.

**Owner costs** means those owner costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistical support. The term does not include the normal administrative costs of processing the VECP.

**Instant contract savings** means the estimated reduction in Contract cost of performance resulting from acceptance of the VECP, minus the allowable Contractor's development and implementation costs, minus subcontractors' development and implementation costs (see paragraph (g) below).

**Value engineering change proposal (VECP)** means a proposal that (1) requires a change to the contract; (2) results in reducing the contract price or estimated cost without impairing essential functions or characteristics; and (3) does not involve a change in deliverable end item quantities, schedule, or a change to the contract type.

C) **VECP Preparation.** As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change affects contractually required schedule and cost reporting, it shall be revised to incorporate proposed VECP modifications. The VECP shall include the following:

- (1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effects of the change on the end item's performance. All design changes must be submitted on 24"x 36" standard drawing sheets along with supporting calculations. Each drawing sheet and at least the content sheet of the calculations shall be sealed by an Engineer registered in the State of Arizona.
- (2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revision.
- (3) A separate, detailed cost estimate for the affected portions of the existing contract requirements and the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (G) below.
- (4) A description and estimate of costs the Owner may incur implementing the VECP, such as test and evaluation and operating and support costs. This is an estimate based only on the Contractor's understanding of additional efforts to be expended by the Owner, should the VECP be accepted. The final cost will be determined by the Owner.
- (5) A prediction of any effects the proposed change would have on collateral costs to the agency, i.e., costs of operation or maintenance.

- (6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.
  - (7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved and previous Owner actions, if known.
- D) **Submission.** The Contractor shall submit VECPs to the Owner's Engineer.
- E) **Owner Action.**
- (1) The Owner shall notify the Contractor of the status of the VECP within 15 calendar days after receipt from the Contractor. If additional time is required, the Owner shall notify the Contractor within the 15-day period and provide the reason for the delay and the expected date of the decision. The Owner will process VECPs expeditiously; however, it shall not be liable for any delay in acting upon a VECP.
  - (2) If the VECP is not accepted, the Owner shall notify the Contractor in writing, explaining the reasons for rejection.
  - (3) The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Owner.
  - (4) Any VECP may be accepted, in whole or in part, by the Owner's award of a change order to this contract, citing this subsection. The Owner may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a change order incorporates a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Owner's decision to accept or reject all or any part of any VECP shall be final and not subject to disputes or otherwise subject to litigation.
- F) **Cost Sharing.**
- (1) **Rates.** The Owner's share of savings is determined by subtracting the Owner's costs from instant contract savings and multiplying the result by 50 percent. The Contractor's share shall be the remaining 50 percent.
  - (2) **Payment.** Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a change order to this contract to accept the VECP, reduce the contract price or estimated cost by the amount of instant contract savings, and provide the Contractor's share of savings by adding the amount calculated to the contract price.
- G) **Subcontracts.** The Contractor may include an appropriate value engineering clause in any subcontract. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Owner under this contract, but shall exclude any value engineering incentive payments; provided that these payments shall not reduce the Owner's share of the savings resulting from the VECP.

**Subsection 105.1 - Authority of Engineer:** Add the following:

105.1.1 - **Engineer's Evaluation:** Engineer will be allowed ten (10) working days within which to evaluate each proposal or submittal made pursuant to subsections 105.3.1 and 106.4. Engineer will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. Engineer will record time required

by Engineer and Engineer's Consultants in evaluating substitutes proposed or submitted by Contractor pursuant to subparagraphs 105.3.1 and 106.4(B) and in making changes in the Contract Documents (or in the provisions of any other direct contract with Owner for work on the project) occasioned thereby. Whether or not Engineer accepts a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer and Engineer's Consultants for evaluating each such proposed substitute item.

**Subsection 105.3 - Conformity with Plans and Specifications:** Add the following:

105.3.1 - Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated and expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by Engineer will be similar to that provided in subparagraph 106.4(B).

**Subsection 105.5 - Cooperation of Contractor:** Add the following:

**105.5.1 - Partnering**

The Owner intends to encourage the foundation of a partnering relationship with the Contractor and its subcontractors. This partnering relationship will be structured to draw on the strength of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance, intended to achieve completion within budget, on schedule, and in accordance with plans and specifications.

This partnering relationship will be bilateral in makeup. Any cost associated with effectuating partnering will be covered by the Bid Item. The initial partnering workshop shall be scheduled after award of the contract, and prior to the Notice to Proceed, and shall be facilitated by a third party competent in the fundamentals of partnering, and mutually acceptable to Contractor and Owner. The Contractor shall be responsible for scheduling, coordinating, and hiring the third party facilitator, and planning all of the partnering meetings in consultation with the Engineer. The Owner will be responsible to notify and coordinate attendance at the partnering meetings by other agencies. To achieve the desired partnering relationships, the Contractor will need to encourage attendance by its major subcontractors on the project. Follow-up workshops will be held periodically throughout the duration of the contract as agreed to by the Contractor and Owner.

An integral aspect of partnering is the resolution of disputes in a timely, professional, and non-adversarial manner. Alternative dispute resolution (ADR) methodologies will be encouraged in place of the more formal dispute resolution procedures. ADR will assist in promoting and maintaining an amicable working relationship to preserve the partnering relationship. ADR in this context is intended to be a voluntary, non-binding procedure available for use by the parties to this contract to resolve any dispute that may arise during performance.

Payment for the Partnering Allowance will be made on the basis of invoices of actual costs, and will be for a total amount not to exceed the amount shown in the bid schedule for the item.

**ITEM 105-1 - PARTNERING ALLOWANCE**

**105.5.2 - Pre-Construction Meeting**

After award of the contract, a pre-construction meeting shall be scheduled at a location and time (prior to mobilization and start of construction) to be agreed upon between the Owner and the Contractor. The Contractor shall make all necessary arrangements to have key personnel of his company and of his principal subcontractors present at the meeting. Each representative shall have authority to make commitments and act for his firm. The purpose of the pre-construction meeting is to discuss any specific concerns or potential problems that the Contractor is aware of, to provide general information appropriate to the contract, to identify responsible individuals for various functions within each organization, and to

develop tentative dates for the start of construction. There are submittals identified within the contract documents which are required to be prepared for the pre-construction meeting.

The Contractor shall be responsible to take minutes of the pre-construction meeting and distribute copies to all meeting participants. The meeting minutes shall be distributed within 48 hours of the meeting. At the subsequent construction progress meeting, the minutes will be attested or revised, as appropriate. The cost for attendance at the pre-construction meeting, and preparation and distribution of meeting minutes shall be incidental to the project and no extra payment will be made.

**105.5.3 –Construction Progress Meetings**

Construction progress meetings shall be scheduled weekly, or as considered necessary by the Owner. The Contractor shall make all arrangements to have key personnel of his company and of his principal subcontractors present at all progress meetings; representatives shall have authority to make commitments and act for their firms. The Contractor shall assume full responsibility to act for and commit any subcontractor employed by the Contractor, whether or not such subcontractor is represented at the meeting.

During the construction progress meeting the Owner's representative will act as chairman and will advise the Contractor of any administrative matters connected with the contract. The Contractor shall submit for review his two-week rolling schedule. The Contractor's representative at these meetings shall be prepared to discuss and resolve construction problems and concerns, material delivery and vendor data submittals status, construction progress as measured against the Contractor's accepted construction schedule and the Contractor's short range construction activities as provided on his two-week rolling schedule. The Contractor shall not be relieved of his responsibility to fulfill all of the terms of the contract as a result of any inferences drawn or suggestions made available at these meetings.

The Contractor shall be responsible to take minutes of the construction progress meetings and distribute copies to all meeting participants. The meeting minutes shall be distributed within 48 hours of the meeting. At the subsequent construction progress meeting, the minutes will be attested or revised, as appropriate. The cost for attendance at meetings, and preparation and distribution of meeting minutes shall be incidental to the project and no extra payment will be made.

**Subsection 105.6 - Cooperation with Utilities:** Add the following:

An attempt has been made to determine the location of all underground utilities, drainage pipes, and structures; however, it shall be the Contractor's responsibility to cooperate with the pertinent utility companies so that any obstructing utility installation(s) may be adjusted. The location of the underground and overhead utilities as shown on the plans is based on the best available information. The Contractor shall not assume that this represents an exact location of the line. No guarantee is made to the accuracy of the location shown on the plans. The Contractor shall determine for himself the exact location of all utilities. Should Contractor's operations result in damage to any utility the location of which has been brought to its attention, he shall assume full responsibility for such damage. There also exists the strong likelihood that other abandoned older and undocumented underground utility and irrigation lines exist within the project area. Contractor shall contact Arizona Blue Stake (telephone number 623-263-1100) a minimum of two (2) working days before beginning any underground work. In addition, Blue Stake notification(s) shall be maintained on a current basis.

The following phone numbers should put the Contractor in contact with the proper personnel:

Arizona Public Service Company (APS)  
Ms. Lois Winkler

(623) 371-6837

City of Phoenix (COP) Water Services Department  
Mr. Jerry Arakaki, Senior Engineer

(602) 261-8229

Salt River Project Power Distribution (SRPPD) Mr. James Frescholtz	(602) 236-8040
Salt River Project Power Transmission (SRPPT) Mr. Bill Phillips, Senior Engineer	(602) 236-8092
Salt River Project Irrigation Mr. Bob Maurer	(602) 236-2962
US West (USW) Mr. John Aker	(602) 630-0496
Southwest Gas Ms. Jody McDougal	(602) 485-5453

**It shall be the responsibility of the Contractor to verify the location of all utilities prior to any construction activities in a particular area where such facilities may exist. All existing overhead and underground utilities shall be Protected-in-Place (P.I.P.) unless noted otherwise on the plans, these Supplementary General Conditions, and the Special Provisions.**

**APS and SRPPT:**

Both APS and SRP maintain high voltage (230kV and 500kV) overhead electric transmission lines in the vicinity of the project. The lines are within the construction limits of the project and shall be protected in place. The Contractor shall use caution in the adjacent area.

**At all times during construction, the Contractor shall comply with all laws, ordinances, rules, regulations, and safety requirements, including but not limited to the National Electric Safety Code, and the Occupational Safety and Health Standards for General Industry and specific requirements of both SRP and APS when working in the vicinity of these high voltage lines.**

**Salt River Project Water Operations:**

All construction activities will occur within the bottom of the Salt River. Flows can occur at any time in the river, and nuisance flows are ever present in the river bottom.

The Contractor **must** contact Salt River Project (SRP) Water Operations, Joe Rauch at 602-236-5461 or Dallas Reigle 602-236-2271 for information regarding SRP releases into the Salt River.

The Contractor should also request that SRP include the Contractor on a call list for anticipated releases into the river. Both the Flood Control District and the City of Phoenix are on the call list and could be used as an information resource for flow releases into the river by SRP. However, it remains the Contractor's responsibility to determine when flows will occur in the river and what impacts those flows will have on his equipment and his work.

**Existing wells and probes:**

Several groundwater monitor wells and methane gas probes exist within the project area, some of which are shown in the plans. The Contractor shall determine for himself the exact location of each of these wells and probes, and any other wells that may have been installed in the project area. The Contractor shall take the necessary precautions to protect in place these wells and probes. Any damage caused by the Contractor to these wells and/or probes shall be repaired by the Contractor to the satisfaction of the owner at no cost to the project.

**Subsection 105.6.3 - Construction Water:**

Construction water is available from City of Phoenix hydrants as follows:

1. There are eleven hydrants located within one-quarter to one-half mile of the river between 7<sup>th</sup> Street and 24<sup>th</sup> Street that could be used for such purposes.
2. The Contractor will obtain a permit from the City at the second floor of the City Hall Building. The Contractor should allow two weeks for the City installation of the meter.
3. A fee of \$500 will be charged for each hydrant and meter, some of this fee being refundable.
4. The charge for the water is approximately \$1.37/100 cubic feet.
5. The Contractor will contact the City for specific information regarding the use of City water and for all costs associated with its use.

The Contractor may elect to use surface water in the river for construction purposes such as dust control. Its use will not be permitted for roller compacted concrete (RCC) production.

The Contractor **cannot** use groundwater from dewatering activities, ~~from the production well (see Section 500)~~, or from within excavations for construction purposes including dust control and RCC production. The Contractor will refer to Special Provisions Section 225.

**Subsection 105.7 - Cooperation Between Contractors: Add the following:**

The City of Phoenix (COP) may have construction activities underway, including the public access "Gateway" site along the south side of the Salt River on the east side of Central Avenue. The COP may also have under construction at the time of this project their Habitat Demonstration Project located along the north side of the low flow channel and east of Central Avenue. The Contractor shall be aware of these possible COP construction activities and shall work cooperatively with the COP Contractors to minimize impacts to all projects. The Contractor shall KEEP OUT of the Habitat Demonstration Project area.

**Subsection 105.8 - Construction Stakes, Lines, and Grades: Add the following:**

- A) The Engineer will furnish a Benchmark which the Contractor will use to set line and grade for all construction. All other surveying required for the project shall be the Contractor's responsibility. The Engineer will not set any construction stakes.
- B) Before any construction work is started, the Contractor shall perform all base surveys and cross sections of existing conditions that may be required as a basis for quantity determination.
- C) The Contractor shall submit original construction surveyor's notes duly signed by a Registered Land Surveyor to the Engineer at the end of the project. Copies of the survey notes shall be submitted to the Engineer during construction as and when requested.
- D) As-built plans sealed by an Engineer registered in the State of Arizona shall be provided by the Contractor to the Engineer prior to project close out. And, as-builts will also be provided in electronic format using files on disk or CD as provided by the Engineer.

**Subsection 106.1 - Source of Materials and Quality: Add the following:**

Select Material, Aggregate Base, Mineral Aggregate, concrete, steel products and pipe shall be obtained from commercial sources. Contractor shall pay all royalties, or any other charges or expenses, incurred in connection with the securing and hauling of the material. Contractor will be required to furnish Engineer with a list of its proposed commercial sources prior to use, and shall present certificates stating that the material produced from any commercial sources is in accordance with the Uniform Standard Specifications and these Supplementary General Conditions.

**Subsection 106.4 - Trade Names and Substitutions: Replace with the following:**

Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quantity required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be accepted by Engineer under the following circumstances:

- A) "Or-Equal": If in the Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.
- B) Substitute Items: If in Engineer's sole discretion an item does not qualify as an "or-equal" item under subparagraph 106.4 (A), it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by Engineer will include the following and may be supplemented in the Special Provisions. The Engineer may decide what is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for work on the project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change, all of which will be considered by Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish additional data about the proposed substitute.
- C) Contractor's Expense: All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense.
- D) If the final placement of a product will remain the property of the municipality or utility and/or owned by the municipality or utility, that entity is responsible for issuing written approval for any equivalent or "or-equal" products. The Contractor or Supplier will submit to that entity the request and documentation for written approval of a product substitution. The Contractor will provide the entity's written approval to the Engineer at the Pre-Construction Meeting.

**Subsection 106.5 - Contractors Marshaling Yards:** Add the following:

The Contractor may establish a Contractor's Work Area (CWA) in the bottom of the Salt River for the purpose of parking and servicing equipment, as well as establishing a roller compacted concrete (RCC) production plant. The Contractor understands that his use of the river bottom for a CWA is solely at his own risk. No compensation will be made to the Contractor for any damage to or loss of equipment caused by the Contractor's establishment of a CWA in the river bottom.

1. The CWA must cover the least amount of acreage possible to accomplish the tasks required for the production plant and servicing of equipment.
2. The Contractor will monitor on a daily basis all activities in the CWA that may result in the leakage of oils, fluids, fuels, etc. which may contaminate soils in the river bottom, and promptly report any suspected leaks to the Engineer.
3. The Contractor will remove or clean up to background concentrations, and in accordance with applicable regulations test and properly dispose of all such contaminated soils resulting from the Contractors activities within the CWA and the river bottom on at least a biweekly basis, or more frequently at the direction of the Engineer. The Contractor shall provide all necessary documentation to the Engineer, including at a minimum the location, quantity, test results, and documentation of disposal of any such contaminated soils within one month after removal. At the discretion of the Engineer, the Contractor may be required to provide a cleanup plan for approval prior to addressing such contaminated soils.
4. The Contractor must create low diversion berms to direct surface flows away from the CWA so as to minimize the transport of contaminated soils downstream.

The Contractor may stockpile aggregate materials for the production of RCC in the river bottom. However the following criteria will be applied to the stockpiles:

1. The stockpiles can be no more than 100 feet wide at the base.
2. The long axis of the stockpiles must be oriented parallel to the direction of flow in the river.
3. Any remnant materials remaining from the stockpiles after completion of the project must be completely removed from the river bottom.

The Contractor shall obtain approval of the Engineer when using property outside the project limits of the river to park and service equipment and store materials for use. The Contractor will obtain prior written approval of the property owner for such use and submit a copy of the approval to the Engineer prior to use of the property.

The Contractor must provide the Owners field office construction trailer area outside of the river bottom. City of Phoenix right-of-way is available along the west side of Central Avenue on the south side of the river for such field office use and as a possible site for Contractor construction trailers and general parking. This site is out of the river bottom, is accessed from the east side of Central, and goes under the bridge via an existing high clearance box culvert.

The Contractor shall grade all construction yards, easements and limits of construction which are disturbed by construction or construction related activities to the lines and grades shown on the plans; or as a minimum, where no line or grade is shown, to a condition similar to or better than the pre-existing condition.

**Subsection 106.5.1 – Contractor Access:**

Contractor access to the river bottom is available at the following locations using City of Phoenix rights-of-way:

1. On the south side of the river, east of Central Avenue (Approx. Station 122+50). There is an existing curb cut along the east side of Central Avenue south of the bridge. The curb cut gains access to an existing ramp which grades to the bottom of the Salt River at approximately Station

122+00. The Contractor may modify the ramp as necessary to provide safe access to the project site. There is also an existing high clearance box culvert crossing under Central Avenue at this location that provides access from the east side to the west side of the bridge and the river bottom.

2. On the north side of the river, west of 16<sup>th</sup> Street (Approximately Station 151+00), the COP has prearranged A Temporary Construction Easement (TCE) from East University Drive to the project area. The TCE gains access to an existing dirt road along the top of the north river bank (approx. Station 151+00 to 168+00). The road leads to an existing concrete paved ramp, which provides access to the river bottom (near Station 170+00). The Contractor may determine that this access will only be useable for pick-up trucks, or other similar light traffic loads. Any damage to the ramp, the existing dirt road along the riverbank, or within the TCE, will be repaired by the Contractor at no additional cost to the project.
3. The Contractor may elect to obtain permission on his own for the use of other access locations to the river bottom. This would include the use of the following existing ramps which gain access from the river bank to the river bottom:

APPROXIMATE LFC STATION	SIDE OF RIVER
121+00	North
187+00	North
189+00	North
207+00	North
209+00	South
211+00	North
236+00	North
241+00	North
259+00	North and South
265+00	South

The Contractor must obtain prior written approval of the property owner for such access use and submit a copy of the approval to the Engineer prior to use of the property and/or ramps. Any damage to the ramps, caused by the Contractor's use, shall be repaired by the Contractor at no cost to the project.

The Contractor will refer to Special Provisions Section 401 for specific traffic control requirements and traffic control plans and the use of these access locations.

**Subsection 107.2 - Permits:** Replace with the following:

Contractor shall obtain all permits and licenses, including those required by the City of Phoenix and Maricopa County and shall pay all charges, fees, taxes, and provide all notices necessary and incidental to the due and lawful prosecution of the work. An exception is the ADWR Groundwater Dewatering Permit, which has already been obtained for the project. See Appendix "C". The ADWR permits ~~are~~ being obtained by the City and the District and will be made available to the Contractor at the Pre-Construction Conference.

In particular the Contractor will obtain all necessary NPDES and SWPPP permits as required and in accordance with subsection 107.2.1.

**Subsection 107.2.1 - NPDES Permit Requirements:** Add the following:

- A. This project is subject to the National Pollutant Discharge Elimination System (NPDES) storm water requirements for construction sites under the Environmental Protection Agency (EPA) General Permit for Arizona. Under provisions of that permit, the Contractor shall be designated as permittee,

and shall take all necessary measures to assure compliance with the NPDES General Permit for Arizona as well as all other applicable Federal, State and local laws, ordinances, statutes, rules and regulations pertaining to Storm water discharge. As the permittee, the Contractor is responsible for preparing, in a manner acceptable to the EPA, all documents required by this regulation, including but not necessarily limited to:

1. Storm Water Pollution Prevention Plan (SWPPP) for the project, including certification of compliance form. Contractor shall be required to develop, implement, update and revise the SWPPP, as necessary, in order to assure compliance with the EPA permit requirements. The SWPPP shall be retained on the project site at all times during construction.
  2. Notice of Intent (NOI) to assure compliance with the NPDES General Permit for Arizona, including certification of signatures.
  3. Notice of Termination (NOT) of coverage under NPDES General Permit for Arizona.
- B. Preliminary copies of the NOI and the SWPPP shall be submitted to Owner during the pre-construction meeting and shall be subject to review by Owner prior to implementation.
- C. Contractor shall submit the completed and duly signed NOI forms no later than forty-eight (48) hours prior to the initial start of construction on the project to the following agencies:

EPA Storm Water Notice of Intent  
P.O. Box 1215  
Newington, VA 22122

A copy of the completed NOI form shall be submitted to the following:

Storm Water Coordinator  
Arizona Department of Environmental Quality  
P.O. Box 600  
Phoenix, AZ 85001-0600

Gary W. Boesch, PE  
Stormwater Management Engineer  
200 West Washington Street, 5<sup>th</sup> Floor  
Phoenix, AZ 85003  
(602) 495-5326

Failure by the Contractor (or Subcontractors of any tier) to submit NOI's within the mandated time frame shall result in delay of the construction start date, and no claim for extension of time will be granted for such delay. A copy of the completed NOI shall be posted at the construction site.

- D. Inspections of all Storm water pollution control devices on the project shall be performed by Contractor on a monthly basis and following each rainfall of 0.50 inches or more in a 24-hour period at the project site as required under provisions of the NPDES General Permit for Arizona. Contractor shall prepare reports on such inspections and retain the reports for a period of three years following the completion of the project. Inspection reports shall be submitted monthly to Owner along with progress payment requests. Additionally, Contractor shall maintain all Storm water pollution control devices on the project in proper working order, which shall include cleaning and/or repair during the duration of the project.

- E. Contractor warrants that its employees and Subcontractors of any tier and their employees shall at all times comply with all applicable laws, ordinances, statutes, rules and regulations set forth by all federal, state and local governments and the Environmental Protection Agency in connection with NPDES Permitting requirements and laws and regulations pertaining to air, groundwater and surface water quality.

Fines and penalties imposed by the EPA against Owner or the Contractor for Contractor's failure to comply with any of the requirements of NPDES General Permit of Arizona shall be borne by the Contractor.

- F. Upon project completion, acceptance and demobilization, Contractor shall submit its completed, duly executed NOT form to the EPA, with a copy to the Arizona Department of Environmental Quality at the address listed in Section (C) above, thereby terminating all NPDES permit coverage for the project. Contractor shall then surrender to Owner copies of the SWPPP, inspection information and all other documents prepared and maintained by the Contractor in compliance of the NPDES General Permit. Contractor shall retain the originals of such documents for a period of three (3) years following the completion of the project.
- G. The Lump Sum price for the SWPPP shall include all material, labor, and all other costs relating to the preparation, installation and maintenance of the SWPPP during project construction, including assuring proper operation of the pollution control devices installed, and all maintenance, cleaning, and disposal costs associated with clean-up and repair following storm events, runoff or releases on the project. The Lump Sum price for the SWPPP shall be inclusive of all costs, and no additional claims shall be made by Contractor under any other specification provision of these documents, including Changed Conditions. Payment of fifty percent (50%) for this bid item shall be made at the beginning of the project, and the remaining payment made upon final completion and acceptance of the project, as per MAG Section 109.1.
- H. Copies of all required forms and guidance for preparing the SWPPP are available in the "Drainage Design Manual for Maricopa County, Volume III Erosion Control." The manual is available at the Flood Control District, 2801 West Durango Street, Phoenix, Arizona 85009.

Payment for NPDES/SWPPP permit requirements shall be made on the basis of lump sum for all work described in Subsection 107.2 .1 for:

**ITEM 107-1 - NPDES/SWPPP PERMITS**

**Subsection 107.4 - Archeological Reports:** Add the following:

Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the Contractor, or any person working on his behalf, shall be immediately reported to the Engineer. The Contractor shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Engineer. An evaluation of the discovery will be made by authorized personnel and the Engineer to determine appropriate actions to prevent the loss of significant cultural or scientific resources. The Contractor shall prevent his employees from trespassing on, removing, or otherwise disturbing such resources.

**Subsection 107.5:** Add the following:

The entire construction site shall be considered a "Hard Hat Area" and all personnel in the area will be required to wear a hard hat.

**Subsection 107.5.3 - Compliance with the Arizona Communication Standard:** Add the following:  
Owner will provide Contractor with Material Safety Data Sheets (MSDS) for any products known to exist on the site that are deemed health hazards. Contractor will provide a copy of Owner-provided MSDS to all Subcontractors.

Contractor will provide Owner and all Subcontractors with MSDS for any products that have or are deemed health hazards that will be brought onto the site or created on the site either by Contractor or by any Subcontractors.

Contractor will provide Owner with a statement certifying that all personnel (Contractor and Subcontractor) employed by Contractor or by a Subcontractor on the job site have received the required Hazard Communication Standard training.

**Subsection 107.5.4 - Contractor Health & Safety Provisions:** Add the following:

An example General Health and Safety (H&S) Plan for the project is included in Appendix "B". The Contractor must adopt a Health and Safety (H&S) Plan for this project, subject to the review and comment of the Engineer. A H&S Plan will be implemented by the Contractor as part of the project.

**Degraded Groundwater:**

The reach of the Salt River in which the project is located is in the vicinity of a number of study areas of the State of Arizona Water Quality Assurance Revolving Fund (WQARF). The WQARF program is designed to study and clean-up areas of degraded groundwater. Environmental assessments of the project location are available for review at the District. The Contractor is responsible for obtaining and reviewing these reports as part of the bidding process. These assessments suggest that degraded groundwater will be present beneath some portions of the project during construction, but present indications are that the levels of contaminants are not high enough to be a hazard to worker health and safety according to a risk assessment prepared for this project. At least one employee who is certified in the OSHA 40-hour hazardous material training shall be present on site at all times during excavation activities. Proof of certification shall be provided to the Engineer at the Pre-Construction meeting. The District will monitor groundwater quality on a periodic basis and provide the Contractor with the results.

A Groundwater Contingency Response Plan for working in degraded groundwater and a Site Groundwater Monitoring Plan to be used to assess water quality are included in Appendix "A". The Contingency Response Plan would be implemented, only if necessary, at the direction of the Engineer. If implementation of the plan becomes necessary, payment for such activities required by the plan will be on a time and materials basis by change order as required. The Site Groundwater Monitoring Plan will be utilized by Flood Control District and City of Phoenix staff for purposes of monitoring the quality of groundwater encountered during the project.

At least fourteen calendar days prior to planned excavation of any guide dike structure or the grade control structure, the Contractor shall excavate a single test pit for each of these structures to at least three feet below the groundwater level encountered. If no groundwater is encountered before reaching the lowest elevation of the structure, no further excavation of the test pit at that location is required. The purpose of these pits is to allow the Engineer to obtain groundwater samples prior to the beginning of work on these structures, to determine if degraded groundwater exists, requiring implementation of the Contingency Response Plan. The Contractor shall notify the Engineer at least seven calendar days in advance of the test pit excavation activities. The Contractor shall assist in providing access into the bottom of the pit for the Engineer to take groundwater samples.

Payment for these test pits shall be made on the basis of the lump sum price bid, including all labor, equipment and materials required to excavate the test pits and provide sampling access.

**ITEM 107-6 – TEST PIT EXCAVATION**

**Waste Material Definitions:**

For purposes of the Rio Salado Low Flow Channel – Phase II Project, the following definitions shall apply.

**Inert Material:** Inert material is material as defined by ARS 49-701 (15), i.e. material that is not flammable, will not decompose, and will not leach significant concentrations of environmental contaminants. Typically for this project it will include concrete, asphaltic materials, metal reinforcement

in concrete, and similar materials. It does not include wood, tires, metal, or contaminated soils in significant amounts.

**Construction Debris:** Construction debris is material as defined by ARS 49-701 (5). It typically includes lumber, insulating material, drywall, concrete block, and similar products. Some landfills are permitted to receive construction debris, but not household waste.

**Household Waste:** Household waste is material as defined by ARS 49-701 (14), including general garbage and rubbish from household sources. For the Rio Salado project, it includes material excavated from landfills known to have accepted these types of wastes, but does not include inert material and construction debris where those materials are separable from the household waste.

**Special Waste:** Includes material as defined by ARS 49-851.A(5). For the Rio Salado project, the type of special waste most likely to be encountered is petroleum contaminated soil where the concentration of petroleum products as determined by laboratory analysis exceeds non-residential soil cleanup standards established by the Arizona Department of Environmental Quality.

**Hazardous Waste:** Hazardous waste is material as defined by ARS 49-921 (5). Hazardous waste is typically defined as a result of exceeding certain established concentrations of contaminants, or by possessing characteristics such as toxicity, flammability, or explosive potential. In accordance with the Special Provisions, these types of materials, if encountered will be handled by the City of Phoenix and its Contractor.

**Landfills:**

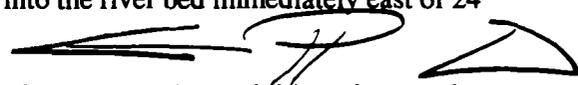
There are a number of old landfill sites located along the river corridor within or adjacent to the Rio Salado project boundaries. These landfills may contain a variety of wastes including inert materials, construction debris, household wastes, special wastes, tires, and some hazardous waste. Landfill materials may be encountered during construction of the guide dike structures (GDS), the grade control structures (GCS), and excavation of the low flow channel (LFC). Environmental assessments of the project location are available for review at the District. The Contractor is responsible for obtaining and reviewing these reports as part of the bidding process.

During previous investigations, landfilled materials have been documented at the following locations:

In the Salt River bed and the adjoining banks west of 7<sup>th</sup> Street.

On the south bank and north bank of the Salt River between 7<sup>th</sup> and 16<sup>th</sup> Streets.

On the south bank of the Salt River and possibly extending into the river bed immediately east of 24<sup>th</sup> Street.



The Contractor shall keep adequately trained staff on site during construction activities where such landfill materials may be encountered. At least one employee who is certified in the OSHA 40-hour hazardous material training shall be present on site at all times during excavation activities. Proof of certification shall be provided to the Engineer at the Pre-Construction meeting. Such staff must be able to distinguish between inert wastes and soil stains, rubbish and other household or potentially hazardous wastes. If during construction, the Contractor encounters soil stains, chemical or petroleum odors, rubbish, household waste or what he believes may be other potentially regulated substances, he will immediately notify the Engineer, and if necessary stop work only in this area. The Engineer will notify the City of Phoenix (COP) environmental staff who will visit the work area, determine whether any immediate precautions should be taken, and make a characterization of the materials to determine the presence of any regulated substances. The site visit and characterization activities by the COP will generally be initiated before the end of the next working day following the day of the discovery of the materials for which such visits and characterization is required. It may take up to four weeks on average to complete the characterization process. In the interim, the Contractor will construct berms to divert nuisance flows away from any exposed suspect material.

The Contractor may be required to prepare a graded area near the waste material area for use by the COP on-call environmental contractor for temporary storage of waste materials and associated soils. The size of the temporary storage stockpile shall not exceed 50 feet by 75 feet in footprint area and shall be free draining. The Contractor shall limit side-slopes of the material placed over the graded area to 3H:1V. If the graded area is constructed in proximity to a positive slope, the Contractor shall limit surface water run-on to the temporary storage area by constructing a diversion berm a minimum 3 feet in height between the river bank and the pile. The berm shall freely discharge diverted flows away from the stockpiled material. See Special Provisions Section 350.

Once the materials and associated soils have been characterized by the COP, and if necessary segregated by a COP on-call environmental contractor, the Contractor, at the direction of the Engineer, can remove and dispose of all non-regulated materials. Household waste and special waste must be removed from the project site and taken to designated stockpile areas indicated on the construction plans, or disposed of within one week of its excavation. The primary stockpile will be located West of the Central Avenue Bridge on the South side of the river bottom and the secondary location will be East of the 16<sup>th</sup> Street Bridge on the North side of the river bottom. If flows in the river are imminent, such household waste or special waste must be removed immediately before flows occur. The disposal of these types of materials will be in accordance with Special Provisions Section 350. Disposal of soils associated with the waste materials and found not to be hazardous will be considered incidental to the Special Provisions Section 215 bid items.

Any waste material characterized and found to be of a hazardous nature will be disposed of by the COP and its on-call environmental contractor.

Methane gas is often associated with household waste disposal sites, and has been detected at some locations within or adjacent to the project area. Such locations include but are not limited to the former Del Rio Landfill on the south bank of the Salt River between 7<sup>th</sup> Street and 16<sup>th</sup> Street.

The Contractor shall take appropriate precautions as described in the example General Health and Safety Plan (HSP), and in the Contingency Response Plan and shall adhere to the excavation safety requirements of 29CFR 1926.650-652. When waste materials are exposed, part of the characterization activities by the COP environmental contractor may include area monitoring for methane and other airborne contaminants. Those monitoring results will be shared with the Contractor. The Contractor shall also perform appropriate monitoring of activities as required, including monitoring for methane gas and submit all results to the engineer.

**Tires:**

Tires will be encountered during construction excavation activities. These will be disposed of by the Contractor in accordance with Special Provisions Section 350.

**Compliance with ARS 49-701:**

The Contractor must provide information necessary to comply with ARS 49-701 to the Engineer. At a minimum, upon encountering any waste, including inert materials, construction debris, household waste, special waste, tires and hazardous waste the Contractor must notify the Engineer of the location of this material by station points and offsets. Within 14 days of removal and disposal of any solid waste, the Contractor must, unless otherwise directed by the Engineer, provide the following information, using the form provided in Appendix "D".

- 1) A written description of the removal project, including the types of material, approximate quantity, approximate dimensions of the excavation, a description of waste handling, storage, and transportation practices, and a description of the disposal method and location.
- 2) Supporting documentation such as load receipts, manifests, etc.

**Subsection 107.5.4.1 Contractor's Status During any Hazard Remediation:**

The Contractor understands that project work activities could expose its employees and subcontractors to degraded groundwater and/or to regulated waste materials. Therefore it shall be the responsibility of the Contractor to conduct a reasonable inquiry of the Flood Control District and the City of Phoenix to ascertain whether the work will affect or disturb any regulated substances, or may result in any potential employee exposure that is known to be present within the limits of project work activities.

If there is the presence of degraded groundwater, as determined by the analytical results following exceedance of all trigger levels, or there is the characterization and remediation, by the COP and/or its on-call environmental contractor, of any discovered regulated and/or hazardous material, and the Contractor is able to work elsewhere on the project site, the Engineer may direct the Contractor to relocate to another activity or location on the project without impacting the project schedule. No compensation will be provided for this relocation. The cost of such relocation will be considered incidental to the related tasks.

**Subsection 107.5.4 - Contractor Health & Safety Provisions:** Add the following:

An example General Health and Safety (H&S) Plan for the project is included in Appendix "B". The Contractor must adopt a Health and Safety (H&S) Plan for this project, subject to the review and comment of the Engineer. A H&S Plan will be implemented by the Contractor as part of the project.

**Degraded Groundwater:**

The reach of the Salt River in which the project is located is in the vicinity of a number of study areas of the State of Arizona Water Quality Assurance Revolving Fund (WQARF). The WQARF program is designed to study and clean-up areas of degraded groundwater. Environmental assessments of the project location are available for review at the District. The Contractor is responsible for obtaining and reviewing these reports as part of the bidding process. These assessments suggest that degraded groundwater will be present beneath some portions of the project during construction, but present indications are that the levels of contaminants are not high enough to be a hazard to worker health and safety according to a risk assessment prepared for this project. At least one employee who is certified in the OSHA 40-hour hazardous material training shall be present on site at all times during excavation activities. Proof of certification shall be provided to the Engineer at the Pre-Construction meeting. The District will monitor groundwater quality on a periodic basis and provide the Contractor with the results.

A Groundwater Contingency Response Plan for working in degraded groundwater and a Site Groundwater Monitoring Plan to be used to assess water quality are included in Appendix "A". The Contingency Response Plan would be implemented, only if necessary, at the direction of the Engineer. If implementation of the plan becomes necessary, payment for such activities required by the plan will be on a time and materials basis by change order as required. The Site Groundwater Monitoring Plan will be utilized by Flood Control District and City of Phoenix staff for purposes of monitoring the quality of groundwater encountered during the project.

At least fourteen (14) calendar days prior to planned excavation of any guide dike structure or the grade control structure, the Contractor shall excavate a single test pit for each of these structures to at least three feet below the groundwater level encountered. If no groundwater is encountered before reaching the lowest elevation of the structure, no further excavation of the test pit at that location is required. The purpose of these pits is to allow the Engineer to obtain groundwater samples prior to the beginning of work on these structures, to determine if degraded groundwater exists, requiring implementation of the Contingency Response Plan. The Contractor shall notify the Engineer at least seven calendar days in advance of the test pit excavation activities. The Contractor shall assist in providing access into the bottom of the pit for the Engineer to take groundwater samples.

Payment for these test pits shall be made on the basis of the lump sum price bid, including all labor, equipment and materials required to excavate the test pits and provide sampling access.

**ITEM 107-6 – TEST PIT EXCAVATION**

**Waste Material Definitions:**

For purposes of the Rio Salado Low Flow Channel – Phase II Project, the following definitions shall apply.

**Inert Material:** Inert material is material as defined by ARS 49-701 (15), i.e. material that is not flammable, will not decompose, and will not leach significant concentrations of environmental contaminants. Typically for this project it will include concrete, asphaltic materials, metal reinforcement in concrete, and similar materials. It does not include wood, tires, metal, or contaminated soils.

**Construction Debris:** Construction debris is material as defined by ARS 49-701 (5). It typically includes lumber, insulating material, drywall, concrete block, and similar products. Some landfills are permitted to receive construction debris, but not household waste.

**Household Waste:** Household waste is material as defined by ARS 49-701 (14), including general garbage and rubbish from household sources. For the Rio Salado project, it includes material excavated from landfills known to have accepted these types of wastes, but does not include inert material and construction debris where those materials are separable from the household waste.

**Special Waste:** Includes material as defined by ARS 49-851.A(5). For the Rio Salado project, the type of special waste most likely to be encountered is petroleum contaminated soil where the concentration of petroleum products as determined by laboratory analysis exceeds non-residential soil cleanup standards established by the Arizona Department of Environmental Quality.

**Hazardous Waste:** Hazardous waste is material as defined by ARS 49-921 (5). Hazardous waste is typically defined as a result of exceeding certain established concentrations of contaminants, or by possessing characteristics such as toxicity, flammability, or explosive potential. In accordance with the Special Provisions, these types of materials, if encountered will be handled by the City of Phoenix and its Contractor.

**Landfills:**

There are a number of old landfill sites located along the river corridor within or adjacent to the Rio Salado project boundaries. These landfills may contain a variety of wastes including inert materials, construction debris, household wastes, special wastes, tires, and some hazardous waste. Landfill materials may be encountered during construction of the guide dike structures (GDS), the grade control structures (GCS), and excavation of the low flow channel (LFC). Environmental assessments of the project location are available for review at the District. The Contractor is responsible for obtaining and reviewing these reports as part of the bidding process.

During previous investigations, landfilled materials have been documented at the following locations:

- In the Salt River bed and the adjoining banks west of 7<sup>th</sup> Street;
- On the south bank and north bank of the Salt River between 7<sup>th</sup> and 16<sup>th</sup> Streets; and,
- On the south bank of the Salt River and possibly extending into the river bed immediately east of 24<sup>th</sup> Street.

The Contractor shall keep adequately trained staff on site during construction activities where such landfill materials may be encountered. At least one employee who is certified in the OSHA 40-hour hazardous material training shall be present on site at all times during excavation activities. Proof of certification shall be provided to the Engineer at the Pre-Construction meeting. Such staff must be able to distinguish between inert wastes and soil stains, rubbish and other household or potentially hazardous wastes. If during construction, the Contractor encounters soil stains, chemical or petroleum odors, rubbish, household waste or what he believes may be other potentially regulated substances, he will immediately notify the Engineer, and if necessary stop work only in this area. The Engineer will notify the City of Phoenix (COP) environmental staff who will visit the work area, determine whether any immediate precautions should be taken, and make a characterization of the materials to determine the presence of any regulated substances. The site visit and characterization activities by the COP will generally be initiated before the end of the next working day following the day of the discovery of the materials for which such visits and characterization is required. It may take up to four weeks on average

to complete the characterization process. In the interim, the Contractor will construct berms to divert nuisance flows away from any exposed suspect material.

The Contractor may be required to prepare a graded area near the waste material area for use by the COP on-call environmental contractor for temporary storage of waste materials and associated soils. The temporary storage stockpile shall be constructed in accordance with the provisions stated in Section 350.

Once the materials and associated soils have been characterized by the COP, and if necessary segregated by a COP on-call environmental contractor, the Contractor, at the direction of the Engineer, can remove and dispose of all non-regulated materials. Within one week of excavation, household waste and special waste must be removed from the project site and disposed or taken to a designated stockpile area. The following three (3) stockpile locations have been designated on the plans:

- West of 7<sup>th</sup> Avenue on the north riverbank;
- East of Central Avenue on the south riverbank; and,
- East of 16<sup>th</sup> Street on the north riverbank .

If flows in the river are imminent, such household waste or special waste must be removed immediately before flows occur. The disposal of these types of materials will be in accordance with Special Provisions Section 350. Disposal of soils associated with the waste materials and found not to be hazardous will be considered incidental to the Special Provisions Section 215 bid items.

Any waste material characterized and found to be of a hazardous nature will be disposed of by the COP and its on-call environmental contractor.

Methane gas is often associated with household waste disposal sites, and has been detected at some locations within or adjacent to the project area. Such locations include but are not limited to the former Del Rio Landfill on the south bank of the Salt River between 7<sup>th</sup> Street and 16<sup>th</sup> Street.

The Contractor shall take appropriate precautions as described in the example General Health and Safety Plan (HSP), and in the Contingency Response Plan and shall adhere to the excavation safety requirements of 29CFR1926.650-652. When waste materials are exposed, part of the characterization activities by the COP environmental contractor may include area monitoring for methane and other airborne contaminants. Those monitoring results will be shared with the Contractor. The Contractor shall also perform appropriate monitoring of activities as required, including monitoring for methane gas and submit all results to the engineer.

**Tires:**

Tires will be encountered during construction excavation activities. These will be disposed of by the Contractor in accordance with Special Provisions Section 350.

**Compliance with ARS 49-701:**

The Contractor must provide information necessary to comply with ARS 49-701 to the Engineer. At a minimum, upon encountering any waste, including inert materials, construction debris, household waste, special waste, tires and hazardous waste the Contractor must notify the Engineer of the location of this material by station points and offset. Within 14 days of removal and disposal of any solid waste, the Contractor must, unless otherwise directed by the Engineer, provide the following information, using the form provided in Appendix "D".

- 3) A written description of the removal project, including the types of material, approximate quantity, approximate dimensions of the excavation, a description of waste handling, storage, and transportation practices, and a description of the disposal method and location.
- 4) Supporting documentation such as load receipts, manifests, etc.

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**Subsection 107.5.4.1 - Contractor's Status During any Hazard Remediation:**

The Contractor understands that project work activities could expose its employees and subcontractors to degraded groundwater and/or to regulated waste materials. Therefore it shall be the responsibility of the Contractor to conduct a reasonable inquiry of the Flood Control District and the City of Phoenix to ascertain whether the work will affect or disturb any regulated substances, or may result in any potential employee exposure that is known to be present within the limits of project work activities. This includes the waste characterization report presented in Appendix ??.

If there is the presence of degraded groundwater, as determined by the analytical results following exceedance of all trigger levels, or there is the characterization and remediation, by the COP and/or its on-call environmental contractor, of any discovered regulated and/or hazardous material, and the Contractor is able to work elsewhere on the project site, the Engineer may direct the Contractor to relocate to another activity or location on the project without impacting the project schedule. No compensation will be provided for this relocation. The cost of such relocation will be considered incidental to the related tasks.

If the presence of degraded groundwater, or the discovery of regulated and/or hazardous materials interferes with the project's critical path, then the critical path and overall project schedule will be reviewed and revised as mutually acceptable by the Engineer and the Contractor to minimize the impact to the **total project schedule**. An extension in contract time for this delay to Contractor may be granted by Owner in accordance with Subsection 108.7. No monetary compensation will be provided the Contractor except as follows.

Upon returning to the site, if the Contractor encounters damages or disturbances made by others in his absence, the Engineer may consider reimbursement only for such repairs. The reimbursement will be made on an actual cost, time and materials basis.

If the presence of degraded groundwater, or the discovery of regulated and/or hazardous materials impacts the project schedule in such a manner that the Contractor is prevented from continuing work on any portion of the project, and Owner issues a suspension of work order, then Contractor shall be entitled to compensation in the form of a **one-time payment** of Demobilization and Remobilization costs, which shall be no more than 6 percent of the original bid item for mobilization.

Contractor's implementation of the Health and Safety Plans under Subsection 107.5.4 will be compensated in accordance with Subsection 109.5 ACTUAL COST OF WORK.

**Subsection 107.6.3 - Public Information and Notification:** Add the following:

The Contractor shall employ a specialty public information service as a subcontractor to provide the community relations program for the project as described herein. The name and address of the public information subcontractor shall be submitted with the bid as specified in subsection 102.6 of the Supplementary General Conditions. Contractor shall work closely with his subcontractor in developing and carrying out the community relations program. Contractor shall submit a history of the subcontractor's qualifications and experience in public information services at the pre-construction conference for acceptance by the Engineer. The community relations program shall be designed to run the full length of calendar days in the contract for this project. The program will include but not be limited to:

1. Distributing a pre-construction information letter to all residents, business, etc. within an area described as follows: from one-quarter mile west of 7<sup>th</sup> Avenue to one-quarter mile east of Interstate 10, and from one-quarter mile north of the Salt River to one-quarter mile south of the Salt River. Included will be all neighborhood associations registered with the City, property owners, City Council members in Districts 7 and 8, and the presidents of the Central City and South Mountain Village Planning Committees.
2. Printing and distribution of public notices and/or newsletters. All printed materials must be in both English and Spanish.

The Contractor will use these or other means to inform the local citizens of necessary operations which create high noise levels, street closures, limited access, detour locations, haul route and material delivery routes, hours of construction and disruption of bus, trash, school bus and other delivery/pick-up routes.

The Contractor will be required to furnish a private line telephone to be used solely for receiving incoming calls from local citizens with questions or complaints concerning construction operations or procedures. The Contractor shall publish this phone number and maintain a 24-hour answering service. The answering service must be fluent in both English and Spanish and shall be operated by Contractor personnel during all hours that work is being performed on the job site. The Contractor shall maintain a log of incoming calls, responses, and action taken which shall be submitted to the Engineer weekly and/or upon request.

Prior to the start of work, the Contractor shall notify, by letter, all affected businesses and residents of construction plans and schedules within the geographic area identified above. In addition, all schools and emergency services which serve the geographic area will also be notified even though they may be located outside the geographic area described above. The letter shall contain, as a minimum, the following information:

1. Name of Contractor
2. 24-hour telephone complaint number
3. Brief description of the project
4. Name of Contractor project Superintendent
5. Name of Engineer
6. Name of area supervisor
7. Construction schedule including anticipated work hours
8. Traffic regulations including lane restrictions
9. City of Phoenix Street Transportation 24-hour phone number

The Contractor shall submit a Public Information and Notification Plan to the Engineer at the pre-construction meeting. No payments shall be made for this item until the Engineer approves the plan.

The plan and work which is eligible for reimbursement shall include: meetings with impacted businesses, schools, emergency services, residents, etc.; scheduling; preparation and distribution of newsletter at least monthly; and maintaining a 24-hour telephone hot line for complaints.

The Contractor shall submit a final report/evaluation of the Public Information and Notification process performed for this project. This report shall be submitted before the Contractor receives final payment.

Payment will be based on invoices, and will be for a total amount not to exceed the amount shown in the bid schedule for the item, PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE, for work performed in notifying and coordinating with the local population impacted by this project. To cover the cost for administration and supervision, the General Contractor may add an amount equal to not more than 5 percent of the accumulated total invoiced billing for actual public information services provided by a Subcontractor. This cost for administration and supervision will be considered included in the PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE.

#### **ITEM 107-2 - PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE**

##### **Subsection 107.6.4 - Project Signs:**

Contractor shall provide and install six project information signs, at locations to be determined by the Engineer, at the start of construction to inform the public of the forthcoming project, construction dates, and suggested alternate travel routes. Project signs shall include the names of all agencies participating in the project. The signs shall be in English and Spanish and include the 24-hour hot line complaint

telephone number. Signs shall be constructed in accordance with the Project Sign Information drawing to be provided to the Contractor at the pre-construction meeting. The signs shall be installed at the location(s) approved by the Engineer. The Contractor shall maintain the signs as necessary, and update the information as requested by the Engineer. Payment shall be made according to the allowance in the Bidding Schedule in installments of 50% upon installation, and the remaining 50% upon final payment for the work.

#### **ITEM 107-3 - PROJECT SIGNS ALLOWANCE**

##### **Subsection 107.9 - Protection and Restoration of Property:** Add the following:

The Contractor shall protect-in-place all existing structures and other features as identified on the plans, including but not limited to transmission towers, existing sand and gravel operation haul roads, and existing vegetation outside of the excavation limits.

The Contractor shall limit all construction activities to the right-of-way limits shown on the plans including dedicated street right-of-way, and shall not disturb any areas other than as required for construction as shown on the plans.

The Contractor will grade all Temporary Construction and Permanent Easement areas, and project areas which are disturbed during construction to the lines and grades shown on the plans, or as a minimum, where no lines and grades are shown, to a condition similar to or better than the pre-existing condition.

Existing river bottom Sand & Gravel Operation (SGO) haul roads in the bottom of the river will be maintained as follows:

1. The haul road crossing the river upstream of 16<sup>th</sup> Avenue shall be maintained for the duration of the project for use by the SGO.
3. The Contractor will allow SGO activities along these haul roads during construction.

The Contractor will minimize damage to and the removal of existing vegetation within the project area that exists beyond required excavation limits. Haul roads and other construction access routes will be created in such a way to minimize such damage and removal whenever possible, and will be approved by the Engineer before vegetation is removed.

##### **Subsection 107.10 - Contractor's Responsibility for Work:** Add the following:

- A. All construction activities will occur within the bottom of the Salt River. As recent as 1993 flows in excess of 100,000 cfs occurred in the river. Flows can occur at any time in the river, and nuisance flows are ever present in the river bottom. The Contractor shall protect his construction work and equipment from flows in the river. The Owner assumes no responsibility for notifying the Contractor of any anticipated flows, nor for any damages incurred by the Contractor to his equipment or to any of the Contractor's work as a result of any flows of water.
- B. The Contractor shall provide the Engineer at the pre-construction conference with his plan for managing flows.
- C. Ground water will be encountered in the area of construction, and it may be pumped from the excavation limits back into the river downstream of the work area under dewatering permits obtained by the City from the Arizona Department of Water Resources, and to be provided to the Contractor.
- D. The ground water infiltration rate to be managed by the Contractor when performing excavation activities can be estimated based on data provided in the Appendix (Appendix would have the raw data from the COE's tests).

- E. Groundwater pumped from excavations will be piped to the south side of the river bottom where it can be allowed to flow downstream. However, because of concerns about impacting downstream sand and gravel mining activities, this piped groundwater cannot be permitted to surface flow past the 19<sup>th</sup> Avenue bridge without the Contractor first contacting the sand and gravel mining operators, and providing evidence of this contact to the Engineer. Project access, concerns about public contact, or proximity to regulated features such as landfills may cause the Engineer to direct that the ground water be directed away from certain areas before allowing discharge.
- F. Installation and abandonment of any wells installed for dewatering purposes will be done by a well drilling Contractor that holds a current well drillers' license pursuant to A.R.S. 45-595. Any dewatering wells installed by the Contractor will be equipped with a sampling port to facilitate the collection of groundwater samples by the Engineer. All dewatering wells will be installed and registered according to the Arizona Department of Water Resources rules and regulations. Contractor shall provide a copy of all well permits, Notice of Abandonment, and drillers logs to the Engineer, and shall provide access to the wells for ground water quality monitoring if requested. Prior to activating any wells, trench pumps, or other dewatering points, the Contractor shall provide a completed copy of a Notice of Intent (NOI) to withdraw groundwater by means of wells, pumps or other dewatering methods, or a written description of the location and type of dewatering device to the Engineer and shall not activate dewatering at that location until authorized by the Engineer. All groundwater that is withdrawn will be discharged back into the Salt River. The Contractor will be required to obtain NOI's as required by the ADWR prior to activating each dewatering point. It can typically take up to fifteen days to obtain an NOI through the ADWR. All NOI's must be signed by the City as the owner and by the District as the applicant.
- G. It will be necessary for the Contractor to monitor the total amount of ground water pumped on a daily basis. The Contractor must provide the necessary gages and/or meters to quantify the amount of water pumped in gallons per day at each well, trench pump or other dewatering point. A daily log will be kept by the Contractor, and the data will be provided to the Engineer on a monthly basis using the form provided in Appendix "C".
- H. The Contractor shall take all necessary action to protect the public from the construction work area. The Contractor will also notify the Engineer of any unauthorized personnel in the project area, including the presence of the general public.
- I. The Contractor is responsible for protecting in place the 24th Street Bridge. Because the construction of the Grade Control Structure (GCS) at 24th Street requires excavating into the river banks in close proximity to the bridge abutments, and because of the potential for significant flows in the river, the Contractor is cautioned about constructing the ends of the GCS into the river banks should this activity occur between December and March. The Contractor shall sequence his work for construction of the GCS and the upstream RCC apron so as to minimize the exposure time of the structure excavation to potential river flows. The Contractor shall take all precautions necessary to protect-in-place the bridge structure during construction of the GCS and apron.
- J. The Contractor is responsible for protecting in place the CALMAT Conveyor Bridge.
- K. In accordance with the Environmental Impact Statement the Contractor **shall avoid all areas of standing or running water wherever possible**, however it may be necessary to operate equipment, including vehicles in areas of water.

Payment for ground water dewatering as described in Subsection 107.10, Parts C, D, E, F and G shall be made on the basis of lump sum for all labor, materials, equipment, and appurtenances necessary to perform the dewatering, including but not limited to pumping equipment, wells, gages and/or meters, and sumps.

#### ITEM 107-4 B GROUND WATER DEWATERING

Payment for surface water management as described in Subsection 107.10, Part A shall be made on the basis of lump sum for all labor, materials, equipment, and appurtenances necessary to manage surface water.

**ITEM 107-5 B SURFACE WATER MANAGEMENT**

**Subsection 108.1 - Notice to Proceed:** Delete Paragraph (A) and replace with the following:

(A) Contractor shall commence work within seven (7) calendar days after the date of the Notice to Proceed and complete all work within three hundred sixty (360) calendar days beginning the day following the effective date specified in the Notice to Proceed.

**Subsection 108.2 - Subletting of Contract:** Add the following:

For this project, Contractor shall perform, with its own organization, work amounting to 50 percent or more of the total contract cost.

**Subsection 108.4 - Contractor's Construction Schedule:** Delete in its entirety and replace with the following:

Contractor shall submit a proposed work schedule to Engineer for review before starting work using the Primavera or other similar software program that is acceptable to the Engineer. Weekly updates shall be submitted to Owner's Inspector at the weekly coordination meeting.

**Subsection 108.4.1 - Contractor's Billing Schedule:** The Contractor shall furnish the Engineer an Estimated Billing Schedule which shall include the estimated amount of each billing for the total project at the pre-construction conference, and thereafter at monthly intervals as agreed to between the Contractor and Engineer.

**Subsection 108.5 - Limitation of Operations:** Add the following:

The normal workweek shall be 40 hours, Monday through Friday, and the work hours will be determined at the pre-construction meeting. This does not imply that this contract can be completed on time utilizing normal working hours. The Contractor shall furnish sufficient forces and shall work such hours including night shifts and overtime operations as necessary to ensure the completion of the work within the time required. To work other than normal working hours, for other than emergency situations, the Contractor shall give the Engineer at least 24 hours advance written notification and receive written approval before working. The notification shall include: the working hours, the type of work to be performed, and the name of and a phone number for the person in charge. Should the Contractor elect to perform any work after regular working hours, on weekends, or legal holidays, any charges incurred by the Owner for inspection of the work, surveys or tests of materials will be deducted from monies due or to become due to the Contractor.

**Subsection 108.9 - Failure to Complete on Time:** Add the following:

The actual cost per calendar day incurred by the District for Administrative and Inspection Services on this project will be added to the daily charges as indicated by TABLE 108, LIQUIDATED DAMAGES, and will be deducted from money due or to become due to the Contractor for each and every calendar day that work shall remain incomplete after the time specified for the completion of the work in the proposal, or as adjusted by the Engineer. Nothing contained in this provision shall prohibit the Owner from deducting from money due or to become due to the Contractor for any other costs incurred by the Owner directly attributable to the delay in completing this contract.

**Subsection 109.2 - Scope of Payment:** Add the following:

In addition to the contained provisions, the work under this section shall consist of preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies and incidentals to the project site, the establishment of all offices, buildings and other facilities necessary for work on the project, and for all other work operations that must be performed and costs incurred prior to beginning work on the various items on the project site.

**Subsection 109.7 - Payment for Bond Issue and Budget Projects:**

(A) To third paragraph, add:

Payment or release of retained funds shall be made to the Contractor within thirty (30) days following final payment to the Contractor [reference (B) following], and Contractor furnishing to Engineer satisfactory receipts for all labor and material billed and waivers of liens from any and all persons and Subcontractors holding claims against the work. Additionally, Contractor shall furnish a completed Certificate of Performance to Engineer evidencing it has satisfactorily discharged all its duties in connection with the work to be performed under this Contract. The form of Certificate of Performance shall be provided to Contractor by the Engineer.

(B) Add the following:

The final payment will be made to Contractor by Owner within thirty (30) days following receipt of Engineer's final estimate and receipt by Owner of Consent of Contractor's Surety to said final payment. If payment will be longer than thirty (30) days as aforesaid, Owner will provide Contractor specific written findings for reasons justifying the delay in payment.

(C) Contractor's pay estimates will be processed by Owner's Construction Branch on the week prior to the last day of the month.

**ENGINEERS COST ESTIMATE**

## ENGINEER'S ESTIMATE

Contract FCD xxxxxxxx Rio Salado - Phoenix Reach Low Flow Channel Project Phase 2

90% Submittal

10/5/00

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
105-1	Partnering Allowance	LS	1	\$18,924.00	\$18,924.00
107-1	NPDES/SWPPP Permits	LS	1	\$13,249.00	\$13,249.00
107-2	Public Information and Notification Allowance	LS	1	\$40,610.00	\$40,610.00
107-3	Project Signs Allowance	LS	1	\$5,672.77	\$5,672.77
107-4	Groundwater Dewatering	LS	1	\$99,633.00	\$99,633.00
107-5	Surface Water Management	LS	1	\$58,606.00	\$58,606.00
107-6	Test Pit Excavation	LS	1	\$25,577.00	\$25,577.00
201-1	Clearing and Grubbing	LS	1	\$72,595.00	\$72,595.00
201-2	Stockpile Area Clearing & Grubbing	ACRE	3	\$1,952.91	\$5,858.73
202-1	Mobilization	LS	1	\$290,767.00	\$290,767.00
211-1	Backfill of Over-Excavated Areas	CY	45,000	\$2.98	\$134,100.00
211-2	Backfill of Over-Excavated Areas Allowance	LS	1	\$33,123.00	\$33,123.00
215-1	Earthwork for Drainage Channels	CY	875,000	\$2.11	\$1,846,250.00
220-1	Plain Riprap	CY	500	\$27.40	\$13,700.00
221-1	RCC Guide Dike Structure	CY	28,275	\$32.87	\$929,399.25
221-2	RCC Grade Control Structure	CY	50,920	\$28.75	\$1,463,950.00
221-3	Cement for RCC	TONS	7,990	\$98.97	\$790,770.30

# ENGINEER'S ESTIMATE

Contract FCD xxxxxxxx Rio Salado - Phoenix Reach Low Flow Channel Project Phase 2

90% Submittal

10/5/00

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
221-4	Fly Ash for RCC	TONS	3,210	\$37.45	\$120,214.50
222-1	Gabion Mattresses	CY	1,015	\$93.03	\$94,425.45
350-1	Inert Material Removal (up to 120,000 cubic yards)	CY	120,000	\$6.67	\$800,400.00
350-2	Inert Material Removal (120,001 to 240,000 cubic yards)	CY	120,000	\$6.67	\$800,400.00
350-3	Construction Debris Removal (up to 5,000 cubic yards)	CY	5,000	\$32.29	\$161,450.00
350-4	Construction Debris Removal (5,001 to 10,000 cubic yards)	CY	5,000	\$32.29	\$161,450.00
350-5	Tire Removal (up to 300 tons)	TONS	300	\$174.99	\$52,497.00
350-6	Tire Removal (301 to 600 tons)	TONS	300	\$174.99	\$52,497.00
350-7	Household Waste Removal (up to 15,000 cubic yards)	CY	15,000	\$48.14	\$722,100.00
350-8	Household Waste Removal (15,001 to 30,000 cubic yards)	CY	15,000	\$48.14	\$722,100.00
350-9	Special Waste Removal (up to 10,000 cubic yards)	CY	10,000	\$48.14	\$481,400.00
350-10	Special Waste Removal (10,001 to 20,000 cubic yards)	CY	10,000	\$48.14	\$481,400.00
350-11	Waste Stockpile	CY	75,000	\$4.77	\$357,750.00
350-12	Temporary Liner	SY	1,000	\$5.16	\$5,160.00
350-13	Permanent Liner	SY	1,600	\$5.35	\$8,560.00
350-14	Temporary Liner Allowance	LS	1	\$3,124.78	\$3,124.78
350-15	Permanent Liner Allowance	LS	1	\$4,374.69	\$4,374.69

# ENGINEER'S ESTIMATE

Contract FCD xxxxxxxx Rio Salado - Phoenix Reach Low Flow Channel Project Phase 2

90% Submittal

10/5/00

ITEM NO.	DESCRIPTION	UNIT	APPROX. QTY	UNIT AMOUNT	EXTENDED AMOUNT
350-16	Conveyor Bridge Removal	LS	1	\$25,239.00	\$25,239.00
350-17	Riprap Removal	CY	300	\$5.00	\$1,500.00
350-18	Grouted Riprap and Gabion Removal	CY	300	\$11.61	\$3,483.00
401-1	Traffic Control	LS	1	\$15,920.00	\$15,920.00
401-2	Off-Duty Uniformed Officer	HR	300	\$35.02	\$10,506.00
TOTAL BID AMOUNT WRITTEN IN NUMBERS					\$10,918,230.47

TOTAL BID AMOUNT WRITTEN IN WORDS

Tue 24 Oct 2000  
Eff. Date 10/18/00

U.S. Army Corps of Engineers  
PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN

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TITLE PAGE 1

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Rio Salado Low Flow Channel  
Phase 2 of Phased Construction  
90% Design  
Construction Cost Estimate

Designed By: Montgomery Watson  
Estimated By: Ed Zurawski, CCC

Prepared By:  
Ed Zurawski, Montgomery Watson

Preparation Date: 10/19/00  
Effective Date of Pricing: 10/18/00  
Est Construction Time: 360 Days

Sales Tax: 7.00%

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Release 5.30

LABOR ID: AR1220 EQUIP ID: MAT97B

Currency in DOLLARS

CREW ID: MAT97A UPB ID: UP99EA

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RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
\*\* PROJECT OWNER SUMMARY - CONTRACT \*\*

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SUMMARY PAGE 1

	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	OWN FURN	SION	TOTAL COST	UNIT
9 CHANNELS AND CANALS	1.00 EA	10,286,623	514,331	116,685	0	0	10,917,639	10917639
TOTAL Rio Salado Low Flow Channel	1.00 EA	10,286,623	514,331	116,685	0	0	10,917,639	10917639

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U.S. Army Corps of Engineers  
 PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 \*\* PROJECT OWNER SUMMARY - Feature \*\*

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 SUMMARY PAGE 2

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OWN FURN	SIQH	TOTAL COST	UNIT
9 CHANNELS AND CANALS									
9-01	Partnering Allowance	1.00	JOB	17,830	891	202	0	18,924	18924
9-02	NPDES/SWPPP Permits	1.00	JOB	12,483	624	142	0	13,249	13249
9-03	Public Information-Notification	1.00	JOB	38,262	1,913	434	0	40,610	40610
9-04	Project Signs Allowance	1.00	JOB	5,345	267	61	0	5,673	5672.77
9-05	Groundwater Dewatering	1.00	JOB	93,874	4,694	1,065	0	99,633	99633
9-06	Surface Water Management	1.00	JOB	55,219	2,761	626	0	58,606	58606
9-07	Test Pit Excavation	1.00	JOB	24,099	1,205	273	0	25,577	25577
9-08	Clearing & Grubbing	1.00	JOB	68,399	3,420	776	0	72,595	72595
9-09	Stockpile Area Clearing-Grubbing	3.00	ACR	5,520	276	63	0	5,859	1952.91
9-10	Mobilization	1.00	JOB	273,961	13,698	3,108	0	290,767	290767
9-11	Backfill of Over-Excavated Areas	45000	CY	126,181	6,309	1,431	0	133,922	2.98
9-12	Backfill-Over-Excavated Allowanc	1.00	JOB	31,208	1,560	354	0	33,123	33123
9-13	Earthwork for Drainage Channels	875000	CY	1,737,253	86,863	19,706	0	1,843,822	2.11
9-14	Plain Riprap	500.00	CY	12,907	645	146	0	13,699	27.40
9-15	RCC Guide Dike Structure	28275	CY	875,654	43,783	9,933	0	929,369	32.87
9-16	RCC Grade Control Structure	50920	CY	1,379,512	68,976	15,648	0	1,464,136	28.75
9-17	Cement for RCC	7920.00	TON	738,523	36,926	8,377	0	783,826	98.97
9-18	Fly Ash for RCC	3168.00	TON	111,776	5,589	1,268	0	118,633	37.45
9-19	Gabion Mattress	1015.00	CY	88,966	4,448	1,009	0	94,424	93.03
9-20	Inert Material Removal-1st 120k	120000	CY	754,071	37,704	8,554	0	800,328	6.67
9-21	Inert Material Removal-2nd 120k	120000	CY	754,071	37,704	8,554	0	800,328	6.67
9-22	Construction Debris Removal-1st	5000.00	CY	152,131	7,607	1,726	0	161,463	32.29
9-23	Construction Debris Removal-2nd	5000.00	CY	152,131	7,607	1,726	0	161,463	32.29
9-24	Tire Removal (up to 300 tons)	300.00	TON	49,462	2,473	561	0	52,496	174.99
9-25	Tire Removal (301 to 600 tons)	300.00	TON	49,462	2,473	561	0	52,496	174.99
9-26	Household Waste Removal-1st 15k	15000	CY	680,415	34,021	7,718	0	722,154	48.14
9-27	Household Waste Removal-2nd 15k	15000	CY	680,415	34,021	7,718	0	722,154	48.14
9-28	Special Waste Removal-1st 10k	10000	CY	453,610	22,680	5,145	0	481,436	48.14
9-29	Special Waste Removal-2nd 10k	10000	CY	453,610	22,680	5,145	0	481,436	48.14
9-30	Waste Stockpile	75000	CY	336,908	16,845	3,822	0	357,575	4.77
9-31	Temporary Liner	1000.00	SY	4,858	243	55	0	5,156	5.16
9-32	Permanent Liner	1600.00	SY	8,064	403	91	0	8,558	5.35
9-33	Temporary Liner Allowance	1.00	JOB	2,944	147	33	0	3,125	3124.78
9-34	Permanent Liner Allowance	1.00	JOB	4,122	206	47	0	4,375	4374.69
9-35	Conveyor Bridge Removal	1.00	JOB	23,780	1,189	270	0	25,239	25239
9-36	Riprap Removal	300.00	CY	1,413	71	16	0	1,500	5.00
9-37	Grouted Riprap Removal	300.00	CY	3,283	164	37	0	3,484	11.61
9-38	Traffic Control	1.00	JOB	15,000	750	170	0	15,920	15920
9-39	Off-Duty Uniformed Officer	300.00	HR	9,900	495	112	0	10,507	35.02
-----									
TOTAL	CHANNELS AND CANALS	1.00	EA	10,286,623	514,331	116,685	0	10,917,639	10917639
-----									
TOTAL	Rio Salado Low Flow Channel	1.00	EA	10,286,623	514,331	116,685	0	10,917,639	10917639

Tue 24 Oct 2000  
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U.S. Army Corps of Engineers  
PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
\*\* PROJECT INDIRECT SUMMARY - CONTRACT \*\*

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SUMMARY PAGE 3

	QUANTITY	UOM	DIRECT	FIELD OH	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
9 CHANNELS AND CANALS	1.00	EA	8,738,488	271,180	359,391	831,630	85,933	10,286,623	10286623
TOTAL Rio Salado Low Flow Channel	1.00	EA	8,738,488	271,180	359,391	831,630	85,933	10,286,623	10286623
Contingency -5%								514,331	
SUBTOTAL								10,800,954	
Escalation - 1%								116,685	
TOTAL INCL OWNER COSTS								10,917,639	

Tue 24 Oct 2000  
 Eff. Date 10/18/00

U.S. Army Corps of Engineers  
 PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 \*\* PROJECT INDIRECT SUMMARY - Feature \*\*

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SUMMARY PAGE 4

	QUANTITY UOM	DIRECT	FIELD OH	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
<b>9 CHANNELS AND CANALS</b>								
9-01	Partnering Allowance	1.00 JOB	15,140	471	624	1,445	149	17,830 17830
9-02	NPDES/SWPPP Permits	1.00 JOB	10,600	330	437	1,012	105	12,483 12483
9-03	Public Information-Notification	1.00 JOB	32,490	1,011	1,340	3,101	320	38,262 38262
9-04	Project Signs Allowance	1.00 JOB	4,539	141	187	433	45	5,345 5344.90
9-05	Groundwater Dewatering	1.00 JOB	79,712	2,481	3,288	7,608	786	93,874 93874
9-06	Surface Water Management	1.00 JOB	46,888	1,459	1,934	4,475	462	55,219 55219
9-07	Test Pit Excavation	1.00 JOB	20,463	637	844	1,953	202	24,099 24099
9-08	Clearing & Grubbing	1.00 JOB	58,080	1,808	2,396	5,543	573	68,399 68399
9-09	Stockpile Area Clearing-Grubbing	3.00 ACR	4,687	146	193	447	46	5,520 1840.04
9-10	Mobilization	1.00 JOB	232,630	7,240	9,595	22,202	2,294	273,961 273961
9-11	Backfill of Over-Excavated Areas	45000 CY	107,145	3,335	4,419	10,226	1,057	126,181 2.80
9-12	Backfill-Over-Excavated Allowanc	1.00 JOB	26,500	825	1,093	2,529	261	31,208 31208
9-13	Earthwork for Drainage Channels	875000 CY	1,475,163	45,909	60,843	140,790	14,548	1,737,253 1.99
9-14	Plain Riprap	500.00 CY	10,960	341	452	1,046	108	12,907 25.81
9-15	RCC Guide Dike Structure	28275 CY	743,548	23,140	30,668	70,965	7,333	875,654 30.97
9-16	RCC Grade Control Structure	50920 CY	1,171,392	36,456	48,314	111,798	11,552	1,379,512 27.09
9-17	Cement for RCC	7920.00 TON	627,106	19,516	25,865	59,851	6,185	738,523 93.25
9-18	Fly Ash for RCC	3168.00 TON	94,913	2,954	3,915	9,059	936	111,776 35.28
9-19	Gabion Mattress	1015.00 CY	75,544	2,351	3,116	7,210	745	88,966 87.65
9-20	Inert Material Removal-1st 120k	120000 CY	640,308	19,927	26,409	61,111	6,315	754,071 6.28
9-21	Inert Material Removal-2nd 120k	120000 CY	640,308	19,927	26,409	61,111	6,315	754,071 6.28
9-22	Construction Debris Removal-1st	5000.00 CY	129,180	4,020	5,328	12,329	1,274	152,131 30.43
9-23	Construction Debris Removal-2nd	5000.00 CY	129,180	4,020	5,328	12,329	1,274	152,131 30.43
9-24	Tire Removal (up to 300 tons)	300.00 TON	42,000	1,307	1,732	4,009	414	49,462 164.87
9-25	Tire Removal (301 to 600 tons)	300.00 TON	42,000	1,307	1,732	4,009	414	49,462 164.87
9-26	Household Waste Removal-1st 15k	15000 CY	577,764	17,981	23,830	55,142	5,698	680,415 45.36
9-27	Household Waste Removal-2nd 15k	15000 CY	577,764	17,981	23,830	55,142	5,698	680,415 45.36
9-28	Special Waste Removal-1st 10k	10000 CY	385,176	11,987	15,887	36,761	3,799	453,610 45.36
9-29	Special Waste Removal-2nd 10k	10000 CY	385,176	11,987	15,887	36,761	3,799	453,610 45.36
9-30	Waste Stockpile	75000 CY	286,080	8,903	11,799	27,304	2,821	336,908 4.49
9-31	Temporary Liner	1000.00 SY	4,125	128	170	394	41	4,858 4.86
9-32	Permanent Liner	1600.00 SY	6,847	213	282	654	68	8,064 5.04
9-33	Temporary Liner Allowance	1.00 JOB	2,500	78	103	239	25	2,944 2944.17
9-34	Permanent Liner Allowance	1.00 JOB	3,500	109	144	334	35	4,122 4121.84
9-35	Conveyor Bridge Removal	1.00 JOB	20,193	628	833	1,927	199	23,780 23780
9-36	Riprap Removal	300.00 CY	1,200	37	49	115	12	1,413 4.71
9-37	Grouted Riprap Removal	300.00 CY	2,788	87	115	266	27	3,283 10.94
9-38	Traffic Control	1.00 JOB	15,000	0	0	0	0	15,000 15000
9-39	Off-Duty Uniformed Officer	300.00 HR	9,900	0	0	0	0	9,900 33.00
<b>TOTAL CHANNELS AND CANALS</b>		1.00 EA	8,738,488	271,180	359,391	831,630	85,933	10,286,62310286623
<b>TOTAL Rio Salado Low Flow Channel</b>		1.00 EA	8,738,488	271,180	359,391	831,630	85,933	10,286,62310286623
Contingency -5%								514,331
SUBTOTAL								10,800,954
Escalation - 1%								116,685

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U.S. Army Corps of Engineers  
PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
\*\* PROJECT INDIRECT SUMMARY - Feature \*\*

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SUMMARY PAGE 5

	QUANTITY	UOM	DIRECT	FIELD ON	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT
TOTAL INCL OWNER COSTS								10,917,639	

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U.S. Army Corps of Engineers  
 PROJECT RIO313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 \*\* PROJECT DIRECT SUMMARY - CONTRACT \*\*

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 SUMMARY PAGE 6

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9 CHANNELS AND CANALS	1.00	EA	58,388	1,504,794	3,057,470	994,124	3,182,100	8,738,488	8738488
TOTAL Rio Salado Low Flow Channel	1.00	EA	58,388	1,504,794	3,057,470	994,124	3,182,100	8,738,488	8738488
Field Overhead -								271,180	
SUBTOTAL								9,009,668	
Prime's Home Office Expense - 4%								359,391	
SUBTOTAL								9,369,059	
Prime Contractor's Profit - 8.9%								831,630	
SUBTOTAL								10,200,689	
Prime Contractor's Bond - 1.0%								85,933	
TOTAL INCL INDIRECTS								10,286,623	
Contingency -5%								514,331	
SUBTOTAL								10,800,954	
Escalation - 1%								116,685	
TOTAL INCL OWNER COSTS								10,917,639	

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U.S. Army Corps of Engineers  
 PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 \*\* PROJECT DIRECT SUMMARY - Feature \*\*

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 SUMMARY PAGE 7

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT
<b>9 CHANNELS AND CANALS</b>									
9-01	Partnering Allowance	1.00	JOB	0	13,000	0	2,140	0	15,140 15140
9-02	NPDES/SWPPP Permits	1.00	JOB	0	0	0	10,600	0	10,600 10600
9-03	Public Information-Motification	1.00	JOB	0	20,000	5,000	7,490	0	32,490 32490
9-04	Project Signs Allowance	1.00	JOB	38	652	479	3,408	0	4,539 4538.54
9-05	Groundwater Dewatering	1.00	JOB	1,280	28,878	1,748	49,085	0	79,712 79712
9-06	Surface Water Management	1.00	JOB	308	17,526	10,551	18,812	0	46,888 46888
9-07	Test Pit Excavation	1.00	JOB	173	5,179	15,284	0	0	20,463 20463
9-08	Clearing & Grubbing	1.00	JOB	206	5,247	7,833	0	45,000	58,080 58080
9-09	Stockpile Area Clearing-Grubbing	3.00	ACR	26	681	1,006	0	3,000	4,687 1562.44
9-10	Mobilization	1.00	JOB	590	43,901	20,189	23,540	145,000	232,630 232630
9-11	Backfill of Over-Excavated Areas	45000	CY	2,106	49,892	49,550	7,704	0	107,145 2.38
9-12	Backfill-Over-Excavated Allowanc	1.00	JOB	0	0	0	0	26,500	26,500 26500
9-13	Earthwork for Drainage Channels	875000	CY	13,825	349,256	1,125,906	0	0	1,475,163 1.69
9-14	Plain Riprap	500.00	CY	79	1,542	911	8,507	0	10,960 21.92
9-15	RCC Guide Dike Structure	28275	CY	10,314	246,652	463,438	33,458	0	743,548 26.30
9-16	RCC Grade Control Structure	50920	CY	16,946	399,942	707,954	63,496	0	1,171,392 23.00
9-17	Cement for RCC	7920.00	TON	0	0	0	627,106	0	627,106 79.18
9-18	Fly Ash for RCC	3168.00	TON	0	0	0	94,913	0	94,913 29.96
9-19	Gabion Mattress	1015.00	CY	842	16,075	9,511	49,958	0	75,544 74.43
9-20	Inert Material Removal-1st 120k	120000	CY	2,880	70,428	149,880	0	420,000	640,308 5.34
9-21	Inert Material Removal-2nd 120k	120000	CY	2,880	70,428	149,880	0	420,000	640,308 5.34
9-22	Construction Debris Removal-1st	5000.00	CY	120	2,935	6,245	0	120,000	129,180 25.84
9-23	Construction Debris Removal-2nd	5000.00	CY	120	2,935	6,245	0	120,000	129,180 25.84
9-24	Tire Removal (up to 300 tons)	300.00	TON	0	4,500	4,500	0	33,000	42,000 140.00
9-25	Tire Removal (301 to 600 tons)	300.00	TON	0	4,500	4,500	0	33,000	42,000 140.00
9-26	Household Waste Removal-1st 15k	15000	CY	528	12,570	25,194	0	540,000	577,764 38.52
9-27	Household Waste Removal-2nd 15k	15000	CY	528	12,570	25,194	0	540,000	577,764 38.52
9-28	Special Waste Removal-1st 10k	10000	CY	352	8,380	16,796	0	360,000	385,176 38.52
9-29	Special Waste Removal-2nd 10k	10000	CY	352	8,380	16,796	0	360,000	385,176 38.52
9-30	Waste Stockpile	75000	CY	2,545	68,195	217,886	0	0	286,080 3.81
9-31	Temporary Liner	1000.00	SY	144	2,117	275	1,733	0	4,125 4.12
9-32	Permanent Liner	1600.00	SY	233	3,450	624	2,773	0	6,847 4.28
9-33	Temporary Liner Allowance	1.00	JOB	0	0	0	0	2,500	2,500 2500.00
9-34	Permanent Liner Allowance	1.00	JOB	0	0	0	0	3,500	3,500 3500.00
9-35	Conveyor Bridge Removal	1.00	JOB	850	15,270	4,923	0	0	20,193 20193
9-36	Riprap Removal	300.00	CY	18	448	752	0	0	1,200 4.00
9-37	Grouted Riprap Removal	300.00	CY	105	1,867	921	0	0	2,788 9.29
9-38	Traffic Control	1.00	JOB	0	7,500	7,500	0	0	15,000 15000
9-39	Off-Duty Uniformed Officer	300.00	HR	0	9,900	0	0	0	9,900 33.00
<b>TOTAL CHANNELS AND CANALS</b>		<b>1.00</b>	<b>EA</b>	<b>58,388</b>	<b>1,504,794</b>	<b>3,057,470</b>	<b>994,124</b>	<b>3,182,100</b>	<b>8,738,488 8738488</b>
<b>TOTAL Rio Salado Low Flow Channel</b>		<b>1.00</b>	<b>EA</b>	<b>58,388</b>	<b>1,504,794</b>	<b>3,057,470</b>	<b>994,124</b>	<b>3,182,100</b>	<b>8,738,488 8738488</b>
Field Overhead -									271,180
SUBTOTAL									9,009,668
Prime's Home Office Expense - 4%									359,391

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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U.S. Army Corps of Engineers  
PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
\*\* PROJECT DIRECT SUMMARY - Feature \*\*

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SUMMARY PAGE 8

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
SUBTOTAL								9,369,059	
Prime Contractor's Profit - 8.9%								831,630	
SUBTOTAL								10,200,689	
Prime Contractor's Bond - 1.0%								85,933	
TOTAL INCL INDIRECTS								10,286,623	
Contingency -5%								514,331	
SUBTOTAL								10,800,954	
Escalation - 1%								116,685	
TOTAL INCL OWNER COSTS								10,917,639	

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PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
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	QUANTY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST
<<< Non-Contracted Work >>>	1.00	EA	0	17,400	7,500	0	0	24,900
AA GENERAL/PRIME	1.00	EA	58,388	1,487,394	3,049,970	994,124	3,182,100	8,713,588

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 Project Distributed Costs

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 DETAIL PAGE 1

-----  
 0-AA. GENERAL/PRIME QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT  
 -----

0-AA. GENERAL/PRIME

0-AA 0. Overhead Items - AA

The A/E's estimate of a 19 month schedule to complete the project was used.

USR	<	>	Description	QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
USR	<	>	Environmental Protection Plan	1.00	EA		0.00	0	960.00	0.00	53.50	0.00	1013.50	
							0.00	0	960	0	54	0	1,014	1013.50
USR	<	>	Quality Control Plan	1.00	EA		0.00	0	960.00	0.00	53.50	0.00	1013.50	
							0.00	0	960	0	54	0	1,014	1013.50

[01000 0001 Overhead]  
 [01036 0011 Field personnel]  
 [01036 0925 Temporary facilities operations personnel]

USR	<	>	SCHEDULE UPDATES	12.00	MO	N/A	0.00	0	0.00	0.00	428.00	0.00	428.00	
							0.00	0	0	0	5,136	0	5,136	428.00
USR	<	>	PROJECT MANAGER	6.00	MO	N/A	0.00	0	6000.00	0.00	0.00	0.00	6000.00	
							0.00	0	36,000	0	0	0	36,000	6000.00
USR	<	>	SUPERINTENDENT	12.00	MO	N/A	0.00	0	6000.00	0.00	0.00	0.00	6000.00	
							0.00	0	72,000	0	0	0	72,000	6000.00
USR	<	>	QUALITY CONTROL MANAGER	6.00	MO	N/A	0.00	0	5000.00	0.00	0.00	0.00	5000.00	
							0.00	0	30,000	0	0	0	30,000	5000.00
USR	<	>	SURVEY/LAYOUT CREW	15.00	DAY	N/A	0.00	0	0.00	0.00	428.00	0.00	428.00	
							0.00	0	0	0	6,420	0	6,420	428.00
USR	<	>	SECRETARY	12.00	MO	N/A	0.00	0	1733.00	0.00	0.00	0.00	1733.00	
							0.00	0	20,796	0	0	0	20,796	1733.00
USR	<	>	TRAVEL EXPENSE (1 TRIP/MONTH)	12.00	MO	N/A	0.00	0	0.00	0.00	321.00	0.00	321.00	
							0.00	0	0	0	3,852	0	3,852	321.00

[01000 0000 General Requirements]  
 [01500 0000 Construction Facilities & Temporary Controls]

USR	<	>	Trailer for contractor	12.00	MO	N/A	0.00	0	0.00	0.00	0.00	350.00	350.00	
							0.00	0	0	0	0	4,200	4,200	350.00
USR	<	>	OFFICE SUPPLIES	12.00	MO	N/A	0.00	0	0.00	0.00	133.75	0.00	133.75	
							0.00	0	0	0	1,605	0	1,605	133.75
USR	<	>	TEMP WATER	12.00	MO	N/A	0.00	0	0.00	0.00	53.50	0.00	53.50	
							0.00	0	0	0	642	0	642	53.50
USR	<	>	TEMP TELEPHONE	12.00	MO	N/A	0.00	0	0.00	150.00	0.00	0.00	150.00	
							0.00	0	0	1,800	0	0	1,800	150.00

LABOR ID: AR1220 EQUIP ID: MAT97B

Currency in DOLLARS

CREW ID: MAT97A UPB ID: UP99EA

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U.S. Army Corps of Engineers  
 PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 Project Distributed Costs

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 DETAIL PAGE 2

0-AA. GENERAL/PRIME		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT
USR	<01500 1008 > PORTABLE TOILETS	12.00	MO	N/A	0.00	0	0.00	0	171.20	0.00	171.20	
									2,054	0	2,054	171.20
[01590 0000 Field Offices & Sheds]												
[01594 0009 Offices]												
[01594 1399 Toilets]												
USR	<01600 1002 > STORAGE/TOOL TRAILER	12.00	MO	N/A	0.00	0	0.00	0	107.00	0.00	107.00	
									1,284	0	1,284	107.00
USR	<01600 1003 > JOBSITE PICK-UP TRUCKS	12.00	MO	N/A	0.00	0	0.00	600.00	0.00	0.00	600.00	
								7,200	0	0	7,200	600.00
USR	<01600 1003 > JOBSITE PICK-UP TRUCKS	12.00	MO	N/A	0.00	0	0.00	600.00	0.00	0.00	600.00	
								7,200	0	0	7,200	600.00
USR	<01600 1003 > JOBSITE PICK-UP TRUCKS	12.00	MO	N/A	0.00	0	0.00	600.00	0.00	0.00	600.00	
								7,200	0	0	7,200	600.00
USR	<01660 1001 > TESTING	1.00	LS	N/A	0.00	0	5000.00	0.00	5350.00	0.00	10350.00	
							5,000	0	5,350	0	10,350	10350
[01000 0000 General Requirements]												
[01700 0000 Contract Closeout]												
USR	<01700 1001 > CONTRACT CLOSEOUT	1.00	MO	N/A	0.00	0	3000.00	0.00	1605.00	0.00	4605.00	
							3,000	0	1,605	0	4,605	4605.00
[01700 0000 Contract Closeout]												
[01710 0000 Final Cleaning]												
MIL	<01710 1111 > DEBRIS REMOVAL & DISPOSAL	80000	SF	ULABB	1125.00	178	0.00	0.03	0.02	0.00	0.05	
							2,632	0	1,498	0	4,130	0.05
USR	<01710 1112 > CONTINUOUS CLEANUP	12.00	MO	N/A	0.00	0	400.00	300.00	53.50	0.00	753.50	
							4,800	3,600	642	0	9,042	753.50
USR	<01710 2111 > FINAL JOB CLEAN-UP	5.00	DAY	N/A	0.00	0	350.00	160.00	53.50	0.00	563.50	
							1,750	800	268	0	2,818	563.50
[01000 0000 General Requirements]												
[01800 0000 General Maintenance]												
USR	<01800 1001 > MAINTAIN EXIST HAUL ROUTES	1.00	LS	N/A	0.00	0	5000.00	5000.00	0.00	0.00	10000.00	
							5,000	5,000	0	0	10,000	10000
[01000 0000 General Requirements]												
[01900 0000 Hazardous, Toxic and Radioactive Waste]												

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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 PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
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 DETAIL PAGE 3

O-AA. GENERAL/PRIME		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
M MIL	<01910 3107 > Payroll Clerks	9.00	MON	N/A	0.00	0	2080.00 18,720	0.00 0	0.00 0	0.00 0	2080.00 18,720	2080.00
[01956 0010 Submittals]												
[01956 1000 Technology plans]												
[01956 1100 Miscellaneous plans]												
M HTW	<01956 1111 > Submittals	10.00	EA	N/A	0.00	0	200.00 2,000	0.00 0	10.70 107	0.00 0	210.70 2,107	210.70
TOTAL Overhead Items - AA		12.00	MO			178	203,618	32,800	30,570	4,200	271,188	22599

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 PROJECT R10313: Rio Salado Low Flow Channel - Phase 2 of Phased Construction  
 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 9. CHANNELS AND CANALS

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 DETAIL PAGE 4

9-01. Partnering Allowance		QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9. CHANNELS AND CANALS												
9-01. Partnering Allowance												
Based on phase 1 estimate.												
9-0101. Partnering Allowance												
USR AA <	> Partnering Allowance						0.00	13000.00	0.00	2140.00	0.00	15140.00
		1.00	JOB		0.00	0	13,000	0	2,140	0	15,140	15140
	TOTAL Partnering Allowance	1.00	JOB			0	13,000	0	2,140	0	15,140	15140
	TOTAL Partnering Allowance	1.00	JOB			0	13,000	0	2,140	0	15,140	15140

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U.S. Army Corps of Engineers  
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 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 9. CHANNELS AND CANALS

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 DETAIL PAGE 5

-----  
 9-02. NPDES/SWPPP Permits  
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QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-02. NPDES/SWPPP Permits  
 Based on phase 1 estimate.

9-0201. NPDES/SWPPP Permits

USR AA <	> NPDES/SWPPP Permits	1.00 JOB	0.00	0.00	0.00	0.00	0.00	10600.00	10600.00	10600
			0	0	0	0	0	10,600	10,600	
	TOTAL NPDES/SWPPP Permits	1.00 JOB		0	0	0	0	10,600	10,600	10600
				0	0	0	0	10,600	10,600	
	TOTAL NPDES/SWPPP Permits	1.00 JOB		0	0	0	0	10,600	10,600	10600

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9-03. Public Information-Notification		QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-03. Public Information-Notification Based on phase 1 estimate.												
9-0301. Public Information-Notification												
USR AA <	> Public Info. Notification Allow	1.00	JOB		0.00	0	20000.00	5000.00	7490.00	0.00	32490.00	32490
					0.00	0	20,000	5,000	7,490	0	32,490	32490
	TOTAL Public Information-Notification	1.00	JOB			0	20,000	5,000	7,490	0	32,490	32490
	TOTAL Public Information-Notification	1.00	JOB			0	20,000	5,000	7,490	0	32,490	32490

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9-04. Project Signs Allowance

QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-04. Project Signs Allowance  
 Assumed five 4'x 5' signs and one 5' x 10' project sign.

9-0401. Project Signs Allowance

[01500 0000 Construction Facilities & Temporary Controls]  
 [01580 0000 Project Signs]  
 [01580 0009 Signs]

Code	Description	QTY	UOM	Crew ID	Output	Manhrs	Labor	Equipmnt	Material	Other	Total Cost	Unit
AF AA <01580 0010 >	Sign, hi-intensity reflectorized, no posts, buy	50.00	SF	N/A	0.00	0	0	0	12.89 645	0.00 0	12.89 645	12.89
AF AA <01580 0010 >	Sign, hi-intensity reflectorized, no posts, buy	20.00	SF	N/A	0.00	0	0	0	12.89 258	0.00 0	12.89 258	12.89
AF AA <01580 0010 >	Sign, hi-intensity reflectorized, no posts, buy	20.00	SF	N/A	0.00	0	0	0	12.89 258	0.00 0	12.89 258	12.89
AF AA <01580 0010 >	Sign, hi-intensity reflectorized, no posts, buy	20.00	SF	N/A	0.00	0	0	0	12.89 258	0.00 0	12.89 258	12.89
AF AA <01580 0010 >	Sign, hi-intensity reflectorized, no posts, buy	20.00	SF	N/A	0.00	0	0	0	12.89 258	0.00 0	12.89 258	12.89
AF AA <01580 0010 >	Sign, hi-intensity reflectorized, no posts, buy	20.00	SF	N/A	0.00	0	0	0	12.89 258	0.00 0	12.89 258	12.89

[02839 0000 Walk/Road/Parking Appurtenances]  
 [02842 0009 Signs]  
 [02842 5000 Removal of signs]

M CIV AA <02842 5210 >	Signs, remove & relocate signs, to 10 SF	6.00	EA	CLABB80B	0.63	6.40 38	108.59 652	79.91 479	245.59 1,474	0.00 0	434.09 2,605	434.09
TOTAL Project Signs Allowance		1.00	JOB			38	652	479	3,408	0	4,539	4538.54
TOTAL Project Signs Allowance		1.00	JOB			38	652	479	3,408	0	4,539	4538.54

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9-05. Groundwater Dewatering		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-05. Groundwater Dewatering Currently no identified dewatering is required. No landfill groundwater monitoring is required as was the case in phase 1. Costs presented represent minimal dewatering that may be required when shallow underground streams are encountered.													
9-0501. Groundwater Dewatering													
[02140 0000 Dewatering]													
[02140 0009 Dewatering]													
[02140 0009 Excavate drainage trench]													
RSM AA	<02140 0010 >	Dewatering, excavate drainage trench, 2' wide, 2' deep	600.00	CY	CODFB11C	11.25	0.18 107	3.82 2,294	1.11 669	0.00 0	0.00 0	4.94 2,962	4.94
[02140 0009 Dewatering]													
[02140 1599 Sump hole construction]													
M MIL AA	<02140 1600 >	Dewatering, sump hole, incl excavation & gravel, pit	300.00	CY	CODLB6	5.79	0.52 156	9.20 2,761	2.17 650	14.16 4,247	0.00 0	25.53 7,658	25.53
M MIL AA	<02140 1700 >	Dewatering, sump hole, 16 ga, 12" gravel collar, 12" corr pipe	300.00	LF	CODLB6	8.75	0.34 103	6.09 1,826	1.43 430	11.16 3,348	0.00 0	18.68 5,604	18.68
[02100 0000 Site Preparation & Excavation Support]													
[02144 0000 Wellpoints]													
[02144 0010 Wellpoints, 2" pipe inserted 20' D, 5' OC]													
M RSM AA	<02144 1000 >	Wellpoints, compl instl, first month, 200' L header, 8" dia	100.00	LF	UOELEQLT4	0.75	5.33 533	128.27 12,827	0.00 0	93.60 9,360	0.00 0	221.86 22,186	221.86
M RSM AA	<02144 1100 >	Wellpoints, compl instl, ea addl month, 200' L header, 8" dia	100.00	LF	UOELEQLT4	1.05	3.81 381	91.71 9,171	0.00 0	47.05 4,705	0.00 0	138.76 13,876	138.76
M AF AA	<02144 2000 >	Compl well point system, 200' 6" pipe @ 5' OC, 20 D, 700 GPM pump, buy	300.00	LF	N/A	0.00	0.00 0	0.00 0	0.00 0	91.42 27,426	0.00 0	91.42 27,426	91.42
TOTAL Groundwater Dewatering			1.00	JOB			1,280	28,878	1,748	49,085	0	79,712	79712
TOTAL Groundwater Dewatering			1.00	JOB			1,280	28,878	1,748	49,085	0	79,712	79712

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9-06. Surface Water Management

QUANTY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-06. Surface Water Management

Some surface water may have to be pumped downstream if rainstorms leave pools of water in areas to be excavated.

9-0601. Surface Water Management

USR AA < > Misc. dewatering allowance 1.00 JOB 0.00 0 10000.00 10000.00 2675.00 0.00 22675.00 22675

[02140 0000 Dewatering]  
 [02140 0009 Dewatering]  
 [02140 0009 Excavate drainage trench]

RSM AA <02140 0010 > Dewatering, excavate drainage trench, 2' wide, 2' deep 300.00 CY CODFB11C 11.25 0.18 3.82 1.11 0.00 0.00 4.94 4.94

[02140 0009 Dewatering]  
 [02140 1599 Sump hole construction]

M MIL AA <02140 1600 > Dewatering, sump hole, incl excavation & gravel, pit 100.00 CY CODLB6 5.79 0.52 9.20 2.17 14.16 0.00 25.53 25.53

[02100 0000 Site Preparation & Excavation Support]  
 [02144 0000 Wellpoints]  
 [02144 0010 Wellpoints, 2" pipe inserted 20' D, 5' OC]

M RSM AA <02144 1000 > Wellpoints, compl instl, first month, 200' L header, 8" dia 30.00 LF UOELEQLT4 0.75 5.33 128.27 0.00 93.60 0.00 221.86 221.86

M AF AA <02144 2000 > Compl well point system, 200' 6" pipe @ 5' OC, 20 D, 700 GPM pump, buy 100.00 LF N/A 0.00 0.00 0.00 91.42 0.00 91.42 91.42

[02667 0010 Piping, water distribution, PVC]  
 [02667 3958 Pressure pipe, class 200, SDR 21]  
 [02667 3959 No trenching or backfill]

M MIL AA <02667 4050 > Piping, water dist, 6", PVC, press pipe, class 200, SDR 21 1000.00 LF MPLUQ1 46.88 0.04 1.61 0.00 2.77 0.00 4.38 4.38

TOTAL Surface Water Management 1.00 JOB 308 17,526 10,551 18,812 0 46,888 46888

TOTAL Surface Water Management 1.00 JOB 308 17,526 10,551 18,812 0 46,888 46888

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9-07. Test Pit Excavation

QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-07. Test Pit Excavation

Assumed a 50 foot by 50 foot pit that is 20 feet deep with 1:1 side slopes or 1,112 cy. The purpose of the pit is to determine if any groundwater is present at the grade control or guide dike structures and the nature of the groundwater present. There are 18 guide dike structures and three grade control structures. 21 each x 1,112 cy = 23,352 cy total excavation.

9-0701. Test Pit Excavation

[02232 0010 Excavate and load]  
 [02232 0011 Hydraulic excavator]  
 [02232 0174 5 CY]

DESCRIPTION	QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
CIV AA <02232 0180 > Excavate & load, hydr excavator, 5 CY, medium matl	23352	CY	CODEB12D	268.75	0.01 173	0.22 5,179	0.65 15,284	0.00 0	0.00 0	0.83 20,463	0.88
TOTAL Test Pit Excavation	1.00	JOB			173	5,179	15,284	0	0	20,463	20463
TOTAL Test Pit Excavation	1.00	JOB			173	5,179	15,284	0	0	20,463	20463

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9-08. Clearing & Grubbing		QUANTITY UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT
9-08. Clearing & Grubbing Very little brush was observed anywhere in the area of excavation. Some of the dikes may require clearing and grubbing near the banks and at the start of the stationing where phase 2 joins phase 1 there is a group of trees that need removing. The entire project channel is about 14,180 feet long. If the sloped cut on each side of the main channel requires an extra thirty feet on each side of the channel to be excavated, and half of that requires clearing and grubbing, then the calculation is 14,180 long x 60 feet width = 850,800 sf. 850,800 divided by 43,560 sf per acre = 19.5 acres.											
9-0801. Clearing & Grubbing											
USR AA <	> Disposal fee	1500.00	CY	0.00	0	0.00	0	0.00	0	15.00	15.00
										22,500	22,500 15.00
[02108 0000 Site Clearing]											
[02110 0009 Clearing]											
[02110 1059 Dry clearing]											
AF AA <02110 1060 >	Clearing, dry, medium size brush, average grub & trees	20.00	ACR	0.93	7.53	198.91	290.19	0.00	0.00	489.09	489.09
					151	3,978	5,804	0	0	9,782	9,782 489.09
[02232 0010 Excavate and load]											
[02232 0199 Wheeler loader]											
[02232 0239 3 CY]											
MIL AA <02232 0240 >	Excavate & load, wheeled loader, 3 CY, lt matl	1500.00	CY	175.00	0.01	0.20	0.25	0.00	0.00	0.46	0.46
					13	306	379	0	0	685	685 0.46
[02234 0010 Hauling, loose cubic yards]											
[02234 0239 Highway haulers, no loading included]											
[02234 0609 16.5 CY]											
MIL AA <02234 1115 >	Hauling, hwy haulers, 16.5 CY, 6 mi round trip @ 40 MPH (2.1 cyc/hr)	1500.00	CY	35.00	0.03	0.64	1.10	0.00	15.00	16.74	16.74
					43	963	1,651	0	22,500	25,113	25,113 16.74
TOTAL Clearing & Grubbing		1.00	JOB		206	5,247	7,833	0	45,000	58,080	58080
TOTAL Clearing & Grubbing		1.00	JOB		206	5,247	7,833	0	45,000	58,080	58080

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9-09. Stockpile Area Clearing-Grubbing		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-09. Stockpile Area Clearing-Grubbing												
9-0901. Clearing & Grubbing												
USR AA	<			>	Disposal fee							
		100.00	CY			0.00	0	0.00	0	0.00	15.00	15.00
										1,500	1,500	15.00
[02108 0000 Site Clearing]												
[02110 0009 Clearing]												
[02110 1059 Dry clearing]												
AF AA	<	02110 1060	>	Clearing, dry, medium size brush, average grub & trees								
		3.00	ACR	COMCB88	0.93	7.53	198.93	290.22	0.00	0.00	489.15	489.15
						23	597	871	0	0	1,467	489.15
[02232 0010 Excavate and load]												
[02232 0199 Wheeler loader]												
[02232 0239 3 CY]												
MIL AA	<	02232 0240	>	Excavate & load, wheeled loader, 3 CY, lt matl								
		100.00	CY	CODFB10T	175.00	0.01	0.20	0.25	0.00	0.00	0.46	0.46
						1	20	25	0	0	46	0.46
[02234 0010 Hauling, loose cubic yards]												
[02234 0239 Highway haulers, no loading included]												
[02234 0609 16.5 CY]												
MIL AA	<	02234 1115	>	Hauling, hwy haulers, 16.5 CY, 6 mi round trip @ 40 MPH (2.1 cyc/hr)								
		100.00	CY	CTDHB34C	35.00	0.03	0.64	1.10	0.00	15.00	16.74	16.74
						3	64	110	0	1,500	1,674	16.74
TOTAL Clearing & Grubbing												
		3.00	ACR			26	681	1,006	0	3,000	4,687	1562.44
TOTAL Stockpile Area Clearing-Grubbing												
		3.00	ACR			26	681	1,006	0	3,000	4,687	1562.44

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9-10. Mobilization

		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-10. Mobilization												
9-1001. Mobilization												
GEN AA <	> TRAILER, LOWBOY, 75 T (68 MT), 3 AXLE	240.00	HR	T4527240	1.00	0.00 0	0.00 0	9.96 2,391	0.00 0	0.00 0	9.96 2,391	9.96 9.96
MIL AA <	> TRK,HWY, 43,000 GVW, 6X4, 3 AXLE	240.00	HR	T50F0017	1.00	0.00 0	0.00 0	32.10 7,704	0.00 0	0.00 0	32.10 7,704	32.10 32.10
MIL AA <	> Outside Truck Dr. Heavy	240.00	HR	X-TRKDVRHV	1.00	1.00 240	22.46 5,391	0.00 0	0.00 0	0.00 0	22.46 5,391	22.46 22.46
USR AA <	> Setup Utilities for Trailers	1.00	JOB		0.00	0.00 0	0.00 0	0.00 0	0.00 0	20000.00 20,000	20000.00 20,000	20000 20000
[01000 0001 Overhead]												
[01036 0011 Field personnel]												
[01036 0925 Temporary facilities operations personnel]												
USR AA <01041 1002 >	PROJECT MANAGER	1.00	MO	N/A	0.00	0.00 0	6000.00 6,000	0.00 0	0.00 0	0.00 0	6000.00 6,000	6000.00 6000.00
USR AA <01041 1002 >	Assitant Project Manager	1.00	MO	N/A	0.00	0.00 0	5000.00 5,000	0.00 0	0.00 0	0.00 0	5000.00 5,000	5000.00 5000.00
USR AA <01041 1005 >	Liability Insurance	1.00	LS	N/A	0.00	0.00 0	0.00 0	0.00 0	0.00 0	110000.00 110,000	110000.00 110,000	110000 110000
[01590 0000 Field Offices & Sheds]												
[01594 0009 Offices]												
[01594 0009 Trailers]												
RSM AA <01594 0010 >	Office trailer, furnished, no hookups, 20' x 8', buy	3.00	EA	USKCSKWK2	0.13	16.00 48	233.69 701	0.00 0	5421.34 16,264	0.00 0	5655.03 16,965	5655.03 5655.03
[01594 0009 Offices]												
[01594 1399 Toilets]												
USR AA <01600 1004 >	MOB AND DE-MOB Key Personnel	1.00	LS	N/A	0.00	0.00 0	5000.00 5,000	0.00 0	1605.00 1,605	0.00 0	6605.00 6,605	6605.00 6605.00
[01000 0000 General Requirements]												
[01900 0000 Hazardous, Toxic and Radioactive Waste]												
AF AA <01942 2002 >	Construction Fence Chain Link 6'	800.00	LF	ULABC	45.00	0.08 62	1.15 918	0.00 0	6.42 5,136	0.00 0	7.57 6,054	7.57 7.57
[01956 0010 Submittals]												
[01956 1000 Technology plans]												

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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9-10. Mobilization		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
[01956 1100 Miscellaneous plans]												
M HTW AA <01956 1111 > Submittals		50.00	EA	N/A	0.00	0	200.00 10,000	0.00 0	10.70 535	0.00 0	210.70 10,535	210.70
TOTAL Mobilization		1.00	JOB			350	33,010	10,095	23,540	130,000	196,644	196644
9-1002. Demobilization												
GEN AA <	> TRAILER, LOWBOY, 75 T (68 MT), 3 AXLE	240.00	HR	T4527240	1.00	0	0.00 0	9.96 2,391	0.00 0	0.00 0	9.96 2,391	9.96
MIL AA <	> TRK, HWY, 43,000 GVW, 6X4, 3 AXLE	240.00	HR	T50FO017	1.00	0	0.00 0	32.10 7,704	0.00 0	0.00 0	32.10 7,704	32.10
MIL AA <	> Outside Truck Dr. Heavy	240.00	HR	X-TRKDVHRV	1.00	240	1.00 5,391	22.46 0	0.00 0	0.00 0	22.46 5,391	22.46
USR AA <	> Remove Utilities	1.00	JOB		0.00	0	0.00 0	0.00 0	0.00 0	15000.00 15,000	15000.00 15,000	15000
[01000 0001 Overhead]												
[01036 0011 Field personnel]												
[01036 0925 Temporary facilities operations personnel]												
USR AA <01041 1002 >	PROJECT MANAGER	0.50	MO	N/A	0.00	0	6000.00 3,000	0.00 0	0.00 0	0.00 0	6000.00 3,000	6000.00
USR AA <01041 1002 >	Assitant Project Manager	0.50	MO	N/A	0.00	0	5000.00 2,500	0.00 0	0.00 0	0.00 0	5000.00 2,500	5000.00
TOTAL Demobilization		1.00	JOB			240	10,891	10,095	0	15,000	35,986	35986
TOTAL Mobilization		1.00	JOB			590	43,901	20,189	23,540	145,000	232,630	232630

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9-11. Backfill of Over-Excavated Areas		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-11. Backfill of Over-Excavated Areas Backfill for placement of fill materials for the purpose of backfilling over-excavated areas where municipal waste materials or construction rubble and debris have been removed.													
9-1101. Backfill of Over-Excavated Areas													
[02214 0000 Excavation/Backfill/Compaction] [02216 0010 Backfill, structural, dozer or front end loader] [02216 5499 Backfill around foundation]													
L MIL AA	<02216 5530 >	Backfill, strl, 6" lifts, w/loader, no compaction, around foundation	45000	CY	CODFB10M	49.93	1,350	32,175	25,488	0.00	0.00	57,663	1.28
						0.03	0.72	0.57	0.00	0.00	1.28		
						1,350	32,175	25,488	0	0	57,663	1.28	
[02214 0000 Excavation/Backfill/Compaction] [02220 0010 Compaction] [02220 5899 Self propelled roller]													
MIL AA	<02220 5900 >	Compaction of backfill, structural, SP roller, 6" lift	45000	CY	COFCB10F	117.50	576	13,671	15,962	0.00	0.00	29,633	0.66
						0.01	0.30	0.35	0.00	0.00	0.66		
						576	13,671	15,962	0	0	29,633	0.66	
[02220 0010 Compaction] [02220 8999 Water]													
M MIL AA	<02220 9030 >	Compaction, water, wagon, 6000 gal, 3 mile haul	45000	CY	COFMB59	250.00	180	4,046	8,100	7,704	0	19,850	0.44
						0.00	0.09	0.18	0.17	0.00	0.44		
						180	4,046	8,100	7,704	0	19,850	0.44	
TOTAL Backfill of Over-Excavated Areas		45000 CY				2,106	49,892	49,550	7,704	0	107,145	2.38	
TOTAL Backfill of Over-Excavated Areas		45000 CY				2,106	49,892	49,550	7,704	0	107,145	2.38	

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9-12. Backfill-Over-Excavated Allowanc		QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-12. Backfill-Over-Excavated Allowanc Based on phase 1 estimate.												
9-1201. Backfill-Over-Excavated Allowanc												
USR AA <	> Backfill Over Excavate Allowance	1.00	JOB		0.00	0	0.00	0	0.00	0	26500.00	26500.00
					0.00	0	0	0	0	26,500	26,500	26500
TOTAL Backfill-Over-Excavated Allowanc		1.00	JOB			0	0	0	0	26,500	26,500	26500
TOTAL Backfill-Over-Excavated Allowanc		1.00	JOB			0	0	0	0	26,500	26,500	26500

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9-13. Earthwork for Drainage Channels

QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-13. Earthwork for Drainage Channels

Assumed material will be hauled for disposal within 1 mile round trip.

9-1302. Earthwork for Drainage Channel

[02226 0010 Excavation, bulk, scrapers]

[02226 3099 Push loaded self propelled scraper]

[02226 3199 43 CY]

MIL AA <02226 3200 > Excavation, bulk, 9 cycle/hr, push loaded self prop scraper, 43 BCY	656250 CY	COOSB33M	387.51	3,019	80,063	285,272	0.00 0	0.00 0	0.56 365,334	0.56
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[02232 0010 Excavate and load]

[02232 0011 Hydraulic excavator]

[02232 0174 5 CY]

CIV AA <02232 0180 > Excavate & load, hydr excavator, 5 CY, medium matl	218750 CY	COOEB12D	268.75	1,619	48,519	143,172	0.00 0	0.00 0	0.88 191,691	0.88
--	-----------	----------	--------	-------	--------	---------	-----------	-----------	-----------------	------

[02232 0010 Excavate and load]

[02232 0199 Wheeler loader]

[02232 0279 7 CY]

CIV AA <02232 0280 > Excavate & load, wheeled loader, 7 CY, light matl	875000 CY	COOLB10Z	275.00	4,813	122,500	338,188	0.00 0	0.00 0	0.53 460,688	0.53
---	-----------	----------	--------	-------	---------	---------	-----------	-----------	-----------------	------

[02234 0010 Hauling, (loose cubic yards)]

[02234 2199 Off highway haulers, no loading included]

[02234 2199 26 CY]

L MIL AA <02234 2200 > Hauling, off hwy haulers, 26 CY, 1 mile RT @ 20 mph (4.2 cyc/hr)	875000 CY	CTDNB34F	200.20	4,375	98,175	359,275	0.00 0	0.00 0	0.52 457,450	0.52
--	-----------	----------	--------	-------	--------	---------	-----------	-----------	-----------------	------

TOTAL Earthwork for Drainage Channel	875000 CY			13,825	349,256	1,125,906	0	0	1,475,163	1.69
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TOTAL Earthwork for Drainage Channels	875000 CY			13,825	349,256	1,125,906	0	0	1,475,163	1.69
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-----												
9-14. Plain Riprap	QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT	
-----												
9-14. Plain Riprap												
9-1401. Plain Riprap												
[02246 0000 Soil Stabilization]												
[02250 0009 Soil stabilization]												
[02250 2019 Hydrated lime, for base]												
M CIV AA <02250 2130 >	Geotextile fabric, 60 mil thick, non-woven polypropylene	9000.00	SF	ULABA2	1687.52	0.00 16	0.03 275	0.01 81	0.05 482	0.00 0	0.09 838	0.09
[02262 0000 Slope/Erosion Control]												
[02270 0010 Rip-rap]												
[Material prices account for hauling 61 miles one-way. Quarry located @ [Riverside.]												
[02270 0999 Random pieces]												
M MIL AA <02270 1120 >	Rip-rap, random pieces, 10 - 200 # pieces, dumped from truck	500.00	CY	COETB3B	32.00	0.13 63	2.53 1,267	1.66 830	16.05 8,025	0.00 0	20.24 10,122	20.24
TOTAL Plain Riprap		500.00	CY			79	1,542	911	8,507	0	10,960	21.92
TOTAL Plain Riprap		500.00	CY			79	1,542	911	8,507	0	10,960	21.92

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9-15. RCC Guide Dike Structure		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-15. RCC Guide Dike Structure													
9-1501. RCC for GDS and Bank Protection													
[02214 0000 Excavation/Backfill/Compaction]													
[02220 0010 Compaction]													
[02220 8999 Water]													
M MIL AA	<02220 9040 >	Compaction, water, wagon, 6000 gal, 6 mile haul	28275	CY	COFW859	200.00	0.01 141	0.11 3,175	0.23 6,362	0.11 3,025	0.00 0	0.44 12,563	0.44
[02200 0000 Earthwork]													
[02242 0000 Pavement Base]													
[02244 0010 Base course, large areas]													
B MIL AA	<02244 1510 >	Base course, 3/4" maximum size, 3" deep, crushed stone, large areas	28275	CY	COFG8368	100.00	0.08 2,262	1.81 51,141	2.61 73,919	1.07 30,254	0.00 0	5.49 155,315	5.49
[03300 0000 Cast-in-Place Concrete]													
[03399 0010 Roller compacted concrete]													
[03399 0099 Mass placement]													
CIV AA	<03399 0100 >	Roller compacted conc, spread & compact, 1' lift, 1' layer	28275	CY	COFTB10C	160.00	0.01 266	0.22 6,308	0.66 18,568	0.00 0	0.00 0	0.88 24,876	0.88
[03399 0010 Roller compacted concrete]													
[03399 0399 Surface preparation]													
CIV AA	<03399 0400 >	Roller compacted conc, surface prep	120169	SF	UOELB6A	3690.03	0.00 84	0.01 1,658	0.02 2,211	0.00 0	0.00 0	0.03 3,869	0.03
CIV AA	<03399 0450 >	Roller compacted conc, water clean, surface prep	120169	SF	ULABB9A	3375.03	0.00 108	0.02 1,839	0.01 1,610	0.00 0	0.00 0	0.03 3,449	0.03
[03399 0010 Roller compacted concrete]													
[03399 0499 Joint bed placement]													
CIV AA	<03399 0500 >	Roller compacted conc, joint bedding placement, 1" thick	735150	SF	CODFB11C	1096.89	0.00 1,323	0.04 28,818	0.01 8,381	0.00 0	0.00 0	0.05 37,199	0.05
[03399 0010 Roller compacted concrete]													
[03399 0509 Conveyance of materials]													
CIV AA	<03399 0580 >	Roller compacted conc, placed by 4 CY loader, 12 min cycle	28275	CY	CODFB10U	20.00	0.08 2,121	1.79 50,474	3.52 99,613	0.00 0	0.00 0	5.31 150,087	5.31
TOTAL RCC for GDS and Bank Protection		28275	CY				6,305	143,413	210,664	33,280	0	387,357	13.70

LABOR ID: AR1220 EQUIP ID: NAT978

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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9-15. RCC Guide Dike Structure		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-1504. Earthwork for RCC Guide Dikes													
9-150401. Excavation													
[02232 0010 Excavate and load]													
[02232 0011 Hydraulic excavator]													
[02232 0174 5 CY]													
CIV AA	<02232 0180 >	Excavate & load, hydr excavator, 5 CY, medium matl	198000	CY	CODEB12D	268.75	1,465	43,916	129,591	0.00	0.00	173,507	0.88
							0.01	0.22	0.65	0.00	0.00	0.88	
TOTAL Excavation			198000	CY			1,465	43,916	129,591	0	0	173,507	0.88
9-150402. Backfill													
[02214 0000 Excavation/Backfill/Compaction]													
[02215 0009 Backfill]													
[02215 1199 Dozer or front end loader]													
MIL AA	<02215 1215 >	Backfill, trench, dozer, no compaction, 200 HP	167000	CY	COOTB108	284.38	885	20,959	53,724	0.00	0.00	74,682	0.45
							0.01	0.13	0.32	0.00	0.00	0.45	
TOTAL Backfill			167000	CY			2,388	55,845	110,454	179	0	166,477	1.00
[02220 0010 Compaction]													
[02220 4999 Riding]													
[02220 5599 Sheepsfoot or wobbly wheel roller]													
RSM AA	<02220 5600 >	Compaction, riding, 6" lifts, 2 passes, sheepsfoot/wobbly wheel roller	167000	CY	COFCB10G	300.00	835	19,873	26,670	0.00	0.00	46,543	0.28
							0.01	0.12	0.16	0.00	0.00	0.28	
TOTAL Backfill			167000	CY			2,388	55,845	110,454	179	0	166,477	1.00
[02220 0010 Compaction]													
[02220 8999 Water]													
M MIL AA	<02220 9030 >	Compaction, water, wagon, 6000 gal, 3 mile haul	167000	CY	COFMB59	250.00	668	15,013	30,060	179	0	45,252	0.27
							0.00	0.09	0.18	0.00	0.00	0.27	
TOTAL Backfill			167000	CY			2,388	55,845	110,454	179	0	166,477	1.00
9-150403. Haul spoils													
[02234 0010 Hauling, loose cubic yards]													
[02234 2199 Off highway haulers, no loading included]													
[02234 2199 26 CY]													
L MIL AA	<02234 2200 >	Hauling, off hwy haulers, 26 CY, 1 mile RT @ 20 mph (4.2 cyc/hr)	31000	CY	CTDHB34F	200.20	155	3,478	12,729	0.00	0.00	16,207	0.52
							0.01	0.11	0.41	0.00	0.00	0.52	
TOTAL Haul spoils			31000	CY			155	3,478	12,729	0	0	16,207	0.52

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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9-15. RCC Guide Dike Structure

	QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
TOTAL Earthwork for RCC Guide Dikes	198000	CY			4,008	103,239	252,773	179	0	356,191	1.80
TOTAL RCC Guide Dike Structure	28275	CY			10,314	246,652	463,438	33,458	0	743,548	26.30

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9-16. RCC Grade Control Structure		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT		
9-16. RCC Grade Control Structure Includes RCC for scour apron at 24th Street Bridge.														
9-1601. RCC for GDS and Bank Protection														
[02214 0000 Excavation/Backfill/Compaction] [02220 0010 Compaction] [02220 8999 Water]														
M MIL AA	<02220 9040 >	Compaction, water, wagon, 6000 gal, 6 mile haul	50920	CY	COFWB59	200.00	0.01 255	0.11 5,718	0.23 11,457	0.17 8,718	0.00 0	0.51 25,893	0.51	
[02200 0000 Earthwork] [02242 0000 Pavement Base] [02244 0010 Base course, large areas]														
B MIL AA	<02244 1510 >	Base course, 3/4" maximum size, 3" deep, crushed stone, large areas	50920	CY	COFGB368	100.00	0.08 4,074	1.81 92,099	2.61 133,120	1.07 54,484	0.00 0	5.49 279,704	5.49	
[03300 0000 Cast-In-Place Concrete] [03399 0010 Roller compacted concrete] [03399 0099 Mass placement]														
CIV AA	<03399 0100 >	Roller compacted conc, spread & compact, 1' lift, 1' layer	50920	CY	CODTB10C	160.00	0.01 479	0.22 11,360	0.66 33,439	0.00 0	0.00 0	0.88 44,799	0.88	
[03399 0010 Roller compacted concrete] [03399 0399 Surface preparation]														
CIV AA	<03399 0400 >	Roller compacted conc, surface prep	216410	SF	UOELB6A	3690.03	0.00 151	0.01 2,986	0.02 3,982	0.00 0	0.00 0	0.03 6,968	0.03	
CIV AA	<03399 0450 >	Roller compacted conc, water clean, surface prep	216410	SF	ULAB89A	3375.03	0.00 195	0.02 3,311	0.01 2,900	0.00 0	0.00 0	0.03 6,211	0.03	
[03399 0010 Roller compacted concrete] [03399 0499 Joint bed placement]														
CIV AA	<03399 0500 >	Roller compacted conc, joint bedding placement, 1" thick	1323920	SF	CODFB11C	1096.89	0.00 2,383	0.04 51,898	0.01 15,093	0.00 0	0.00 0	0.05 66,990	0.05	
[03399 0010 Roller compacted concrete] [03399 0509 Conveyance of materials]														
CIV AA	<03399 0580 >	Roller compacted conc, placed by 4 CY loader, 12 min cycle	50920	CY	CODFB10U	20.00	0.08 3,819	1.79 90,897	3.52 179,391	0.00 0	0.00 0	5.31 270,288	5.31	
TOTAL RCC for GDS and Bank Protection						50920	CY	11,355	258,270	379,382	63,202	0	700,854	13.76

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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9-16. RCC Grade Control Structure		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-1604. Earthwork -RCC Grade Control Str													
9-160401. Excavation													
[02232 0010 Excavate and load]													
[02232 0011 Hydraulic excavator]													
[02232 0174 5 CY]													
CIV AA	<02232 0180 >	Excavate & load, hydr excavator, 5 CY, medium matl	224100	CY	CODEB12D	268.75	0.01 1,658	0.22 49,705	0.65 146,673	0.00 0	0.00 0	0.88 196,379	0.88
TOTAL Excavation			224100	CY			1,658	49,705	146,673	0	0	196,379	0.88
9-160402. Backfill													
[02214 0000 Excavation/Backfill/Compaction]													
[02215 0009 Backfill]													
[02215 1199 Dozer or front end loader]													
MIL AA	<02215 1215 >	Backfill, trench, dozer, no compaction, 200 HP	275020	CY	COOTB10B	284.38	0.01 1,458	0.13 34,515	0.32 88,474	0.00 0	0.00 0	0.45 122,989	0.45
[02220 0010 Compaction]													
[02220 4999 Riding]													
[02220 5599 Sheepsfoot or wobbly wheel roller]													
RSM AA	<02220 5600 >	Compaction, riding, 6" lifts, 2 passes, sheepsfoot/wobbly wheel roller	275020	CY	COFCB10G	300.00	0.01 1,375	0.12 32,727	0.16 43,921	0.00 0	0.00 0	0.28 76,648	0.28
[02220 0010 Compaction]													
[02220 8999 Water]													
M MIL AA	<02220 9030 >	Compaction, water, wagon, 6000 gal, 3 mile haul	275020	CY	COFWB59	250.00	0.00 1,100	0.09 24,724	0.18 49,504	0.00 294	0.00 0	0.27 74,522	0.27
TOTAL Backfill			275020	CY			3,933	91,967	181,898	294	0	274,159	1.00
TOTAL Earthwork -RCC Grade Control Str			224100	CY			5,591	141,672	328,572	294	0	470,538	2.10
TOTAL RCC Grade Control Structure			50920	CY			16,946	399,942	707,954	63,496	0	1,171,392	23.00

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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9-17. Cement for RCC

-----  
 QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT  
 -----

9-17. Cement for RCC

9-1701. Cement for RCC

(13275 0010 Chemical fixation and stabilization)  
 (13275 1000 Cement based processes)  
 (13275 1100 Fixation agents)

QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
M HTW AA <13275 1112 >				0.00	0.00	0.00	79.18	0.00	79.18	
			plant, fix agent, cem, type I, bulk	7920.00	TON	N/A	0.00	0	0	0
							627,106	0	627,106	79.18
-----										
TOTAL Cement for RCC				0	0	0	627,106	0	627,106	79.18
-----										
TOTAL Cement for RCC				0	0	0	627,106	0	627,106	79.18

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-----  
 9-18. Fly Ash for RCC QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT  
 -----

9-18. Fly Ash for RCC  
 Based on 0.5 cubic feet of fly ash per cubic yard of RCC and a weight of  
 45 pounds per cubic foot of fly ash.

9-1801. Fly Ash for RCC

[13276 0010 Sludge treatment]  
 [13276 6000 Sludge solidification]  
 [13276 6100 Cement/pozzolan processes]

DESCRIPTION	QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
M HTW AA <13276 6112 > Fly Ash for RCC cement/pozzolan, portland cem, type K, bulk	3168.00	TON	N/A	0.00	0	0.00	0	29.96 94,913	0.00 0	29.96 94,913	29.96
TOTAL Fly Ash for RCC	3168.00	TON		0	0	0	0	94,913	0	94,913	29.96
TOTAL Fly Ash for RCC	3168.00	TON		0	0	0	0	94,913	0	94,913	29.96

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9-19. Gabion Mattress		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT
9-19. Gabion Mattress												
9-1901. Gabion Mattress												
[02262 0000 Slope/Erosion Control]												
[02270 0010 Rip-rap]												
[Material prices account for hauling 61 miles one-way. Quarry located @]												
[Riverside.]												
[02270 0399 Gabions, galvanized steel mesh mats]												
M MIL AA <02270 0800 >	Rip-rap, gabions, 36" deep, galv					0.10	1.98	1.17	6.15	0.00	9.30	
	steel mesh boxes, stone filled	8120.00	SF	CLABB13	67.50	842	16,075	9,511	49,958	0	75,544	9.30
TOTAL Gabion Mattress		1015.00	CY			842	16,075	9,511	49,958	0	75,544	74.43
TOTAL Gabion Mattress		1015.00	CY			842	16,075	9,511	49,958	0	75,544	74.43

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9-20. Inert Material Removal-1st 120k		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-20. Inert Material Removal-1st 120k												
9-2001. Inert Material Removal												
USR AA <	> Dump Fees	120000	CY		0.00	0	0.00	0	0.00	0	3.50	3.50
										420,000	420,000	3.50
[02232 0010 Excavate and load]												
[02232 0011 Hydraulic excavator]												
[02232 0174 5 CY]												
CIV AA <02232 0175 >	Excavate & load, hydr excavator, 5 CY, light matl	120000	CY	CODEB12D	303.75	0.01 792	0.20 23,544	0.58 69,492	0.00 0	0.00 0	0.78 93,036	0.78
[02234 0010 Hauling, loose cubic yards]												
[02234 0239 Highway haulers, no loading included]												
[02234 0609 16.5 CY]												
MIL AA <02234 0610 >	Hauling, hwy haulers, 16.5 CY, 1 mile round trip @ 20 MPH (4.2 cyc/hr)	120000	CY	CTDH834C	57.50	0.02 2,088	0.39 46,884	0.67 80,388	0.00 0	0.00 0	1.06 127,272	1.06
TOTAL Inert Material Removal		120000	CY			2,880	70,428	149,880	0	420,000	640,308	5.34
TOTAL Inert Material Removal-1st 120k		120000	CY			2,880	70,428	149,880	0	420,000	640,308	5.34

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9-21. Inert Material Removal-2nd 120k		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-21. Inert Material Removal-2nd 120k												
9-2101. Inert Material Removal												
USR AA <	> Dump Fees	120000	CY		0.00	0	0.00	0	0.00	0	3.50	3.50
										420,000	420,000	3.50
[02232 0010 Excavate and load]												
[02232 0011 Hydraulic excavator]												
[02232 0174 5 CY]												
CIV AA <02232 0175 >	Excavate & load, hydr excavator, 5 CY, light matl	120000	CY	CODEB12D	303.75	0.01 792	0.20 23,544	0.58 69,492	0.00 0	0.00 0	0.78 93,036	0.78
[02234 0010 Hauling, loose cubic yards]												
[02234 0239 Highway haulers, no loading included]												
[02234 0609 16.5 CY]												
MIL AA <02234 0610 >	Hauling, hwy haulers, 16.5 CY, 1 mile round trip @ 20 MPH (4.2 cyc/hr)	120000	CY	CTDHB34C	57.50	0.02 2,088	0.39 46,884	0.67 80,388	0.00 0	0.00 0	1.06 127,272	1.06
TOTAL Inert Material Removal		120000	CY			2,880	70,428	149,880	0	420,000	640,308	5.34
TOTAL Inert Material Removal-2nd 120k		120000	CY			2,880	70,428	149,880	0	420,000	640,308	5.34

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9-22. Construction Debris Removal-1st		QUANTY	UCM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-22. Construction Debris Removal-1st 1st 5,000 cy.												
9-2201. Construction Debris Removal												
USR AA <	> Dump Fees	5000.00	CY		0.00	0	0.00	0	0.00	0	24.00	24.00
										120,000	120,000	24.00
[02232 0010 Excavate and load] [02232 0011 Hydraulic excavator] [02232 0174 5 CY]												
CIV AA <02232 0175 >	Excavate & load, hydr excavator, 5 CY, light matl	5000.00	CY	CODEB12D	303.75	0.01 33	0.20 981	0.58 2,896	0.00 0	0.00 0	0.78 3,877	0.78 0.78
[02234 0010 Hauling, loose cubic yards] [02234 0239 Highway haulers, no loading included] [02234 0609 16.5 CY]												
MIL AA <02234 0610 >	Hauling, hwy haulers, 16.5 CY, 1 mile round trip @ 20 MPH (4.2 cyc/hr)	5000.00	CY	CTDHB34C	57.50	0.02 87	0.39 1,954	0.67 3,350	0.00 0	0.00 0	1.06 5,303	1.06 1.06
TOTAL Construction Debris Removal		5000.00	CY			120	2,935	6,245	0	120,000	129,180	25.84
TOTAL Construction Debris Removal-1st		5000.00	CY			120	2,935	6,245	0	120,000	129,180	25.84

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9-23. Construction Debris Removal-2nd		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT			
9-23. Construction Debris Removal-2nd 2nd 5,000 cy.															
9-2301. Construction Debris Removal															
USR AA	<					0.00	0.00	0.00	0.00	24.00	24.00				
	>	Dump Fees			0.00	0	0	0	0	120,000	120,000	24.00			
			5000.00	CY											
[02232 0010 Excavate and load] [02232 0011 Hydraulic excavator] [02232 0174 5 CY]															
CIV AA	<	02232 0175	>	Excavate & load, hydr excavator, 5 CY, light matl	5000.00	CY	CODEB12D	303.75	0.01 33	0.20 981	0.58 2,896	0.00 0	0.00 0	0.78 3,877	0.78
[02234 0010 Hauling, loose cubic yards] [02234 0239 Highway haulers, no loading included] [02234 0609 16.5 CY]															
MIL AA	<	02234 0610	>	Hauling, hwy haulers, 16.5 CY, 1 mile round trip @ 20 MPH (4.2 cyc/hr)	5000.00	CY	CTDHB34C	57.50	0.02 87	0.39 1,954	0.67 3,350	0.00 0	0.00 0	1.06 5,303	1.06
TOTAL Construction Debris Removal						5000.00	CY		120	2,935	6,245	0	120,000	129,180	25.84
TOTAL Construction Debris Removal-2nd						5000.00	CY		120	2,935	6,245	0	120,000	129,180	25.84

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9-24. Tire Removal (up to 300 tons)		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-24. Tire Removal (up to 300 tons)												
9-2401. Tire Removal												
USR AA <	> Tire Removal	300.00	TON		0.00	0	15.00	15.00	0.00	110.00	140.00	
						0	4,500	4,500	0	33,000	42,000	140.00
	TOTAL Tire Removal	300.00	TON			0	4,500	4,500	0	33,000	42,000	140.00
	TOTAL Tire Removal (up to 300 tons)	300.00	TON			0	4,500	4,500	0	33,000	42,000	140.00

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9-25. Tire Removal (301 to 600 tons)		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-25. Tire Removal (301 to 600 tons)												
9-2501. Tire Removal												
USR AA <	> Tire Removal	300.00	TON		0.00	0	15.00	15.00	0.00	110.00	140.00	
					0.00	0	4,500	4,500	0	33,000	42,000	140.00
	TOTAL Tire Removal	300.00	TON			0	4,500	4,500	0	33,000	42,000	140.00
	TOTAL Tire Removal (301 to 600 tons)	300.00	TON			0	4,500	4,500	0	33,000	42,000	140.00

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9-26. Household Waste Removal-1st 15k		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-26. Household Waste Removal-1st 15k												
9-2601. Household Waste Removal-1st 15k												
USR AA <	> Dump Fees	15000	CY		0.00	0	0.00	0	0.00	0	36.00	36.00
										540,000	540,000	36.00
[02232 0010 Excavate and load]												
[02232 0011 Hydraulic excavator]												
[02232 0174 5 CY]												
CIV AA <02232 0175 >	Excavate & load, hydr excavator, 5 CY, light matl	15000	CY	CODEB12D	303.75	0.0199	0.20	2,943	0.58	8,687	0.00	0.00
										0	0	11,630
												0.78
												0.78
[02234 0010 Hauling, loose cubic yards]												
[02234 0239 Highway haulers, no loading included]												
[02234 0609 16.5 CY]												
MIL AA <02234 1115 >	Hauling, hwy haulers, 16.5 CY, 6 mi round trip @ 40 MPH (2.1 cyc/hr)	15000	CY	CTDHB34C	35.00	0.03429	0.64	9,627	1.10	16,508	0.00	0.00
										0	0	26,135
												1.74
												1.74
TOTAL Household Waste Removal-1st 15k		15000	CY			528	12,570	25,194	0	540,000	577,764	38.52
TOTAL Household Waste Removal-1st 15k		15000	CY			528	12,570	25,194	0	540,000	577,764	38.52

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9-27. Household Waste Removal-2nd 15k		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-27. Household Waste Removal-2nd 15k												
9-2701. Household Waste Removal-2nd 15k												
USR AA <	> Dump Fees	15000	CY		0.00	0	0.00	0	0.00	36.00	36.00	
					0.00	0	0	0	0	540,000	540,000	36.00
[02232 0010 Excavate and load]												
[02232 0011 Hydraulic excavator]												
[02232 0174 5 CY]												
CIV AA <02232 0175 >	Excavate & load, hydr excavator, 5 CY, light matl	15000	CY	CODEB12D	303.75	0.01 99	0.20 2,943	0.58 8,687	0.00 0	0.00 0	0.78 11,630	0.78
[02234 0010 Hauling, loose cubic yards]												
[02234 0239 Highway haulers, no loading included]												
[02234 0609 16.5 CY]												
MIL AA <02234 1115 >	Hauling, hwy haulers, 16.5 CY, 6 mi round trip @ 40 MPH (2.1 cyc/hr)	15000	CY	CTDHB34C	35.00	0.03 429	0.64 9,627	1.10 16,508	0.00 0	0.00 0	1.74 26,135	1.74
TOTAL Household Waste Removal-2nd 15k		15000	CY			528	12,570	25,194	0	540,000	577,764	38.52
TOTAL Household Waste Removal-2nd 15k		15000	CY			528	12,570	25,194	0	540,000	577,764	38.52

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9-28. Special Waste Removal-1st 10k		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-28. Special Waste Removal-1st 10k													
9-2801. Special Waste Removal-2nd 10k													
USR AA < > Dump Fees		10000	CY		0.00	0	0.00	0	0.00	0	36,000	36,000	36.00
[02232 0010 Excavate and load] [02232 0011 Hydraulic excavator] [02232 0174 5 CY]													
CIV AA <02232 0175 > Excavate & load, hydr excavator, 5 CY, light matl		10000	CY	CODEB12D	303.75	0.01 66	0.20 1,962	0.58 5,791	0.00 0	0.00 0	0.78 7,753	0.78	
[02234 0010 Hauling, loose cubic yards] [02234 0239 Highway haulers, no loading included] [02234 0609 16.5 CY]													
MIL AA <02234 1115 > Hauling, hwy haulers, 16.5 CY, 6 mi round trip @ 40 MPH (2.1 cyc/hr)		10000	CY	CTDHB34C	35.00	0.03 286	0.64 6,418	1.10 11,005	0.00 0	0.00 0	1.74 17,423	1.74	
TOTAL Special Waste Removal-2nd 10k		10000	CY			352	8,380	16,796	0	360,000	385,176	38.52	
TOTAL Special Waste Removal-1st 10k		10000	CY			352	8,380	16,796	0	360,000	385,176	38.52	

LABOR ID: ARIZ20 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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9-29. Special Waste Removal-2nd 10k		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-29. Special Waste Removal-2nd 10k												
9-2901. Special Waste Removal-2nd 10k												
USR AA < > Dump Fees		10000	CY		0.00	0	0	0	0	36,000	36,000	36.00
[02232 0010 Excavate and load] [02232 0011 Hydraulic excavator] [02232 0174 5 CY]												
CIV AA <02232 0175 > Excavate & load, hydr excavator, 5 CY, light matl		10000	CY	CODEB12D	303.75	0.01 66	0.20 1,962	0.58 5,791	0.00 0	0.00 0	0.78 7,753	0.78
[02234 0010 Hauling, loose cubic yards] [02234 0239 Highway haulers, no loading included] [02234 0609 16.5 CY]												
MIL AA <02234 1115 > Hauling, hwy haulers, 16.5 CY, 6 mi round trip @ 40 MPH (2.1 cyc/hr)		10000	CY	CTDHB34C	35.00	0.03 286	0.64 6,418	1.10 11,005	0.00 0	0.00 0	1.74 17,423	1.74
TOTAL Special Waste Removal-2nd 10k		10000	CY			352	8,380	16,796	0	360,000	385,176	38.52
TOTAL Special Waste Removal-2nd 10k		10000	CY			352	8,380	16,796	0	360,000	385,176	38.52

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9-30. Waste Stockpile

QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-30. Waste Stockpile

9-3001. Special Waste Stockpile Allowanc  
 The 500 cy of backfill material represents a berm around the stockpile area.

[02232 0010 Excavate and load]  
 [02232 0011 Hydraulic excavator]  
 [02232 0154 3-1/2 CY]

CIV AA <02232 0165 > Excavate & load, hydr excavator,  
 3.5 CY, wet rock 75000 CY CODEB12D 100.00 0.02 0.60 1.76 0.00 0.00 2.36  
 1,500 44,700 131,933 0 0 176,633 2.36

[02234 0010 Hauling, loose cubic yards]  
 [02234 2199 Off highway haulers, no loading included]  
 [02234 2199 26 CY]

MIL AA <02234 2210 > Hauling, off hwy haulers, 26 CY,  
 3 mile RT @ 30 mph (2.9 cyc/hr) 75000 CY CTDHB34F 71.88 0.01 0.31 1.14 0.00 0.00 1.46  
 1,043 23,438 85,785 0 0 109,223 1.46

[02239 0010 Spread and compact]  
 [02239 0011 Spread and compact roadway embankment]  
 [02239 0011 Tractor]

MIL AA <02239 0012 > Spread & compact, 8" lift,  
 roadway embankment, 300 HP tractor 500.00 CY CODT810C 312.50 0.00 0.11 0.34 0.00 0.00 0.45  
 2 57 168 0 0 225 0.45

TOTAL Special Waste Stockpile Allowanc 75000 CY 2,545 68,195 217,886 0 0 286,080 3.81

TOTAL Waste Stockpile 75000 CY 2,545 68,195 217,886 0 0 286,080 3.81

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9-31. Temporary Liner

QUANTY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-31. Temporary Liner

9-3101. Temporary Liner

[02081 0010 Containment of hazardous waste]  
 [02081 2000 Secure burial cell construction]  
 [02081 2100 Polymeric liner and cover system]

M HTW AA <02081 2111 > Cont, SBCC, polymeric liner &  
 cover sys, VLDPE, 20 mil

QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9000.00	SF	USKCF	501.01	0.02 144	0.24 2,117	0.03 275	0.19 1,733	0.00 0	0.46 4,125	0.46
<hr/>										
TOTAL Temporary Liner	1000.00	SY		144	2,117	275	1,733	0	4,125	4.12
<hr/>										
TOTAL Temporary Liner	1000.00	SY		144	2,117	275	1,733	0	4,125	4.12

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9-32. Permanent Liner

QUANTITY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-32. Permanent Liner  
 One foot of dirt must be placed on top of liner per specs.

9-3201. Permanent Liner

[02081 0010 Containment of hazardous waste]  
 [02081 2000 Secure burial cell construction]  
 [02081 2100 Polymeric liner and cover system]

M HTW AA <02081 2111 > Cont, SBCC, polymeric liner &  
 cover sys, VLDPE, 20 mil 14400 SF USKCF 501.01 0.02 0.24 0.03 0.19 0.00 0.46  
 230 3,387 439 2,773 0 6,600 0.46

[02239 0010 Spread and compact]  
 [02239 0011 Spread and compact roadway embankment]  
 [02239 0011 Tractor]

MIL AA <02239 0012 > Spread & compact, 8" lift,  
 roadway embankment, 300 HP tractor 550.00 CY C0DTB10C 312.50 0.00 0.11 0.34 0.00 0.45  
 3 63 185 0 0 248 0.45

TOTAL Permanent Liner 1600.00 SY 233 3,450 624 2,773 0 6,847 4.28

TOTAL Permanent Liner 1600.00 SY 233 3,450 624 2,773 0 6,847 4.28

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9-33. Temporary Liner Allowance		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT
9-33. Temporary Liner Allowance												
9-3301. Temporary Liner Allowance												
USR AA <	> Temporary Liner Allowance	1.00	JOB		0.00	0	0.00	0	0.00	0	2500.00	2500.00
											2,500	2,500
	TOTAL Temporary Liner Allowance	1.00	JOB			0	0	0	0	2,500	2,500	2500.00
	TOTAL Temporary Liner Allowance	1.00	JOB			0	0	0	0	2,500	2,500	2500.00

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9-34. Permanent Liner Allowance		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMT	MATERIAL	OTHER	TOTAL COST	UNIT
9-34. Permanent Liner Allowance												
9-3401. Permanent Liner Allowance												
USR AA <	> Permanent Liner allowance	1.00	JOB		0.00	0	0.00	0	0.00	0	3500.00	3500.00
					0.00	0	0	0	0	0	3,500	3,500 3500.00
	TOTAL Permanent Liner Allowance	1.00	JOB			0	0	0	0	0	3,500	3,500 3500.00
	TOTAL Permanent Liner Allowance	1.00	JOB			0	0	0	0	0	3,500	3,500 3500.00

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9-35. Conveyor Bridge Removal		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT		
9-35. Conveyor Bridge Removal														
9-3501. Conveyor Bridge Removal														
[02045 0000 Site Demolition]														
[02046 0009 Site demolition, no hauling]														
[02046 2099 Concrete 7" to 24" thick]														
MIL AA	<02046 2115 >	Site dml, conc, 7" to 24" thick, reinf, w/backhoe	200.00	CY	CODLB6	1.05	2.86 571	50.73 10,145	11.94 2,388	0.00 0	0.00 0	62.66 12,533	62.66	
[02046 0009 Site demolition, no hauling]														
[02046 3499 Railroad track removal]														
MIL AA	<02046 3500 >	Site dml, conveyor system removal	800.00	LF	CLABB13	41.25	0.17 136	3.24 2,592	1.92 1,533	0.00 0	0.00 0	5.16 4,125	5.16	
[02053 0010 Rubbish handling, add to demolition prices]														
[02053 2999 Loading & trucking, including 2 mile haul]														
[02053 3079 Machine loading truck]														
MIL AA	<02053 3080 >	Rubbish handling, 2 mile haul, loading & trucking, machine loading truck	300.00	CY	COE1B17	15.00	0.27 80	5.05 1,514	3.28 984	0.00 0	0.00 0	8.33 2,498	8.33	
[02058 0010 Electrical demolition]														
[02058 0020 Conduit, to 15' hi, incl fittings and hangers]														
[02058 0099 Rigid galvanized steel]														
CIV AA	<02058 0100 >	Electrical dml, 1/2" to 1" dia, conduit to 15' high, rigid galv steel	1200.00	LF	EELELEC1	30.25	0.03 40	0.57 685	0.00 0	0.00 0	0.00 0	0.57 685	0.57	
[02073 0000 Concrete Removal]														
[02074 0010 Footings and foundations demolition]														
[02074 1999 Walls, block]														
L RSM AA	<02074 2083 >	Foot/fdn dml, walls, remove damaged block, 8" thick	500.00	SF	ALABCLAB1	21.87	0.05 23	0.67 334	0.04 18	0.00 0	0.00 0	0.70 352	0.70	
TOTAL Conveyor Bridge Removal						1.00	JOB	850	15,270	4,923	0	0	20,193	20193
TOTAL Conveyor Bridge Removal						1.00	JOB	850	15,270	4,923	0	0	20,193	20193

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9-36. Riprap Removal		QUANTITY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT	
9-36. Riprap Removal													
9-3601. Riprap Removal													
[02228 0010 Excavating, trench or continuous footing]													
[02228 0300 Excavate with hydraulic excavator]													
[02228 0389 3 CY]													
CIV AA	<02228 0396 >	Excavate trench, loose rock,											
		14'-20' D, 3 CY excavator	300.00	CY	CODEB12Y	53.75	0.06 17	1.38 414	2.10 629	0.00 0	0.00 0	3.48 1,043	3.48
[02234 0010 Hauling, loose cubic yards]													
[02234 2199 Off highway haulers, no loading included]													
[02234 2199 26 CY]													
L MIL AA	<02234 2200 >	Hauling, off hwy haulers, 26 CY,											
		1 mile RT @ 20 mph (4.2 cyc/hr)	300.00	CY	CTDHB34F	200.20	0.01 2	0.11 34	0.41 123	0.00 0	0.00 0	0.52 157	0.52
TOTAL Riprap Removal			300.00	CY			18	448	752	0	0	1,200	4.00
TOTAL Riprap Removal			300.00	CY			18	448	752	0	0	1,200	4.00

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 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 9. CHANNELS AND CANALS

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9-37. Grouted Riprap Removal		QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT		
9-37. Grouted Riprap Removal														
9-3701. Grouted Riprap Removal														
[02045 0000 Site Demolition]														
[02046 0009 Site demolition, no hauling]														
[02046 2099 Concrete 7" to 24" thick]														
AF AA	<02046 2325 >	Site dml, conc dml w/air eqpt, to 6" thick, no reinf	4050.00	SF	CLADB39	280.00	0.02 87	0.35 1,419	0.04 169	0.00 0	0.00 0	0.39 1,588	0.39	
[02228 0010 Excavating, trench or continuous footing]														
[02228 0300 Excavate with hydraulic excavator]														
[02228 0389 3 CY]														
CIV AA	<02228 0396 >	Excavate trench, loose rock, 14'-20' D, 3 CY excavator	300.00	CY	CODEB12Y	53.75	0.06 17	1.38 414	2.10 629	0.00 0	0.00 0	3.48 1,043	3.48	
[02234 0010 Hauling, loose cubic yards]														
[02234 2199 Off highway haulers, no loading included]														
[02234 2199 26 CY]														
L MIL AA	<02234 2200 >	Hauling, off hwy haulers, 26 CY, 1 mile RT @ 20 mph (4.2 cyc/hr)	300.00	CY	CTDHB34F	200.20	0.01 2	0.11 34	0.41 123	0.00 0	0.00 0	0.52 157	0.52	
TOTAL Grouted Riprap Removal						300.00	CY	105	1,867	921	0	0	2,788	9.29
TOTAL Grouted Riprap Removal						300.00	CY	105	1,867	921	0	0	2,788	9.29

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9-38. Traffic Control

QUANTY UOM CREW ID OUTPUT MANHRS LABOR EQUIPMNT MATERIAL OTHER TOTAL COST UNIT

9-38. Traffic Control

9-3801. Traffic Control

USR < > Traffic Control

QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
1.00	JOB		0.00	0	7,500.00	7,500.00	0.00	0.00	15,000.00	15000
					0	7,500	7,500	0	15,000	15000
-----										
TOTAL	Traffic Control				0	7,500	7,500	0	15,000	15000
-----										
TOTAL	Traffic Control				0	7,500	7,500	0	15,000	15000

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9-39. Off-Duty Uniformed Officer		QUANTY	UOM	CREW ID	OUTPUT	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER	TOTAL COST	UNIT
9-39. Off-Duty Uniformed Officer												
9-3901. Off-Duty Uniformed Officer												
USR	<			> Off-Duty Uniformed Officer			0.00	33.00	0.00	0.00	0.00	33.00
			300.00	HR	0.00	0	9,900	0	0	0	9,900	33.00
TOTAL Off-Duty Uniformed Officer			300.00	HR		0	9,900	0	0	0	9,900	33.00
TOTAL Off-Duty Uniformed Officer			300.00	HR		0	9,900	0	0	0	9,900	33.00
TOTAL CHANNELS AND CANALS			1.00	EA		58,388	1,504,794	3,057,470	994,124	3,182,100	8,738,488	8738488
TOTAL Rio Salado Low Flow Channel			1.00	EA		58,388	1,504,794	3,057,470	994,124	3,182,100	8,738,488	8738488

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 \*\* CREW BACKUP \*\*

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BACKUP PAGE 1

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR HOURS	**** COST	**** EQUIP HOURS	**** COST	TOTAL COST
* ALABCLAB1 1 laborer w/Small Tools					PROD = 100%		CREW HOURS = 23		
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00 HR	14.61	1.00	14.61			14.61
NON	XMIXX020	E Small Tools	0.50 HR	1.57			0.50	0.79	0.79
TOTAL					1.00	14.61	0.50	0.79	15.39
CLABB13 5 laborers + 1 crane, hydr, trk mtd, 60 ton					PROD = 100%		CREW HOURS = 140		
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00 HR	15.61	1.00	15.61			15.61
MIL	B-LABORER L	Laborers, (Semi-Skilled)	4.00 HR	14.61	4.00	58.42			58.42
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00 HR	31.21	1.00	31.21			31.21
MIL	B-EQOPROILL	Equip. Operators, Oilers	1.00 HR	28.40	1.00	28.40			28.40
GEN	C8022280	E CRANE, HYD, TRUCK MTD, 60 TON	1.00 HR	79.06			1.00	79.06	79.06
TOTAL					7.00	133.63	1.00	79.06	212.69
CLABB80B 3 laborers + 1 crane, hydr, trk mtd, 14 ton					PROD = 100%		CREW HOURS = 10		
MIL	B-LABORER L	Laborers, (Semi-Skilled)	3.00 HR	14.61	3.00	43.82			43.82
MIL	B-EQOPRLT L	Equip. Operators, Light	1.00 HR	24.05	1.00	24.05			24.05
GEN	C8022240	E CRANE, HYD, TRUCK MTD, 14 TON	1.00 HR	49.95			1.00	49.95	49.95
TOTAL					4.00	67.87	1.00	49.95	117.81
CLADB39 5 laborers + 2 paving breakers, 66 lb					PROD = 100%		CREW HOURS = 14		
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00 HR	15.61	1.00	15.61			15.61
MIL	B-LABORER L	Laborers, (Semi-Skilled)	4.00 HR	14.61	4.00	58.42			58.42
MIL	B-EQOPRLT L	Equip. Operators, Light	1.00 HR	24.05	1.00	24.05			24.05
GEN	A1520120	E AIR COMPRESSOR, 100 CFM, 100 PS	1.00 HR	9.26			1.00	9.26	9.26
GEN	A2020400	E PAVING BREAKER, 66 Lb	2.00 HR	0.94			2.00	1.88	1.88
GEN	A2020480	E AIR HOSE, 1.5" X 100', HARDROC	1.00 HR	0.54			1.00	0.54	0.54
TOTAL					6.00	98.08	4.00	11.69	109.76
CODEB12D 1 eqoprcrn + 1 hydr excavator, crawler, 3.70 CY					PROD = 100%		CREW HOURS = 4209		
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00 HR	31.21	1.00	31.21			31.21
MIL	B-EQOPROILL	Equip. Operators, Oilers	1.00 HR	28.40	1.00	28.40			28.40
GEN	H2523210	E HYD EXCAV, CRAWLER, 3.70 CY BKT	1.00 HR	175.91			1.00	175.91	175.91
TOTAL					2.00	59.60	1.00	175.91	235.52
CODEB12Y 1 eqoprcrn + 1 hydr excavator, crawler, 3.13 CY					PROD = 100%		CREW HOURS = 11		
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00 HR	31.21	1.00	31.21			31.21
MIL	B-EQOPROILL	Equip. Operators, Oilers	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00 HR	14.61	1.00	14.61			14.61
GEN	H2523205	E HYD EXCAV, CRAWLER, 3.13 CY BKT	1.00 HR	112.69			1.00	112.69	112.69
TOTAL					3.00	74.21	1.00	112.69	186.90

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 BACKUP PAGE 2

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR HOURS	**** COST	**** EQUIP HOURS	**** COST	TOTAL COST
-----									
	CODFB10N	1 eqoprmed + 1 loader, F/E, crawler, 1.50 CY			PROD = 100%				CREW HOURS = 901
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	L3524240	E LOADER, F/E, CRAWLER, 1.50 CY	1.00 HR	28.28			1.00	28.28	28.28
-----									
	TOTAL				1.50	35.70	1.00	28.28	63.99
-----									
	CODFB10T	1 eqoprmed + 1 loader, F/E, wheel, 4WD, 3.25 CY			PROD = 100%				CREW HOURS = 9
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	L4024397	E LOADER, F/E, WHEEL, 3.25 CY, 4W	1.00 HR	44.21			1.00	44.21	44.21
-----									
	TOTAL				1.50	35.70	1.00	44.21	79.91
-----									
	CODFB10U	1 eqoprmed + 1 loader, F/E, wheel, 4WD, 5.50 CY			PROD = 100%				CREW HOURS = 3960
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	L4024420	E LOADER, F/E, WHEEL, 5.50 CY, 4W	1.00 HR	70.46			1.00	70.46	70.46
-----									
	TOTAL				1.50	35.70	1.00	70.46	106.16
-----									
	CODFB11C	1 eqoprmed + 1 loader, BH, wheel, 0.80 CY F/E bkt			PROD = 100%				CREW HOURS = 1957
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00 HR	14.61	1.00	14.61			14.61
GEN	L5024640	E LOADER/BH, WH, 0.80 CY, F/E BKT	1.00 HR	12.54			1.00	12.54	12.54
-----									
	TOTAL				2.00	43.01	1.00	12.54	55.54
-----									
	CODLB10Z	1 eqoprmed + 1 loader, F/E, wheel, 4WD, 7 CY			PROD = 100%				CREW HOURS = 3182
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
MIL	B-EQOPRCRNL	Equip. Operators, Crane/Shovel	1.00 HR	31.21	1.00	31.21			31.21
GEN	L4024440	E LOADER, F/E, WHEEL, 7.00 CY, 4W	1.00 HR	106.30			1.00	106.30	106.30
-----									
	TOTAL				1.50	38.51	1.00	106.30	144.81
-----									
	CODLB6	2 laborers + 1 loader, BH, wheel, 0.80 CY F/E bkt			PROD = 100%				CREW HOURS = 294
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-EQOPRLT	L Equip. Operators, Light	1.00 HR	24.05	1.00	24.05			24.05
GEN	L5024640	E LOADER/BH, WH, 0.80 CY, F/E BKT	1.00 HR	12.54			1.00	12.54	12.54
-----									
	TOTAL				3.00	53.26	1.00	12.54	65.80
-----									
	CODSB33H	2 eqoprmeds + 1 scraper, self propelled, 21-31 CY			PROD = 100%				CREW HOURS = 1694
MIL	B-EQOPRMEDF	Equip. Operators, Medium	0.30 HR	29.40	0.30	8.82			8.82
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.20 HR	28.40	1.20	34.08			34.08
MIL	B-LABORER L	Laborers, (Semi-Skilled)	0.30 HR	14.61	0.30	4.38			4.38
GEN	S1525980	E SCRAPER, S/P, 21-31 CY, 37.5T	1.00 HR	142.15			1.00	142.15	142.15
GEN	T1026360	E BLADE, UNIVERSAL, HYDRAULIC	0.20 HR	11.59			0.20	2.32	2.32
GEN	T1526600	E DOZER, CRAWLER, 341-440 HP, PS	0.20 HR	119.96			0.20	23.99	23.99
-----									
	TOTAL				1.80	47.28	1.40	168.46	215.74

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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 BACKUP PAGE 3

SRC	ITEM ID	DESCRIPTION	NO. LOM	RATE	**** LABOR HOURS	**** COST	**** EQUIP HOURS	**** COST	TOTAL COST
					PROD = 100%		CREW HOURS = 1554		
MIL	COOTB10B	1 eqoprmed + 1 dozer, crawler, 181-250 HP							
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER	L Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	T1526520	E DOZER, CRAWLER, 181-250 HP, PS	1.00 HR	84.75			1.00	84.75	84.75
GEN	T1026280	E BLADE, ANGLE, HYDRAULIC	1.00 HR	6.75			1.00	6.75	6.75
TOTAL					1.50	35.70	2.00	91.50	127.20
					PROD = 100%		CREW HOURS = 498		
MIL	COOTB10C	1 eqoprmed + 1 roller, vib, sd, towed, 2 ton							
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER	L Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	T1526520	E DOZER, CRAWLER, 181-250 HP, PS	1.00 HR	84.75			1.00	84.75	84.75
GEN	T1026280	E BLADE, ANGLE, HYDRAULIC	1.00 HR	6.75			1.00	6.75	6.75
GEN	R5025760	E ROLLER, VIB, SD, TOWED	1.00 HR	13.58			1.00	13.58	13.58
TOTAL					1.50	35.70	3.00	105.07	140.78
					PROD = 100%		CREW HOURS = 20		
MIL	COE1B17	2 laborers + 1 loader, BH, wheel, 0.80 CY F/E bkt							
MIL	B-LABORER	L Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-EQOPRLT	L Equip. Operators, Light	1.00 HR	24.05	1.00	24.05			24.05
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	L5024640	E LOADER/BH, WH, 0.80 CY, F/E BKT	1.00 HR	12.54			1.00	12.54	12.54
GEN	T5027420	E TRUCK, 40,000 - 45,000 GVW	1.00 HR	33.71			1.00	33.71	33.71
GEN	T4027090	E REAR DUMP BODY, 12 CY	1.00 HR	2.93			1.00	2.93	2.93
TOTAL					4.00	75.72	3.00	49.18	124.90
					PROD = 100%		CREW HOURS = 16		
MIL	COETB3B	2 laborers + 1 truck, dump, 8 CY							
MIL	B-EQOPRMEDF	Equip. Operators, Medium	1.00 HR	29.40	1.00	29.40			29.40
MIL	B-LABORER	L Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	L5024650	E LOADER/BH, WH, 1.25 CY, F/E BKT	1.00 HR	17.68			1.00	17.68	17.68
GEN	T4027080	E REAR DUMP BODY, 8 CY	1.00 HR	2.86			1.00	2.86	2.86
GEN	T5027480	E TRUCK, 30,000 - 35,000 GVW	1.00 HR	32.59			1.00	32.59	32.59
TOTAL					4.00	81.07	3.00	53.12	134.20
					PROD = 100%		CREW HOURS = 383		
MIL	COFCB10F	1 eqoprmed + 1 roller, vib, tandem, S/P, 12 ton							
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER	L Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	R4525690	E ROLLER, VIB, TANDEM, S/P	1.00 HR	41.68			1.00	41.68	41.68
TOTAL					1.50	35.70	1.00	41.68	77.38
					PROD = 100%		CREW HOURS = 1473		
MIL	COFCB10G	1 eqoprmed + 1 sheepsfoot roller, S/P, vib							
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
MIL	B-LABORER	L Laborers, (Semi-Skilled)	0.50 HR	14.61	0.50	7.30			7.30
GEN	R4525580	E ROLLER, VIB, SHEEPSFOOT, S/P	1.00 HR	47.91			1.00	47.91	47.91
TOTAL					1.50	35.70	1.00	47.91	83.61

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR HOURS	**** COST	**** EQUIP HOURS	**** COST	TOTAL COST
COFG8368 4 eqoprmeds + 1 grader, motor, artic, 28,770 lbs				PROD = 100%		CREW HOURS = 792			
MIL	B-LABORER F	Laborers, (Semi-Skilled)	1.00 HR	15.61	1.00	15.61			15.61
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-EQOPRMEDL	Equip. Operators, Medium	4.00 HR	28.40	4.00	113.60			113.60
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	G1523080	E GRADER, MOTOR, ARTICULATED	1.00 HR	33.33			1.00	33.33	33.33
GEN	L3524240	E LOADER, F/E, CRAWLER, 1.50 CY	1.00 HR	28.28			1.00	28.28	28.28
GEN	T1526570	E DOZER, CRAWLER, 300-340 HP, PS	1.00 HR	113.59			1.00	113.59	113.59
GEN	T1026320	E BLADE, UNIVERSAL, HYDRAULIC	1.00 HR	8.48			1.00	8.48	8.48
GEN	R4525690	E ROLLER, VIB, TANDEM, S/P	1.00 HR	41.68			1.00	41.68	41.68
GEN	T6027910	E TRUCK, WATER, OFF-HWY, 5000 GAL	1.00 HR	36.07			1.00	36.07	36.07
TOTAL					8.00	180.88	6.00	261.43	442.31
COFMB59 1 trkdvrhv + 1 water tanker, 5,000 gal				PROD = 100%		CREW HOURS = 2344			
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	T5027520	E TRUCK, 50,000 - 55,000 GW	1.00 HR	34.99			1.00	34.99	34.99
GEN	T4527280	E TRAILER, WATER TANKER, 5000 GAL	1.00 HR	10.02			1.00	10.02	10.02
TOTAL					1.00	22.46	2.00	45.01	67.47
COMCB88 6 eqoprmeds + 1 log chipper, 22" capacity				PROD = 100%		CREW HOURS = 25			
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00 HR	14.61	1.00	14.61			14.61
MIL	B-EQOPRMEDL	Equip. Operators, Medium	6.00 HR	28.40	6.00	170.40			170.40
GEN	L6024800	E LOG FELLER/BUNCHER, 20" DIA	2.00 HR	38.78			2.00	77.57	77.57
GEN	B2021000	E LOG CHIPPER, 22" CAPACITY	1.00 HR	108.47			1.00	108.47	108.47
GEN	L6024760	E LOG SKIDDER, CABLE	2.00 HR	26.19			2.00	52.38	52.38
GEN	T1026200	E BLADE, ANGLE, HYDRAULIC	1.00 HR	3.34			1.00	3.34	3.34
GEN	T1526440	E DOZER, CRAWLER, 76-100 HP, PS	1.00 HR	26.64			1.00	26.64	26.64
GEN	C0521210	E CHAINSAW, 24" - 43" BAR	1.00 HR	1.51			1.00	1.51	1.51
TOTAL					7.00	185.00	8.00	269.90	454.91
CTDHB34C 1 trkdvrhv + 1 trlr, dump, 16.5 CY				PROD = 100%		CREW HOURS = 5822			
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	T5027420	E TRUCK, 40,000 - 45,000 GW	1.00 HR	33.71			1.00	33.71	33.71
GEN	T4527080	E TRAILER, END DUMP, 17 CY	1.00 HR	4.81			1.00	4.81	4.81
TOTAL					1.00	22.46	2.00	38.52	60.98
CTDHB34F 1 trkdvrhv + 1 trk, off-highway, dump, 23-29 CY				PROD = 100%		CREW HOURS = 5572			
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	T5527720	E TRUCK, OFF-HWY, REAR-DUMP, 36TO	1.00 HR	82.21			1.00	82.21	82.21
TOTAL					1.00	22.46	1.00	82.21	104.67
EELELEC1 1 electrn				PROD = 100%		CREW HOURS = 40			
MIL	B-ELECTRN L	Electricians	1.00 HR	17.27	1.00	17.27			17.27
TOTAL					1.00	17.27	0.00	0.00	17.27

LABOR ID: AR1220 EQUIP ID: NAT97B

Currency in DOLLARS

CREW ID: NAT97A UPB ID: UP99EA

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U.S. Army Corps of Engineers  
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 RIO SALADO LOW FLOW CHANNEL -PHASE 2 -90% DESIGN  
 \*\* CREW BACKUP \*\*

TIME 11:35:24  
 BACKUP PAGE 5

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR HOURS	**** COST	**** EQUIP HOURS	**** COST	TOTAL COST
-----									
	MPLUQ1	2 plumbers			PROD = 100%		CREW HOURS =	21	
MIL	B-PLUMBER L	Plumbers	1.00 HR	41.12	1.00	41.12			41.12
MIL	B-PLUMBER A	Plumbers	1.00 HR	34.37	1.00	34.37			34.37
-----									
TOTAL					2.00	75.49	0.00	0.00	75.49
-----									
	ULABA2	2 laborers + 1 truck, flatbed, 20,000-25,000 GVW			PROD = 100%		CREW HOURS =	5	
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-TRKDVR LTL	Truck Drivers, Light	1.00 HR	22.46	1.00	22.46			22.46
GEN	T40Z6960 E	FLATBED, 8' X 12'	1.00 HR	0.61			1.00	0.61	0.61
GEN	T50Z7400 E	TRUCK, 20,000 - 25,000 GVW	1.00 HR	14.54			1.00	14.54	14.54
-----									
TOTAL					3.00	51.67	2.00	15.15	66.82
-----									
	ULABB	2 laborer			PROD = 100%		CREW HOURS =	71	
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50 HR	15.61	0.50	7.80			7.80
-----									
TOTAL					2.50	37.01	0.00	0.00	37.01
-----									
	ULABB9A	2 laborers + 1 trailer, water tanker, 5000 gal			PROD = 100%		CREW HOURS =	100	
MIL	B-LABORER L	Laborers, (Semi-Skilled)	2.00 HR	14.61	2.00	29.21			29.21
MIL	B-TRKDVRHVL	Truck Drivers, Heavy	1.00 HR	22.46	1.00	22.46			22.46
GEN	T4527280 E	TRAILER, WATER TANKER, 5000 GAL	1.00 HR	10.02			1.00	10.02	10.02
GEN	T50Z7520 E	TRUCK, 50,000 - 55,000 GVW	1.00 HR	34.99			1.00	34.99	34.99
GEN	P50Z5086 E	HOSE, SUCTION/DISCHARGE, 3" X 20	2.00 HR	0.17			2.00	0.35	0.35
-----									
TOTAL					3.00	51.67	4.00	45.36	97.03
-----									
	ULABC	4 laborers			PROD = 100%		CREW HOURS =	18	
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50 HR	15.61	0.50	7.80			7.80
MIL	B-LABORER L	Laborers, (Semi-Skilled)	3.00 HR	14.61	3.00	43.82			43.82
-----									
TOTAL					3.50	51.62	0.00	0.00	51.62
-----									
	UOELB6A	1 eqoprmed + 1 trk mtd vacuum, 5500 gal, 3170 CFM			PROD = 100%		CREW HOURS =	91	
MIL	B-LABORER F	Laborers, (Semi-Skilled)	0.50 HR	15.61	0.50	7.80			7.80
MIL	B-LABORER L	Laborers, (Semi-Skilled)	1.00 HR	14.61	1.00	14.61			14.61
MIL	B-EQOPRMEDL	Equip. Operators, Medium	1.00 HR	28.40	1.00	28.40			28.40
GEN	T57Z7880 E	TRUCK, VACUUM, 5500 GAL, 3170CF	1.00 HR	32.72			1.00	32.72	32.72
GEN	T50Z7520 E	TRUCK, 50,000 - 55,000 GVW	1.00 HR	34.99			1.00	34.99	34.99
-----									
TOTAL					2.50	50.81	2.00	67.71	118.52
-----									
	UOELEQLT4	4 eqoprts			PROD = 100%		CREW HOURS =	269	
MIL	B-EQOPRLT L	Equip. Operators, Light	4.00 HR	24.05	4.00	96.20			96.20
-----									
TOTAL					4.00	96.20	0.00	0.00	96.20

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 \*\* CREW BACKUP \*\*

TIME 11:35:24  
 BACKUP PAGE 6

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR HOURS	**** COST	**** EQUIP HOURS	**** COST	TOTAL COST
	USKCF	6 laborers + 1 truck, flatbed, 20,000-25,000 GVW			PROD = 100%		CREW HOURS =		47
MIL	B-SKILLWKRF	Skilled Workers	1.00 HR	15.61	1.00	15.61			15.61
MIL	B-SKILLWKRL	Skilled Workers	1.00 HR	14.61	1.00	14.61			14.61
MIL	B-LABORER L	Laborers, (Semi-Skilled)	6.00 HR	14.61	6.00	87.63			87.63
GEN	T50Z7400 E	TRUCK, 20,000 - 25,000 GVW	1.00 HR	14.54			1.00	14.54	14.54
GEN	T40Z7010 E	FLATBED, 8' X 16'	1.00 HR	0.73			1.00	0.73	0.73
TOTAL					8.00	117.85	2.00	15.27	133.11
	USKCSWK2	2 skillwks			PROD = 100%		CREW HOURS =		24
MIL	B-SKILLWKRL	Skilled Workers	2.00 HR	14.61	2.00	29.21			29.21
TOTAL					2.00	29.21	0.00	0.00	29.21

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 \*\* LABOR BACKUP \*\*

TIME 11:35:24

BACKUP PAGE 7

SRC LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
MIL B-ELECTRN	Electricians	11.91	0.0%	33.0%	1.43	0.00	17.27	HR	03/13/00	24.38	40
MIL B-EQOPRCRM	Eq Oper, Crane/Shovl	20.32	0.0%	33.0%	4.18	0.00	31.21	HR	03/13/00	21.20	7542
MIL B-EQOPRLT	Eq Oper, Light	14.94	0.0%	33.0%	4.18	0.00	24.05	HR	03/13/00	17.02	1413
MIL B-EQOPRMED	Eq Oper, Medium	18.21	0.0%	33.0%	4.18	0.00	28.40	HR	03/13/00	17.15	16699
MIL B-EQOPROIL	Eq Oper, Oilers	18.21	0.0%	33.0%	4.18	0.00	28.40	HR	03/13/00	11.00	4360
MIL B-LABORER	Laborer (Semi-Skilled)	9.29	0.0%	33.0%	2.25	0.00	14.61	HR	03/13/00	12.86	13206
MIL B-PLUMBER	Plumbers	25.35	0.0%	33.0%	7.40	0.00	41.12	HR	03/13/00	23.92	43
MIL B-SKILLWKR	Skilled Worker	9.29	0.0%	33.0%	2.25	0.00	14.61	HR	03/13/00	13.34	141
MIL B-TRKDVRHV	Truck Drivers, Heavy	14.13	0.0%	33.0%	3.67	0.00	22.46	HR	03/13/00	10.49	14665
MIL B-TRKDVRTLT	Truck Drivers, Light	14.13	0.0%	33.0%	3.67	0.00	22.46	HR	03/13/00	9.26	5
MIL X-TRKDVRHV	Outside Truck Dr. Heavy	14.13	0.0%	33.0%	3.67	0.00	22.46	HR	03/13/00	19.19	480

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 \*\* EQUIPMENT BACKUP \*\*

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 BACKUP PAGE 8

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR	WR	TR REP	EQ REP	TOTAL RATE	TOTAL HOURS
GEN	A1520120	AIR COMPRESSOR,100 CFM(3CMH),100	0.98	0.22	4.88	1.95	0.04		0.01	1.19	9.26 HR	14
GEN	A2020400	PAVING BREAKER, 66 LB (30 KG)	0.26	0.02		0.06				0.59	0.94 HR	29
GEN	A2020480	AIR HOSE,1.5"(38MM) X 100'(31M),	0.18	0.01						0.35	0.54 HR	14
GEN	B2021000	LOG CHIPPER, 22" (559 MM) CAP	29.89	5.03	21.58	9.06	0.31		0.06	42.53	108.47 HR	25
GEN	C0521210	CHAIN SAW, 24"-43"	0.16	0.01	0.18	0.57				0.59	1.51 HR	25
GEN	C8022240	CRANE, HYD, TRUCK MTD, 14 TON	17.93	4.59	7.19	3.24	0.75		0.13	16.11	49.95 HR	10
GEN	C8022280	CRANE, HYD, TRUCK MTD, 60 TON	26.95	7.80	11.15	3.63	1.11		0.20	28.24	79.06 HR	140
GEN	G1523080	GRADER, MOTOR, ARTICULATED	10.39	2.81	4.56	1.94	0.53		0.09	13.01	33.33 HR	792
GEN	H2523205	HYD EXCV, CRAWLER, 3.00 CY	34.56	7.57	10.79	2.97				56.80	112.69 HR	11
GEN	H2523210	HYD EXCV, CRAWLER, 3.50 CY	54.97	12.05	14.53	4.00				90.36	175.91 HR	4209
GEN	L3524240	LOADER, F/E, CRWLR, 1.50 CY	6.80	1.39	3.53	1.68				14.89	28.28 HR	1693
GEN	L4024397	LOADER, F/E, WHEEL, 3.25 CY	12.88	3.05	6.11	3.21	2.85		0.50	15.59	44.21 HR	9
GEN	L4024420	LOADER, F/E, WHEEL, 5.50 CY	21.86	5.06	9.71	3.64	5.92		1.05	23.22	70.46 HR	3960
GEN	L4024440	LOADER, F/E, WHEEL, 7.00 CY	34.06	7.92	14.39	5.40	7.08		1.25	36.20	106.30 HR	3182
GEN	L5024640	LOADER/BH, WH, 0.80 CY (0.6 M3),	3.21	0.77	2.34	0.94	0.70		0.12	4.46	12.54 HR	2271
GEN	L5024650	LOADER/BH, WH, 1.25 CY (1 M3),	5.30	1.21	2.52	1.01	0.32		0.06	7.26	17.68 HR	16
GEN	L6024760	LOG SKIDDER, CABLE	8.44	1.61	4.14	1.45	0.85		0.15	9.55	26.19 HR	49
GEN	L6024800	LOG FELLER/BUNCHER, 20" (508 MM)	12.06	2.34	6.11	2.14	2.05		0.36	13.70	38.78 HR	49
GEN	P5025086	HOSE, SUCTION/DISCH,3" (76 MM) X	0.06	0.00						0.11	0.17 HR	199
GEN	R4525580	ROLLER, VIB, SHEEPSFOOT, S/P	12.65	2.17	7.27	2.91	0.67		0.12	22.12	47.91 HR	1473
GEN	R4525690	ROLLER, VIB, TANDEM, S/P 12 T	11.75	1.97	5.37	2.15				20.45	41.68 HR	1175
GEN	R5025760	ROLLER, VIB, ST 3 T (2.7 MT),	4.24	0.73	1.20	0.48	0.16		0.03	6.74	13.58 HR	498
GEN	S1525980	SCRAPER, S/P, 21-31 CY	49.01	9.60	15.21	6.09	10.02		1.77	50.47	142.15 HR	1694
GEN	T1026200	BLADE, ANGLE, HYDRAULIC	1.30	0.27		0.08				1.69	3.34 HR	25
GEN	T1026280	BLADE, ANGLE, HYDRAULIC	2.67	0.54		0.08				3.46	6.75 HR	2053
GEN	T1026320	BLADE, UNIVERSAL, HYDRAULIC	3.34	0.68		0.13				4.33	8.48 HR	792
GEN	T1026360	BLADE, UNIVERSAL, HYDRAULIC	4.56	0.93		0.19				5.92	11.59 HR	339
GEN	T1526440	DOZER, CRWLR, 76-100 HP	6.43	1.44	3.73	1.68				13.36	26.64 HR	25
GEN	T1526520	DOZER, CRAWLER, 181-250 HP	25.67	5.24	9.03	3.16				41.65	84.75 HR	2053
GEN	T1526570	DOZER, CRWLR, 300-340 HP	34.19	6.98	12.56	4.40				55.47	113.59 HR	792
GEN	T1526600	DOZER, CRWLR, 341-440 HP	35.50	7.24	14.52	5.08				57.61	119.96 HR	339
GEN	T4026960	FLATBED,8' (2.4 M) X 12' (3.7 M)	0.29	0.05						0.27	0.61 HR	5
GEN	T4027010	FLATBED,8' (2.4 M) X 16' (4.9 M)	0.34	0.06						0.33	0.73 HR	47
GEN	T4027080	REAR DUMP BODY, 8 CY (6.1 M3)	1.22	0.20		0.09				1.35	2.86 HR	16
GEN	T4027090	REAR DUMP BODY, 12 CY (9.2 M3)	1.25	0.21		0.09				1.38	2.93 HR	20
GEN	T4527080	TRAILER, END DUMP,17 CY (13 M3)	1.85	0.39			0.63		0.11	1.82	4.81 HR	5822
GEN	T4527240	TRAILER, LOWBOY, 75 T (68 MT),	3.55	1.01		0.50	1.33		0.23	3.34	9.96 HR	480
GEN	T4527280	TRAILER, WTR TANKER, 5000 GAL	2.65	0.72	2.27	0.68	0.65		0.11	2.94	10.02 HR	2444
MIL	T50F0017	TRK,HWY, 43,000 GVW, 6X4, 3 AXLE	8.10	1.44	9.06	3.17	1.81		0.32	8.19	32.10 HR	480
GEN	T5027400	TRUCK, 20,000 - 25,000 (9072 -	3.16	0.64	4.58	1.49	1.03		0.18	3.45	14.54 HR	52
GEN	T5027420	TRUCK, 40,000 - 45,000 (18 144 -	9.66	1.64	9.06	3.17	0.44		0.08	9.67	33.71 HR	5842
GEN	T5027480	TRUCK, 30,000-35,000 (13 608-15	9.25	1.56	9.06	3.17	0.25		0.04	9.25	32.59 HR	16
GEN	T5027520	TRUCK, 50,000-55,000 (22 680-24	10.25	1.74	9.06	3.17	0.44		0.08	10.26	34.99 HR	2535
GEN	T5527720	TRUCK, OFF-HWY REAR-DUMP, 36T	27.53	6.36	8.58	3.65	8.49		1.50	26.09	82.21 HR	5572
GEN	T5727880	TRUCK, VACUUM,5500 GAL(20818 L)	9.78	2.00	6.37	2.23				12.35	32.72 HR	91
GEN	T6027910	TRUCK, WATER, OFF-HWY, 5000 GAL	10.08	2.60	6.29	2.52	2.27		0.40	11.91	36.07 HR	792
NON	XN1X020	SMALL TOOLS	0.50	0.22	0.16	0.07				0.63	1.57 HR	11

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SETTINGS PAGE 1

\*\*\*\*\* PROJECT SETTINGS \*\*\*\*\*

ESTIMATE TYPE : A-Crews with Auto Reprice

SALES TAX : 7.00%

DATE OF ESCALATION SCHEDULE : 10/18/00

PROJECT DIRECT COST COLUMNS

Col Type	H	L	E	M	U
Rep Width	8	10	10	10	10
Title	MANHRS	LABOR	EQUIPMNT	MATERIAL	OTHER

PROJECT INDIRECT COST COLUMNS

Col Type	O	U	P	B	X
Rep Width	10	10	10	10	0
Title	FIELD OH	HOME OFC	PROFIT	BOND	(Unused)

PROJECT OWNER COST COLUMNS

Col Type	C	E	U	U	X
Rep Width	10	10	10	10	0
Title	CONTINGN	ESCALATN	OWN FURN	SIOH	(Unused)

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	1	-	CONTRACT	0
Level 2 ID :	2	N	Feature	0
Level 3 ID :	2	N	Sub Feat	0
Level 4 ID :	2	N	Element	0
Level 5 ID :	2	N	Level 5	0
Level 6 ID :	2	N	Level 6	0

Owner Cost Level : 0

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\*\* PROJECT SETTINGS \*\*  
---

2ND VIEW COLUMNS

Quantity Column Width : 10

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	(Unused)	(Unused)	(Unused)	(Unused)	(Unused)

Shadow	X	X	X	X	X
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DETAIL REPORT FORMATTING

PAGE OPTIONS

Page Break Levels : 2  
Table of Contents Levels : 6

0 1 2 3 4 5 6 7

ROW OPTIONS

Print Titles at Levels : Y Y Y Y Y Y  
Print Totals at Levels : Y Y Y Y N N  
Print Notes at Levels : Y Y Y Y Y Y Y  
Print Unit Cost Row : Y  
Print Page Footer : Y  
Show Cost Codes : Y

COLUMNS OPTIONS

Print Crew Id : Y  
Crew Output : Y  
Unit Cost : Y

UPB TITLES

No. of Levels to Print : 3  
Bracket Titles With : [ ]  
Include titles Notes : Y

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\*\* PROJECT SETTINGS \*\*  
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OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1 FIELD OH : Field Overhead -  
Column 2 HOME OFC : Prime's Home Office Expense - 4%  
Column 3 PROFIT : Prime Contractor's Profit - 8.9%  
Column 4 BOND : Prime Contractor's Bond - 1.0%  
Column 5 (Unused) : (Unused)

Column 1 CONTINGM : Contingency -5%  
Column 2 ESCALATM : Escalation - 1%  
Column 3 OWN FURN :  
Column 4 SIOH : CM - 0%  
Column 5 (Unused) :

STANDARD COLUMN WIDTHS

SUMMARY FEATURES

Quantity Columns : 8      Round Totals Column : N-None  
Total cost Columns : 12      Contingency Notes : No  
Unit Cost Columns : 8      Show Project Totals : Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID : (None)  
Show Markup at Level : 0  
Display Indirect/Owner Markup as : A - Unit Costs Only  
CSI Sort at Level : (None)

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\*\* PROJECT SETTINGS \*\*

REPORT SELECTION

Project Settings : Y Profit Guidelines : N  
Contractor Settings : N  
Link Listing : N Measurement Units : U.S.

REPORT FORMAT TYPE FOR LEVEL (S)  
Direct Indirect Owner 0 1 2 3 4 5 6

Detail : Y  
Project : Y Y Y Y Y N N N N  
Contractor : Y N N Y N N N N N  
Division : N N N N N N N N N  
System : N N N N N N N N N  
2nd View : N  
Crew : Y Y N N N N N N  
Labor : Y  
Equipment : Y  
Prime Labor Cost Level : N

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\*\* OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS \*\*

		**ESCALATN DATE**		**ESCALATN INDEX**			
		AMOUNT	PERCENT	BEGIN	END	BEGIN	END
Project Information Record							
Contingency -5%	P		5.00				
Escalation - 1%	C		1.08	10/00	06/01	2129	2152
	P		0.00				
CM - 0%	P		0.00				

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ERROR REPORT

U.S. Army Corps of Engineers  
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ERROR PAGE 1

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No errors detected...

\*\*\* END OF ERROR REPORT \*\*\*

**COST BACKUP**

new-vols

End-Area Volume Error Log

Surface ends do not meet at station 120+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 148+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 157+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 262+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 262+66.44, surfaces dtm\_all and proposed  
Surface ends do not meet at station 120+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 148+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 157+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 262+00.00, surfaces dtm\_all and proposed  
Surface ends do not meet at station 262+66.44, surfaces dtm\_all and proposed

End-Area Volume Report

Original Surface: dtm\_all  
Design Surface: proposed

Cut Factor: 1.000000  
Fill Factor: 1.000000

Cut: 875356.30 cu yd  
Fill: 1264.33 cu yd  
Net: 874091.96 cu yd

CHANNEL  
EXCAVATION

SAY 875,000 yd<sup>3</sup>

Grid Volume Report

Original Surface: dtm\_all  
Design Surface: proposed

Area  
Cut Factor: 1.00  
Fill Factor: 1.00  
Grid Interval: 10.00

Cut: 23420896.50 cu ft  
Fill: 31859.79 cu ft  
Net: 23389036.72 cu ft

Cut: 867440.61 cu yd  
Fill: 1179.99 cu yd  
Net: 866260.62 cu yd

- Say 875,000 yd<sup>3</sup>

TOTAL EXCAVATION

AS OF 10/05/00

Ex

875,000 cy-Channel

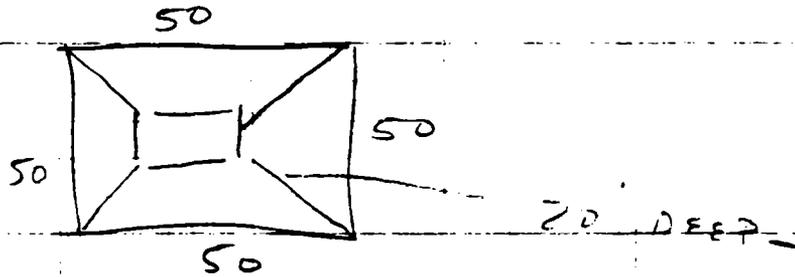


MONTGOMERY WATSON

BY EZ DATE 10-19/00 CLIENT USACE SHEET \_\_\_\_\_ OF \_\_\_\_\_

CHKD. BY \_\_\_\_\_ DESCRIPTION Rio Salado - Phase 2 JOB NO. \_\_\_\_\_

TEST PIT -107-6

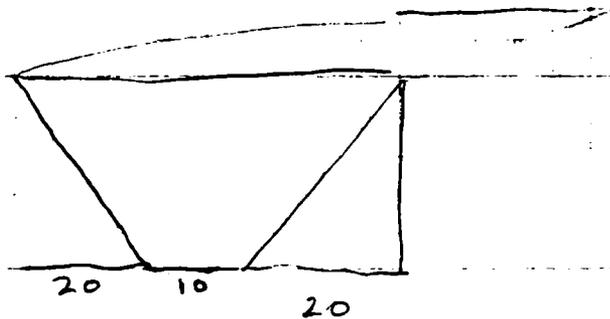


$$50 \times 50 \times 20 = 50,000 \text{ FT}^3 / 27 = 1,852 \text{ yd}^3$$

$$-(20 \times 20 \times 50) = -740$$

$$\underline{\quad - 740 \quad}$$

$$1,112 \text{ yd}^3$$





Kevin C Kammerzell

10/23/2000 07:18 AM

To: Edwin J Zurawski/User/Americas/Montgomery Watson@MW  
cc: Thomas M Lishner/User/Americas/Montgomery Watson@MW

Subject: More Rio Salado Quantities

Ed,

Below are the quantities for each of the Grade Control Structures:

GCS STATION	RCC VOLUME (cy)	EXCAVATION VOLUME (cy)	BACKFILL VOLUME (cy)
176 + 39.00	14,867	75,734	90,602
237 + 08.00 (includes apron)	21,866 (7,616 for apron included)	86,991	108,857
260 + 82.00	14,179	61,374	75,553
<b>TOTAL</b>	<b>50,912</b>	<b>224,099</b>	<b>275,012</b>

Note: Excavation and backfill are still subsequent to payment for RCC. No costs should be presented in direct association of excavation and backfill. This is considered part of the RCC cost...

The volume of riprap associated with the side drain channel is:

250 cy

If you can fax the updated \$ estimate summary to 480.755.8203 that would be appreciated. The only volumes you have outstanding are excavation volumes for the side drain, gabion replacement for GCS wingwall abutment construction, and inlet excavation quantities for head of channel construction.

Kevin



MONTGOMERY WATSON

Telephone Discussion Notes

Subject:

Discussion:

7  
RCC VOLUME Guide DIKE STRUCTURE

RCC - 28,275

EXCAVATION - 198,000

BALKFILL - 167,000

GABIONS - 1,015  
SAY 1,200 CY TOTAL

AREA OF STOCKPILE

Montgomery Watson Party

Other Party

Project Name: RIO SALADO Phase 2

Company Name: KEVIN KAMMERZELL

Project No. \_\_\_\_\_ Billable? Yes. No

Address: \_\_\_\_\_

Employee Name: ED ZURAWSKI

Phone No. \_\_\_\_\_

Date: 10-19-00

Time: \_\_\_\_\_

Person Name: \_\_\_\_\_

Call placed by: MW \_\_\_\_\_ Other Party \_\_\_\_\_



MONTGOMERY WATSON

By E Z Date 10/21/00 Client USACE Sheet 1 of       
Chkd By      Description FLY ASH : CEMENT PALL Job No     

AS PER PROPORTIONS (221.6.2) SECTION OF RLL SPECS.

170-200 LBS OF WATER  
200 LBS OF PORTLAND CEMENT  
40-45 LBS OF FLY ASH (0.5 FT<sup>3</sup>)

RCC - GDS - 28,275 yd<sup>3</sup>  
GLS - 50,920 yd<sup>3</sup>  

---

79,195 yd<sup>3</sup>

CEMENT  
 $79,195 \text{ yd}^3 \times 200 \text{ lbs/yd}^3 = 15,839,000 \text{ } \frac{\#}{2,000 \text{ } \# \text{ TON}}$   
 $= \underline{7,920 \text{ TON}}$

FLY ASH  
 $79,195 \text{ yd}^3 \times 160 \text{ lbs/ft}^3 \times 0.5 \text{ ft}^3/\text{yd}^3 = 6,335,600 \text{ lbs/2,000 } \# \text{ TON}$   
 $= 3,168 \text{ TONS.}$



MONTGOMERY WATSON

Telephone Discussion Notes

Subject:

DISPOSAL FEES

Discussion:

CAL MAT - INERT - \$75/LOAD - END DUMP

CAL MAT - 480-962-5869

WASTE MANAGEMENT - DUMP - FEE - \$ 24 TON

- HOUSEHOLD WASTE  
CONSTRUCTION DEBRIS

602-459-2013

MICKSY - KEILMAN -

602-470-0692-

CAL

Montgomery Watson Party

Other Party

Project Name: RIO SALADO - PHASE 2

Company Name: WASTE MANAGEMENT

Project No. \_\_\_\_\_ Billable? Yes. No

Address: 3000 S. 7TH AVE, PHOENIX

Employee Name: \_\_\_\_\_

Phone No. 602-437-3165

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Person Name: MICKEY KEILMAN

Call placed by: MW \_\_\_\_\_ Other Party \_\_\_\_\_



EXCAVATION

$1,297,000 \text{ yd}^3 \div 8 \text{ cycles / HOUR}$

FOUR SCAPERS @ 8 TRIPS / HOUR x 35 BLY/TRIP  
= 4 EA x 8 CYCLES x 8 HOURS = 256 CYCLES  
256 CYCLES x 35 BLY = 8960  $\text{yd}^3$  / DAY

$1,297,000 \text{ yd}^3 / 8,960 \text{ yd}^3 / \text{DAY}$   
= 160 DAYS

875,000 - DRAINAGE      145 DAYS / 22 DAYS / MO = 6.6 MO.  
198,000 - GUIDE DIKE  
224,000 - GRADE CONTROL      SAT 8 MO.  
1,297,000      18 MO x 22 DAYS = 176 DAYS

RCE

79,000  $\text{yd}^3$

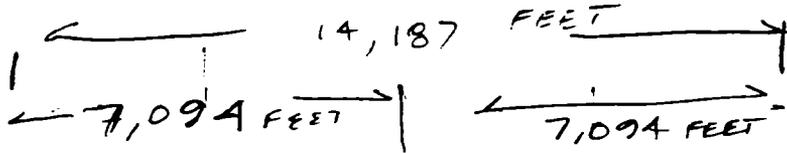
18 GUIDE DIKE STRUCTURES  
@ 3,100  $\text{yd}^3$  EA

4 GRADE CONTROL STRUCTURES  
(INCL. SCOUR @ 24th ST BRIDGE)  
@ 12,000  $\text{yd}^3$  EACH

ASSUME 1,000  $\text{yd}^3$  / DAY = 79 DAYS



CYCLE TIME FOR SCRAPERS



ASSUME TWO SEGMENTS.

$$7,094 \text{ FEET} \div 2 = \text{MIDPOINT} = 3,546 \text{ FEET}$$

$$= .67 \text{ MILES} \quad 2 \text{ WAYS} = 1.34 \text{ MILES}$$

$$3,546 \text{ FEET} / 5,280 \text{ FT/MILE}$$

ADD 1,000 FEET TO GET TO STAGING AREA (500 FEET EACH WAY) = 0.19 MILES

1.53 MILES ROUND TRIP

1.53 MILES ROUND TRIP      15 MILES/HOUR AVG SPEED

$$= 15 \text{ MILES}^{\text{HOUR}} / 1.53 \text{ MILES} =$$

9.8 ROUNDTRIPS/HOUR

9.8 ROUNDTRIPS/HOUR x 80% EFFICIENCY

= 8 TRIPS/HOUR

= 7.5 MINUTES/TRIP

FOUR SCRAPERS @ 35 BCY/LOAD

EVERY TWO MINUTES A SCRAPER WOULD TAKE A LOAD.

$$4 \text{ SCRAPERS} \times 8 \text{ TRIPS/HOUR} \times 8 \text{ HOURS} = 256 \text{ TRIPS}$$

$$256 \text{ TRIPS} \times 35 \text{ BCY} = 8,960 \text{ CY/DAY}$$

$$8,960 \text{ CY/DAY} = 111 \text{ DAYS} \text{ - 5 MONTHS}$$



MONTGOMERY WATSON

By \_\_\_\_\_ Date 10/22/00 Client USACE Sheet \_\_\_\_\_ of \_\_\_\_\_  
Chkd By \_\_\_\_\_ Description Phase 2 - Job No \_\_\_\_\_

S CALLED THESE TWO CONTRACTORS  
ABOUT PHASE 1  
BID RESULTS  
PULICE CONSTRUCTION  
602-944-2241  
STEVE BASILIA

SUNIST CONST  
602-253-2972  
520-748-7555  
STEVE DREES

BID TAB

Item No.	Description	Unit	Qty	Engineer's Estimate		R. E. MONKS		PULICE CONSTRUCTION		FNF CONSTRUCTION		KIEWIT WESTERN		BUNDT CONSTRUCTION		D.H. BLAT	
				Unit Price	Bid Total	Unit Price	Bid Total	Unit Price	Bid Total	Unit Price	Bid Total	Unit Price	Bid Total	Unit Price	Bid Total	Unit Price	Bid Total
105-1	Permitting Allowance	LS	1	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00
107-1	NFDES/SWPPP Permit	LS	1	15,000.00	15,000.00	5,000.00	5,000.00	5,000.00	5,000.00	7,000.00	7,000.00	50,000.00	50,000.00	10,000.00	10,000.00	5,000.00	5,000.00
107-2	Public Information and Notification Allowance	LS	1	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00
107-3	Project Sign Allowance	LS	1	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
107-4	Groundwater Dewatering	LS	1	500,000.00	500,000.00	240,000.00	240,000.00	250,000.00	250,000.00	200,000.00	200,000.00	480,000.00	480,000.00	650,000.00	650,000.00	1,050,000.00	1,050,000.00
107-5	Surface Water Management	LS	1	35,500.00	35,500.00	30,000.00	30,000.00	50,000.00	50,000.00	100,000.00	100,000.00	15,000.00	15,000.00	45,000.00	45,000.00	50,000.00	45,000.00
107-6	Test Pit Excavation	LS	1	20,000.00	20,000.00	7,500.00	7,500.00	15,000.00	15,000.00	15,000.00	15,000.00	25,000.00	25,000.00	25,000.00	25,000.00	20,000.00	30,000.00
201-1	Clearing and Grubbing	AC	1	300,000.00	300,000.00	100,000.00	100,000.00	45,000.00	45,000.00	391,000.00	391,000.00	105,000.00	105,000.00	150,000.00	150,000.00	50,000.00	400.00
201-2	Stockpile Area Clearing and Grubbing	AC	10	1,000.00	10,000.00	2,000.00	20,000.00	600.00	6,000.00	250.00	2,500.00	1,500.00	15,000.00	500.00	5,000.00	400.00	400.00
201-1	Mobilization	LS	1	145,000.00	145,000.00	100,000.00	100,000.00	183,500.00	183,500.00	150,000.00	150,000.00	129,052.00	129,052.00	215,000.00	215,000.00	225,000.00	225,000.00
211-1	Backfill of Over-Excavated Areas	CY	5,000	4.00	20,000.00	3.00	15,000.00	10.00	50,000.00	2.50	12,500.00	2.00	10,000.00	5.00	25,000.00	3.00	10,000.00
211-2	Backfill of Over-Excavated Areas Allowance	LS	1	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00
215-1	Earthwork for Drainage Channels	CY	695,000	3.80	2,642,000.00	0.90	625,500.00	1.45	1,007,750.00	1.85	1,285,750.00	2.00	1,390,000.00	2.25	1,563,750.00	2.30	1,598,750.00
215-2	Earthwork for United Metro	CY	75,000	5.30	397,500.00	1.10	82,500.00	1.45	108,750.00	1.80	135,000.00	2.20	165,000.00	2.25	168,750.00	2.30	168,750.00
220-1	Plain Riprap	CY	745	73.00	54,385.00	25.00	18,625.00	22.00	16,390.00	30.00	22,350.00	30.00	22,350.00	45.00	33,825.00	45.00	33,825.00
220-2	Grouted Riprap	CY	345	115.00	39,675.00	50.00	17,250.00	70.00	24,150.00	100.00	34,500.00	50.00	17,250.00	25.00	8,625.00	25.00	8,625.00
221-1	RCC for GDS and Bank Protection	CY	36,600	49.50	1,811,700.00	30.00	1,098,000.00	19.50	713,700.00	28.00	1,024,800.00	28.00	1,024,800.00	25.00	915,000.00	25.00	915,000.00
221-2	RCC Grade Control Structure	CY	34,614	49.50	1,713,393.00	30.00	1,038,420.00	15.50	536,517.00	28.00	969,194.00	19.00	657,666.00	25.00	865,350.00	25.00	865,350.00
221-3	Cement for RCC	TONS	8,828	100.00	882,800.00	83.00	732,444.00	110.00	971,080.00	95.00	838,260.00	100.00	882,800.00	80.00	706,240.00	80.00	706,240.00
221-4	Fly Ash for RCC	TONS	3,408	39.00	132,912.00	33.00	112,464.00	31.00	105,678.00	35.00	119,315.00	38.00	129,542.00	35.00	118,315.00	31.00	101,000.00
222-1	Gabion Mattresses	CY	820	75.50	61,870.00	65.00	53,300.00	60.00	49,200.00	100.00	82,000.00	80.00	65,600.00	80.00	65,600.00	80.00	65,600.00
350-1	Inert Waste Removal	TONS	50,000	39.00	1,950,000.00	2.50	125,000.00	7.50	375,000.00	2.00	100,000.00	8.00	400,000.00	2.25	112,500.00	3.15	123,750.00
350-2	Topsoil Removal	TONS	1,500	125.00	187,500.00	150.00	225,000.00	175.00	262,500.00	1.00	1,500.00	180.00	270,000.00	125.00	187,500.00	150.00	187,500.00
350-3	Municipal Solid Waste Removal	TONS	13,000	41.25	536,250.00	30.00	390,000.00	38.00	507,000.00	45.00	585,000.00	41.00	533,250.00	32.50	422,625.00	32.50	422,625.00
350-4	Inert Waste Removal Allowance	LS	1	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	
350-5	Inert Waste Removal Allowance	LS	1	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	
350-6	Municipal Solid Waste Removal Allowance	LS	1	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	
350-7	Temporary Liner	SY	1,000	12.50	12,500.00	1.50	1,500.00	7.50	7,500.00	9.00	9,000.00	5.00	5,000.00	4.00	4,000.00	0.90	900.00
350-8	Permanent Liner	SY	1,600	12.00	19,200.00	2.50	4,000.00	6.00	9,600.00	10.00	16,000.00	5.00	8,000.00	5.00	8,000.00	1.00	1,600.00
350-9	Temporary Liner Allowance	LS	1	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	
350-10	Permanent Liner Allowance	LS	1	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	
350-11	Concrete Bridge Removal	LS	1	50,000.00	50,000.00	35,000.00	35,000.00	25,000.00	25,000.00	45,000.00	45,000.00	25,000.00	25,000.00	75,000.00	75,000.00	20,000.00	
350-12	Riprap Removal	CY	3,980	20.00	79,600.00	2.00	7,960.00	2.25	8,910.00	15.00	59,700.00	2.00	7,960.00	4.90	15,840.00	3.25	12,925.00
350-13	Grouted Riprap and Gabion Removal	CY	470	34.00	16,078.00	5.00	2,350.00	15.00	7,050.00	20.00	9,400.00	6.00	2,820.00	10.00	4,700.00	3.50	1,645.00
350-14	Miscellaneous Removals	LS	1	290,000.00	290,000.00	10,000.00	10,000.00	11,000.00	11,000.00	15,000.00	15,000.00	10,000.00	10,000.00	40,000.00	40,000.00	10,000.00	
401-1	Traffic Control	LS	1	39,000.00	39,000.00	10,000.00	10,000.00	22,000.00	22,000.00	7,000.00	7,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	
401-2	Off-Duty Uniformed Officer	HR	300	30.00	9,000.00	35.00	10,500.00	30.00	9,000.00	33.00	9,900.00	30.00	9,000.00	25.00	7,500.00	32.00	9,600.00
609-1	Production Well Installation	EA	1	78,000.00	78,000.00	165,000.00	165,000.00	165,000.00	165,000.00	165,000.00	165,000.00	175,000.00	175,000.00	175,000.00	175,000.00	160,000.00	
609-2	Production Well Development and Testing	LS	1	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	30,000.00	30,000.00	25,000.00	25,000.00	24,000.00	
609-3	Test Hole Drilling and Logging	EA	2	20,000.00	40,000.00	18,000.00	36,000.00	18,000.00	36,000.00	18,000.00	36,000.00	20,000.00	40,000.00	20,000.00	40,000.00	35,000.00	
<b>TOTALS</b>					\$12,588,994.00		\$6,111,408.00		\$6,270,078.00		\$6,887,838.00		\$7,346,000.00		\$7,388,225.00		
<b>Difference in Dollars from Engineer's Estimate</b>							\$ (6,488,586.00)		\$ (6,329,918.00)		\$ (5,712,155.00)		\$ (5,253,984.00)		\$ (5,211,789.00)		
<b>Difference in Dollars from Low Bid</b>									\$ 158,670.00		\$ 776,433.00		\$ 1,234,584.00		\$ 1,276,819.00		

BID TAB

Item No.	Description	Unit	Qty	Engineer's Estimate		NER & SONS		NORTHERN LINE LAYERS		ASB RCC	
				Unit Price	Bid Total	Bid Total	Unit Price	Bid Total	Unit	Bid Total	
105-1	Partnering Allowance	LS	1	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00
107-1	NIPDES/SWPPP Permits	LS	1	15,000.00	15,000.00	5,000.00	46,000.00	46,000.00	200,000.00	200,000.00	200,000.00
107-2	Public Information and Notification Allowance	LS	1	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00
107-3	Project Signs Allowance	LS	1	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
107-4	Gravel/Stone Dewatering	LS	1	500,000.00	500,000.00	1,050,000.00	3,500,000.00	3,500,000.00	1,875,000.00	1,875,000.00	1,875,000.00
107-5	Surface Water Management	LS	1	39,500.00	39,500.00	45,000.00	350,000.00	350,000.00	180,000.00	180,000.00	180,000.00
107-6	Test Pit Excavation	LS	1	20,000.00	20,000.00	30,000.00	50,000.00	50,000.00	12,000.00	12,000.00	12,000.00
201-1	Clearing and Grubbing	LS	1	300,000.00	300,000.00	60,000.00	290,000.00	290,000.00	130,000.00	130,000.00	130,000.00
201-2	Stockpile Area Clearing and Grubbing	AC	10	1,000.00	10,000.00	4,000.00	4,800.00	4,800.00	800.00	8,000.00	8,000.00
202-1	Mobilization	LS	1	145,000.00	145,000.00	225,000.00	350,000.00	350,000.00	350,000.00	350,000.00	350,000.00
211-1	Backfill of Over-Excavated Areas	CY	5,000	4.00	20,000.00	15,000.00	9.00	45,000.00	3.50	17,500.00	17,500.00
211-2	Backfill of Over-Excavated Areas Allowance	LS	1	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00
215-1	Earthwork for Drainage Channels	CY	695,000	3.80	2,602,000.00	1,588,500.00	3.50	2,432,500.00	2.80	1,946,000.00	1,946,000.00
215-2	Earthwork for Limited Metro	CY	75,000	5.30	397,500.00	172,500.00	3.50	262,500.00	2.50	187,500.00	187,500.00
220-1	Plain Riprap	CY	748	73.00	54,396.00	18,626.00	36.00	28,075.00	30.00	22,360.00	22,360.00
220-2	Grouted Riprap	CY	345	116.00	39,870.00	29,326.00	120.00	41,400.00	120.00	41,400.00	41,400.00
221-1	RCC for GDS and Bank Protection	CY	38,600	49.50	1,910,700.00	1,235,200.00	32.00	1,235,200.00	54.00	2,084,400.00	2,084,400.00
221-2	RCC Grade Control Structure	CY	34,614	49.50	1,713,393.00	1,107,648.00	33.00	1,142,262.00	48.00	1,661,472.00	1,661,472.00
221-3	Concrete for RCC	TONS	8,908	100.00	890,800.00	864,076.00	125.00	1,113,500.00	104.00	926,432.00	926,432.00
221-4	Fly Ash for RCC	TONS	3,408	39.00	132,912.00	105,678.00	50.00	170,400.00	45.00	153,405.00	153,405.00
222-1	Gabion Mattresses	CY	820	75.50	61,910.00	82,800.00	80.00	65,600.00	80.00	65,600.00	65,600.00
350-1	Inert Waste Removal	TONS	50,000	38.00	1,900,000.00	157,500.00	9.00	450,000.00	8.00	400,000.00	400,000.00
350-2	Tire Removal	TONS	1,500	125.00	187,500.00	225,000.00	35.00	52,500.00	180.00	270,000.00	270,000.00
350-3	Municipal Solid Waste Removal	TONS	13,000	41.25	536,250.00	101,400.00	70.00	910,000.00	31.00	403,000.00	403,000.00
350-4	Inert Waste Removal Allowance	LS	1	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00
350-5	Tire Removal Allowance	LS	1	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00	75,000.00
350-6	Municipal Solid Waste Removal Allowance	LS	1	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00	150,000.00
350-7	Temporary Liner	SY	1,000	12.50	12,500.00	800.00	12.00	12,000.00	9.00	9,000.00	9,000.00
350-8	Permanent Liner	SY	1,600	12.00	19,200.00	1,800.00	8.00	12,800.00	16.00	25,600.00	25,600.00
350-9	Temporary Liner Allowance	LS	1	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00
350-10	Permanent Liner Allowance	LS	1	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
350-11	Conveyor Bridge Removal	LS	1	50,000.00	50,000.00	20,000.00	15,000.00	15,000.00	50,000.00	50,000.00	50,000.00
350-12	Riprap Removal	CY	3,880	20.00	77,600.00	12,870.00	6.00	23,280.00	4.00	15,520.00	15,520.00
350-13	Grouted Riprap and Gabion Removal	CY	470	34.00	15,980.00	1,645.00	16.00	7,520.00	12.00	5,640.00	5,640.00
350-14	Miscellaneous Removals	LS	1	290,000.00	290,000.00	10,000.00	12,000.00	12,000.00	40,000.00	40,000.00	40,000.00
401-1	Traffic Control	LS	1	39,000.00	39,000.00	5,000.00	50,000.00	50,000.00	175,000.00	175,000.00	175,000.00
401-2	Off-Duty Uniformed Officer	HR	300	30.00	9,000.00	9,800.00	48.00	13,800.00	45.00	13,500.00	13,500.00
609-1	Production Well Installation	EA	1	78,000.00	78,000.00	180,000.00	200,000.00	200,000.00	150,000.00	150,000.00	150,000.00
609-2	Production Well Development and Testing	LS	1	28,000.00	28,000.00	24,000.00	33,000.00	33,000.00	32,000.00	32,000.00	32,000.00
609-3	Test Hole Drilling and Logging	EA	2	20,000.00	40,000.00	70,000.00	38,000.00	72,000.00	11,000.00	22,000.00	22,000.00
<b>TOTALS</b>					\$12,599,804.00	\$7,986,868.00		\$13,804,107.00		\$12,047,838.00	
<b>Difference in Dollars from Engineer's Estimate</b>						\$ (4,604,126.00)		\$ 1,004,113.00		\$ (582,156.00)	
<b>Difference in Dollars from Low Bid</b>						\$ 1,884,462.00		\$ 7,482,701.00		\$ 5,936,433.00	



MONTGOMERY WATSON

By E.Z. Date 3/12/200 Client USACE Sheet 1 of       
Chkd. By      Description BIO SALADO WAGE RATES Job No     

MARICOPA COUNTY, ARIZONA

AZ 000014

2/11/2000

	<u>RATE</u>	<u>FRINGE</u>	
ASESETS/INSULATOR	24.11	5.07	
BOILERMAKER	21.58	9.60	
CARPENTER	18.07	3.40	
MILLWRIGHT	19.85	5.29	
POWER Equip OPERATORS	20.32	4.18	LARGE
	18.21	4.18	MED
	14.94	4.18	SMALL
IRONWORKER-	19.20	8.96	
PUMBER/PIPEFITTER	25.35	7.40	
MASONS	14.30	3.05	
ELECTRICIANS	11.91	1.43	
LABORERS -	9.29	2.25	
SPRINKLER FITTER	6.65	2.60	
TRUCK DRIVER	14.13	3.67	

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Zone 4: over 60 miles

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ENGI0428D 06/01/1999

POWER EQUIPMENT OPERATORS:

ZONE 1:

	Rates	Fringes
Group 1	14.94	4.18
Group 2	18.21	4.18
Group 3	19.29	4.18
Group 4	20.32	4.18

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Loader, 3.5 cu yd and under  
GROUP 2: Bulldozer; Crane, under 15 tons; Loader, over 3.5 cu yd but less than 6 cu yd; Oiler Truck; and roller  
GROUP 3: Crane, over 15 tons but less than 100 tons; Loader, over 6 cu yd but less than 10 cu yd; and Mechanic

GROUP 4: Crane, 100 tons and over; Loader, 10 cu yd and over  
All Operators, Oilers, and Motor Crane Drivers on equipment with Booms, except concrete pumping truck booms, including Jibs, shall receive \$0.01 per hour per foot over 80 ft in addition to regular rate of pay

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IRON0075D 08/01/1999

IRONWORKERS; REBAR & STRUCTURAL

	Rates	Fringes
0-50 miles from City Hall in Phoenix or Tucson	17.70	8.96
50-100 miles	19.20	8.96
100-150 miles	20.45	8.96
over 150 miles	21.70	8.96

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PLUM0469E 07/01/1999

MARICOPA COUNTY  
PLUMBERS AND PIPEFITTERS

ZONE 1:

	Rates	Fringes
Commercial	22.35	7.40
Industrial (Power Plants, Pumping Stations, Pipelines)	25.35	7.40

ZONE 2:

Commercial	25.35	7.40
Industrial (Power Plants, Pumping Stations, Pipelines)	28.35	7.40

ZONE DEFINITIONS FOR PLUMBERS AND PIPEFITTERS:

ZONE 1: Area within a 40 mile radius of the center of Phoenix  
ZONE 2: Area outside a 40 mile radius of the center of Phoenix

PLUM0741E 07/01/1999

	Rates	Fringes
PINAL COUNTY PLUMBERS AND PIPEFITTERS	20.75	6.17

SUAZ2001A 02/01/1994

	Rates	Fringes
CEMENT MASONS	14.30	3.05
ELECTRICIANS	11.91	1.43
LABORERS:		
General	9.29	2.25
Landscape	5.15	
Mechanical Tools	10.58	1.76
Pipelayer	9.78	
Concrete Worker	11.66	
POWER EQUIPMENT OPERATORS:		
Backhoe	14.47	3.28
Blade/Grader/Scraper	14.64	3.28
Skip Loader	11.96	2.78
Trencher	15.10	3.28
Water Well Driller	12.80	2.68
SPRINKLER FITTER, IRRIGATION	6.65	

TEAM0104C 06/01/1998

	Rates	Fringes
TRUCK DRIVERS:		
Dump Truck, 2 or 3 axle; Water Truck under 2500 gallons	13.24	3.67
Dump Truck, 4-axle; Water Truck 2500 but less than 4000 gallons	13.28	3.67
Dump Truck, 5-axle; Water Truck, 4000 gal. and over	14.13	3.67

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

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On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

Guide Dike Structure Calculations

## Rio Salado Phase 2

Guide Dike Structure  
Volume Estimates-RCC

GUIDE DIKE NUMBER	TYPE	LENGTH AB (ft)	RCC THICKNESS (ft)	SECTION AREAS		VOLUME AB (cu.yd.)	LENGTH BC (ft)	SECTION AREAS		VOLUME BC (cu.yd.)	TOTAL VOLUME (cu.yd)
				A-A (sq.ft.)	B-B (sq.ft.)			B-B (sq.ft.)	C-C (sq.ft.)		
21	S	10	15.75	389.8	171	217.54	73.76	171	171	467.15	684.69
22	R	50	15.75	389.8	171	632.95	50.82	171	171	321.86	954.81
23	R	50	15.75	389.8	171	632.95	87.94	171	171	556.95	1189.90
24	S	10	15.75	389.8	171	217.54	71.41	171	171	452.26	669.81
25	R	50	15.75	389.8	171	632.95	86.16	171	171	545.68	1178.63
26	R	50	15.75	389.8	171	632.95	105.05	171	171	665.32	1298.27
27	R	50	15.75	389.8	171	632.95	189.68	171	171	1201.31	1834.26
28	R	50	15.75	389.8	171	632.95	332.78	171	171	2107.61	2740.56
29	R	50	15.75	389.8	171	632.95	105.20	171	171	666.27	1299.22
30	R	50	15.75	389.8	171	632.95	232.99	171	171	1475.60	2108.55
31	S	10	15.75	389.8	171	217.54	65.33	171	171	413.76	631.30
32	R	50	15.75	389.8	171	632.95	65.31	171	171	413.63	1046.58
33	R	50	15.75	389.8	171	632.95	112.33	171	171	711.42	1344.37
34	R	50	15.75	389.8	171	632.95	337.92	171	171	2140.16	2773.11
35	R	50	15.75	389.8	171	632.95	352.93	171	171	2235.22	2868.17
36	R	50	15.75	389.8	171	632.95	95.51	171	171	604.90	1237.85
37	R	50	15.75	389.8	171	632.95	349.51	171	171	2213.56	2846.51
38	R	50	15.75	389.8	171	632.95	147.70	171	171	935.43	1568.38

**TOTAL RCC VOLUME = 28274.98 cu.yd.**

**Rio Salado Phase 2**  
Guide Dike Structure  
Volume Estimates-Excavation

GUIDE DIKE NUMBER	TYPE	LENGTH AB (ft)	EXCAVATION DEPTH (ft)	SECTION AREAS		VOLUME AB (cu.yd.)	LENGTH BC (ft)	SECTION AREAS		VOLUME BC (cu.yd.)	LENGTH DE (ft)	SECTION AREAS		VOLUME DE (cu.yd.)	LENGTH EF (ft)	SECTION AREAS		VOLUME EF (cu.yd.)	TOTAL VOLUME (cu.yd)
				A-A (sq.ft.)	B-B (sq.ft.)			B-B (sq.ft.)	C-C (sq.ft.)			D-D (sq.ft.)	E-E (sq.ft.)			E-E (sq.ft.)	F-F (sq.ft.)		
21	S	10	18	1840.8	1151.5	1167.73	73.76	1151.5	1151.5	3145.73	18	839.25	839.25	559.50	30	839.25	300.37	633.12	5506.08
22	R	50	18	1840.8	1151.5	3384.25	50.82	1151.5	1151.5	2167.38	18	839.25	839.25	559.50	30	839.25	300.37	633.12	6744.25
23	R	50	18	1840.8	1151.5	3384.25	87.94	1151.5	1151.5	3750.48	18	839.25	839.25	559.50	30	839.25	300.37	633.12	8327.35
24	S	10	18	1840.8	1151.5	1167.73	71.41	1151.5	1151.5	3045.50	18	839.25	839.25	559.50	30	839.25	300.37	633.12	5405.86
25	R	50	18	1840.8	1151.5	3384.25	86.16	1151.5	1151.5	3674.56	18	839.25	839.25	559.50	30	839.25	300.37	633.12	8251.43
26	R	50	18	1840.8	1151.5	3384.25	105.05	1151.5	1151.5	4480.19	18	839.25	839.25	559.50	30	839.25	300.37	633.12	9057.06
27	R	50	18	1840.8	1151.5	3384.25	189.68	1151.5	1151.5	8089.50	18	839.25	839.25	559.50	30	839.25	300.37	633.12	12666.37
28	R	50	18	1840.8	1151.5	3384.25	332.78	1151.5	1151.5	14192.45	18	839.25	839.25	559.50	30	839.25	300.37	633.12	18769.32
29	R	50	18	1840.8	1151.5	3384.25	105.20	1151.5	1151.5	4486.59	18	839.25	839.25	559.50	30	839.25	300.37	633.12	9063.46
30	R	50	18	1840.8	1151.5	3384.25	232.99	1151.5	1151.5	9936.59	18	839.25	839.25	559.50	30	839.25	300.37	633.12	14513.48
31	S	10	18	1840.8	1151.5	1167.73	65.33	1151.5	1151.5	2786.20	18	839.25	839.25	559.50	30	839.25	300.37	633.12	5146.56
32	R	50	18	1840.8	1151.5	3384.25	65.31	1151.5	1151.5	2785.35	18	839.25	839.25	559.50	30	839.25	300.37	633.12	7362.22
33	R	50	18	1840.8	1151.5	3384.25	112.33	1151.5	1151.5	4790.67	18	839.25	839.25	559.50	30	839.25	300.37	633.12	9367.54
34	R	50	18	1840.8	1151.5	3384.25	337.92	1151.5	1151.5	14411.66	18	839.25	839.25	559.50	30	839.25	300.37	633.12	18988.53
35	R	50	18	1840.8	1151.5	3384.25	352.93	1151.5	1151.5	15051.81	18	839.25	839.25	559.50	30	839.25	300.37	633.12	19828.68
36	R	50	18	1840.8	1151.5	3384.25	95.51	1151.5	1151.5	4073.32	18	839.25	839.25	559.50	30	839.25	300.37	633.12	8650.20
37	R	50	18	1840.8	1151.5	3384.25	349.51	1151.5	1151.5	14905.95	18	839.25	839.25	559.50	30	839.25	300.37	633.12	19482.82
38	R	50	18	1840.8	1151.5	3384.25	147.70	1151.5	1151.5	6299.13	18	839.25	839.25	559.50	30	839.25	300.37	633.12	10876.00

**TOTAL EXCAVATION VOLUME = 197807.18 cu.yd.**

**Rio Salado Phase 2**  
Guide Dike Structure  
Volume Estimates-Backfill

GUIDE DIKE NUMBER	TYPE	LENGTH AB (ft)	BACKFILL DEPTH (ft)	SECTION AREAS		VOLUME AB (cu.yd.)	LENGTH BC (ft)	SECTION AREAS		VOLUME BC (cu.yd.)	LENGTH DE (ft)	SECTION AREAS		VOLUME DE (cu.yd.)	LENGTH EF (ft)	SECTION AREAS		VOLUME EF (cu.yd.)	TOTAL VOLUME (cu.yd)
				A-A (sq.ft.)	B-B (sq.ft.)			B-B (sq.ft.)	C-C (sq.ft.)			D-D (sq.ft.)	E-E (sq.ft.)			E-E (sq.ft.)	F-F (sq.ft.)		
21	S	10	18	1379	980.5	896.61	73.76	980.5	980.5	2678.58	18	810.00	810.00	540.00	30	810.00	271.12	600.62	4715.81
22	R	50	18	1379	980.5	2644.39	50.82	980.5	980.5	1845.52	18	810.00	810.00	540.00	30	810.00	271.12	600.62	5630.53
23	R	50	18	1379	980.5	2644.39	87.94	980.5	980.5	3193.52	18	810.00	810.00	540.00	30	810.00	271.12	600.62	6978.54
24	S	10	18	1379	980.5	896.61	71.41	980.5	980.5	2593.24	18	810.00	810.00	540.00	30	810.00	271.12	600.62	4630.47
25	R	50	18	1379	980.5	2644.39	86.16	980.5	980.5	3128.88	18	810.00	810.00	540.00	30	810.00	271.12	600.62	6913.90
26	R	50	18	1379	980.5	2644.39	105.05	980.5	980.5	3814.87	18	810.00	810.00	540.00	30	810.00	271.12	600.62	7599.88
27	R	50	18	1379	980.5	2644.39	189.68	980.5	980.5	6888.19	18	810.00	810.00	540.00	30	810.00	271.12	600.62	10673.21
28	R	50	18	1379	980.5	2644.39	332.78	980.5	980.5	12084.84	18	810.00	810.00	540.00	30	810.00	271.12	600.62	15869.86
29	R	50	18	1379	980.5	2644.39	105.20	980.5	980.5	3820.32	18	810.00	810.00	540.00	30	810.00	271.12	600.62	7805.33
30	R	50	18	1379	980.5	2644.39	232.99	980.5	980.5	8460.99	18	810.00	810.00	540.00	30	810.00	271.12	600.62	12246.00
31	S	10	18	1379	980.5	896.61	65.33	980.5	980.5	2372.45	18	810.00	810.00	540.00	30	810.00	271.12	600.62	4409.68
32	R	50	18	1379	980.5	2644.39	65.31	980.5	980.5	2371.72	18	810.00	810.00	540.00	30	810.00	271.12	600.62	6156.73
33	R	50	18	1379	980.5	2644.39	112.33	980.5	980.5	4079.24	18	810.00	810.00	540.00	30	810.00	271.12	600.62	7864.25
34	R	50	18	1379	980.5	2644.39	337.92	980.5	980.5	12271.50	18	810.00	810.00	540.00	30	810.00	271.12	600.62	16056.51
35	R	50	18	1379	980.5	2644.39	352.93	980.5	980.5	12818.59	18	810.00	810.00	540.00	30	810.00	271.12	600.62	16601.60
36	R	50	18	1379	980.5	2644.39	95.51	980.5	980.5	3468.43	18	810.00	810.00	540.00	30	810.00	271.12	600.62	7253.44
37	R	50	18	1379	980.5	2644.39	349.51	980.5	980.5	12692.39	18	810.00	810.00	540.00	30	810.00	271.12	600.62	16477.40
38	R	50	18	1379	980.5	2644.39	147.70	980.5	980.5	5363.70	18	810.00	810.00	540.00	30	810.00	271.12	600.62	9148.71

**TOTAL BACKFILL VOLUME = 168831.86 cu.yd.**

**Rio Salado Phase 2**  
**Guide Dike Structure**  
**Volume Estimates-Gabion Installation and Fill**

GUIDE DIKE NUMBER	TYPE	LENGTH	GABION	SECTION LENGTHS		AREA	LENGTH	SECTION LENGTHS		AREA	TOTAL	TOTAL
		CE (ft)	THICKNESS (ft)	C-C (ft)	E-E (ft)	CE (sq.ft.)	EF (ft)	E-E (ft)	F-F (ft)	EF (sq.ft.)	AREA (sq.ft.)	VOLUME (cu.yd.)
21	S	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
22	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
23	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
24	S	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
25	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
26	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
27	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
28	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
29	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
30	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
31	S	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
32	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
33	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
34	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
35	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
36	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
37	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33
38	R	22	0.75	39	39	858.00	30	39	39	1170.00	2028.00	56.33

**TOTAL GABION SURFACE AREA = 36504.00 sq.ft.**

**TOTAL GABION FILL VOLUME = 1014.00 cu.yd.**

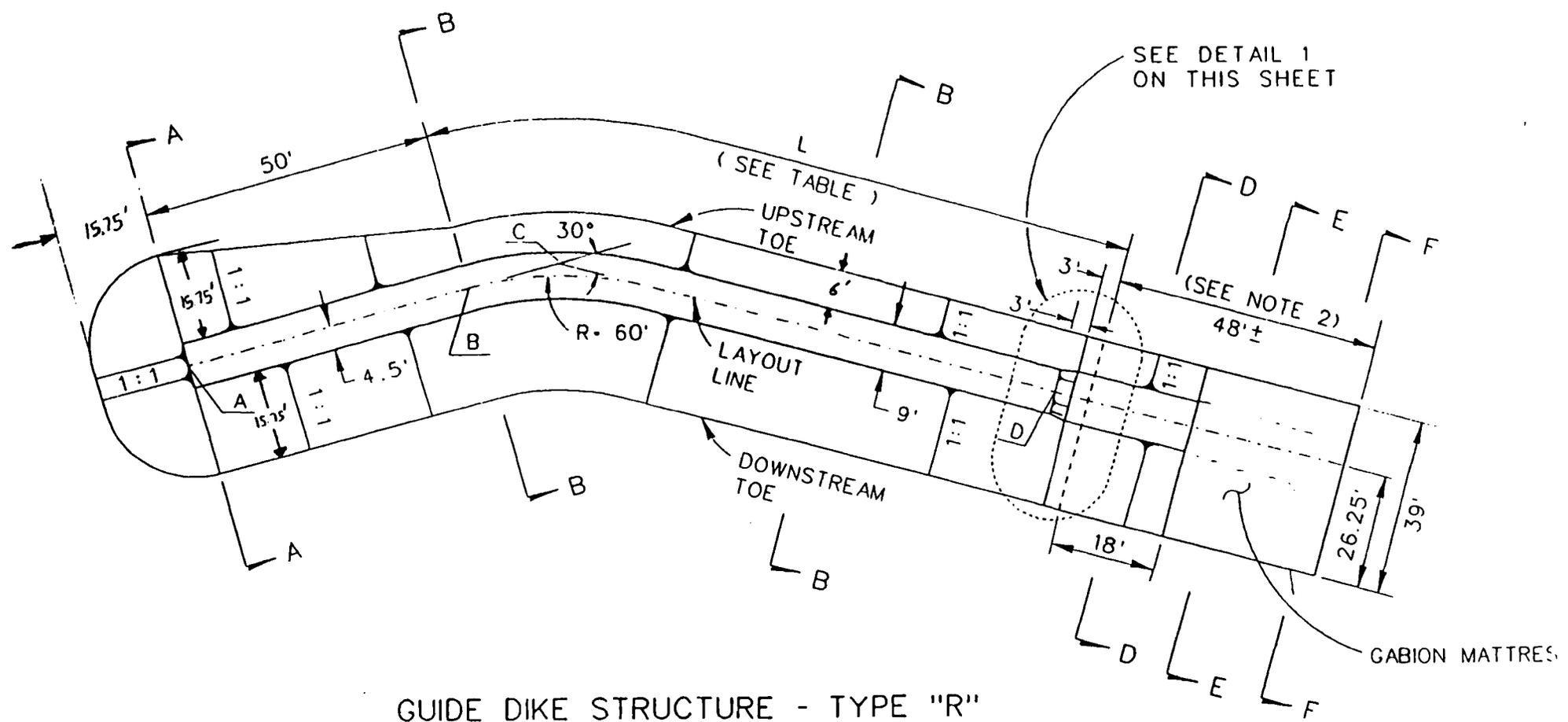
### Tabulation of Guide Dike Structure - Type "R"

Station NO.	Guide Dike NO.	A			BEARING OF AC	ELEVATION			L ( Ft. )
		NORTHING	EASTING	ELEVATION		B	D	K	
127	22	880512.37	654574.71	1038.75	S 13d 45' 6.47" E	1039.75	1040.20	1023.00	50.82
140	23	880836.70	655895.07	1040.25	N 26d 21' 30.57" E	1041.25	1042.07	1024.50	87.94
155	25	880631.53	657344.31	1042.25	N 23d 44' 17.82" E	1043.25	1044.05	1026.50	86.16
155	26	880351.44	657311.55	1040.00	S 7d 25' 39.20 " E	1041.00	1041.99	1024.25	105.05
166	27	880303.92	658412.10	1044.75	N 25d 52' 22.05" E	1045.75	1047.59	1029.00	189.68
166	28	880028.70	658375.81	1044.75	S 5d 18' 56.46" E	1045.75	1049.02	1029.00	332.78
190	29	879626.03	660760.60	1055.75	N 41d 26' 54.67" E	1056.75	1057.74	1040.00	105.20
190	30	879352.22	660638.62	1055.75	S 11d 12' 35.84" W	1056.75	1059.02	1040.00	232.99
202	32	879046.46	661848.44	1052.50	S 9d 26' 50.03" E	1053.50	1054.09	1036.75	65.31
217	33	879422.22	663352.89	1061.00	N 18d 11' 4.15" E	1062.00	1063.06	1045.25	112.33
217	34	879173.28	663354.76	1058.50	S 11d 34' 31.27" E	1059.50	1062.82	1042.75	337.92
228	35	879202.71	664426.41	1063.25	N23d 51' 54.66" E	1064.25	1067.72	1047.50	352.93
228	36	878931.50	664416.97	1064.85	S 7d 7' 35.55" E	1065.85	1066.75	1049.10	95.51
245	37	879214.77	666077.98	1072.00	N 13d 25' 51.83" E	1073.00	1076.44	1056.25	349.51
245	38	878991.43	666120.44	1067.50	S 18d 21' 59.54" E	1068.50	1069.92	1051.75	147.70

### Tabulation of Guide Dike Structure - Type "S"

Station NO.	Guide Dike NO.	A			BEARING OF AE	ELEVATION		M ( Ft. )
		NORTHING	EASTING	ELEVATION		D	K	
127	21	880822.09	654581.49	1037.75	N 16d 56' 7.39" E	1038.95	1022.00	73.76
140	24	880544.92	655848.25	1040.25	S 4d 47' 54.54"E	1041.42	1024.50	71.41
202	31	879292.57	661869.61	1056.00	N 21d 32' 46.49" E	1057.07	1040.25	65.33

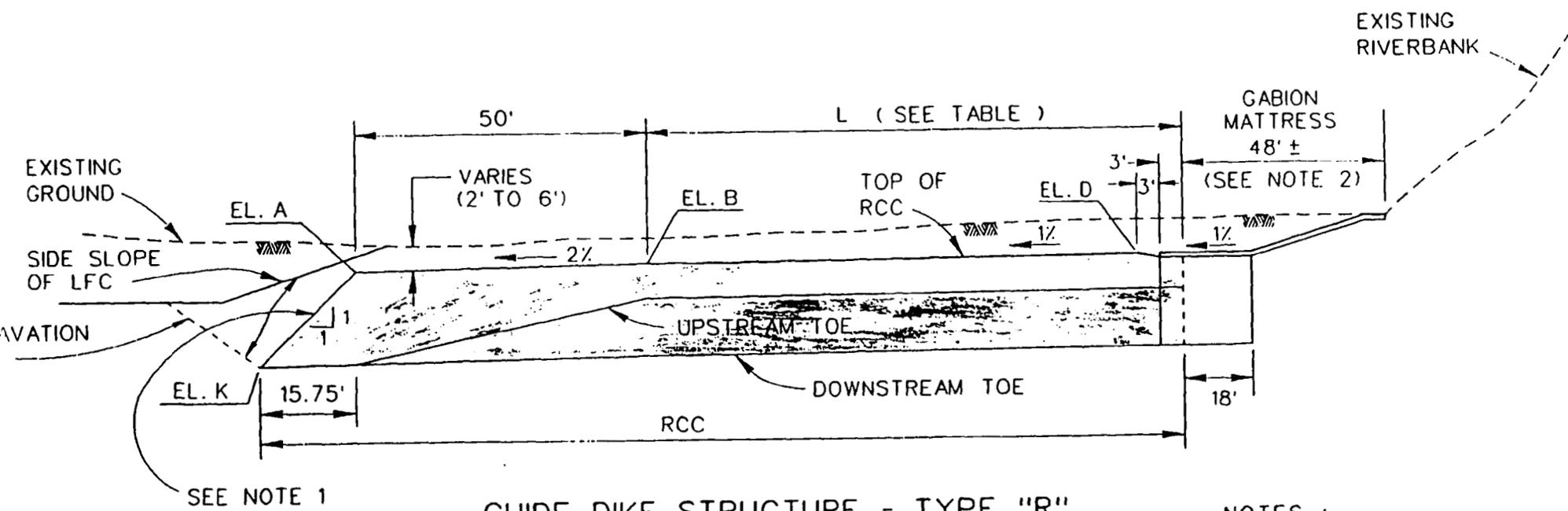
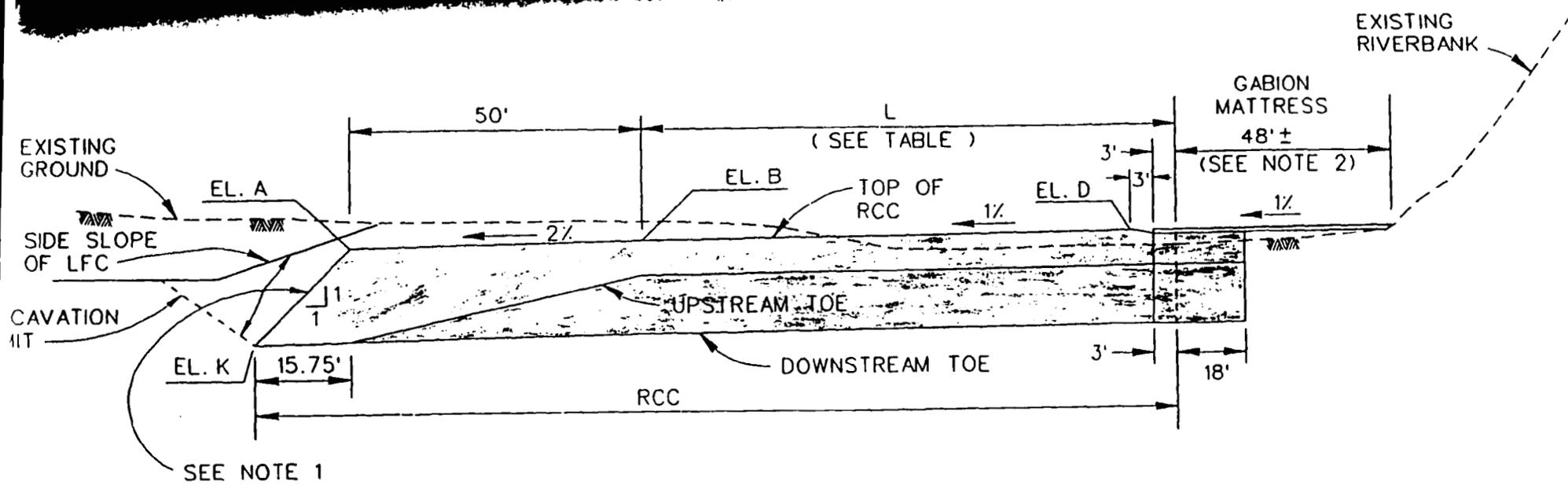
- 3. SEE SHEET 34 FOR SECTIONS A-A, B-B, E-E, AND F-F
- 4. SEE SHEET 35 FOR INTERFACE DETAIL GUIDE DIKE AND BANK PROTECTION.



GUIDE DIKE STRUCTURE - TYPE "R"

PLAN

NOT TO SCALE



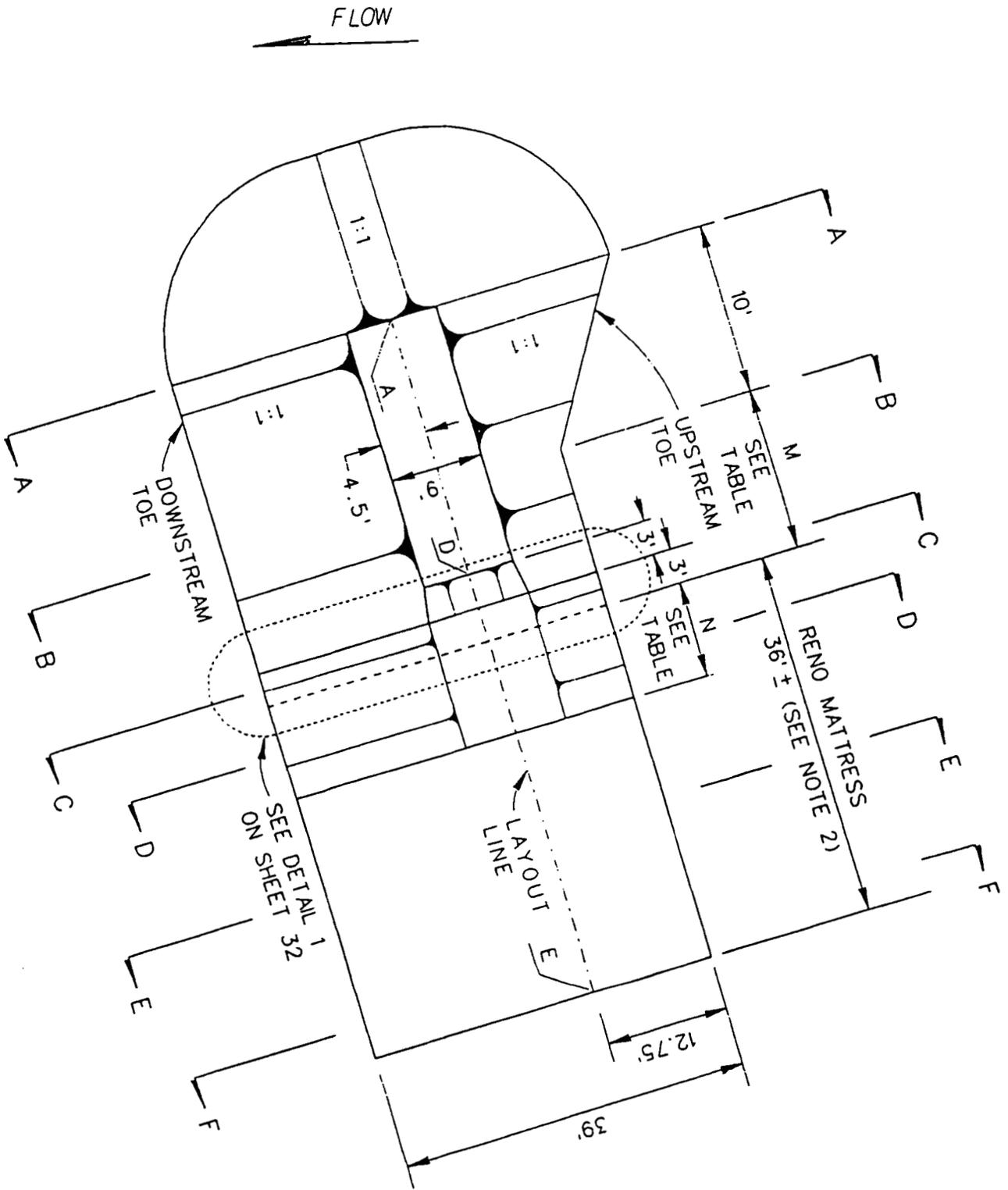
**GUIDE DIKE STRUCTURE - TYPE "R"**

**PROFILE**

NOT TO SCALE

**NOTES :**

1. BACKFILL AND COMPACT TO
2. THIS DIMENSION SHALL BE AD WITH THE APPROVAL OF THE



RIO SALADO - PHOENIX REACH  
 LOW FLOW CHANNEL, PHASE 1  
 (19TH AVENUE TO 7TH STREET)





**MONTGOMERY WATSON**  
Mining Group

Project Name Rio Salsado Phase 2  
 Project Number: 1046034 Sheet \_\_\_\_\_ of \_\_\_\_\_  
 Prepared By: K. Keenan Zell Date \_\_\_\_\_  
 Checked By: \_\_\_\_\_ Date \_\_\_\_\_

SECTION F-F



AREA ①

$$5.5 \times \frac{6.75}{2.75} \times \frac{1}{2} = 7.6 \text{ ft}^2$$

18.56

AREA ②

$$\frac{1}{2} \times 39 = 78 \text{ ft}^2$$

234

AREA ③

$$5.5 \times \frac{6.75}{2.75} \times \frac{1}{2} = 7.6 \text{ ft}^2$$

18.56

GABION AREA

$$39 \times 0.75 = 29.25 \text{ ft}^2$$

300.37 ft<sup>2</sup>

TOTAL EXCAVATION AREA = 122.5 ft<sup>2</sup>

TOTAL BACKFILL AREA = 93.2 ft<sup>2</sup>



**MONTGOMERY WATSON**  
Mining Group

Project Name Rio Salado Phase 2  
Project Number 1046034 Sheet \_\_\_\_\_ of \_\_\_\_\_  
Prepared By K. Kennecott Date \_\_\_\_\_  
Checked By \_\_\_\_\_ Date \_\_\_\_\_

SECTION E-E

Section E-E matches Section D-D.

This Section marks the <sup>start of</sup> transition from E-E to F-F

TOTAL EXCAVATION AREA = 535 ft<sup>2</sup>

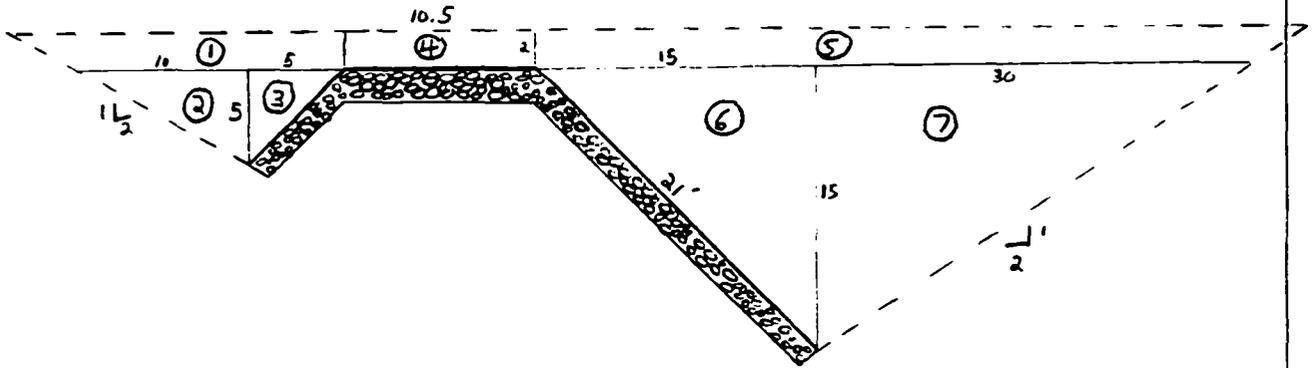
TOTAL BACKFILL AREA = 496 ft<sup>2</sup>



**MONTGOMERY WATSON**  
Mining Group

Project Name Rio Salado Phase 2  
 Project Number 1046034 Sheet 0  
 Prepared By K. Kennell Date \_\_\_\_\_  
 Checked By \_\_\_\_\_ Date \_\_\_\_\_

SECTION D-D



AREA ①

$$15 \times \frac{6}{2} = 45 \text{ ft}^2$$

AREA ②

$$5 \times 10 \times \frac{1}{2} = 25 \text{ ft}^2$$

AREA ③

$$5 \times 5 \times \frac{1}{2} = 12.5 \text{ ft}^2$$

AREA ④

$$10.5 \times \frac{6}{2} = 31.5 \text{ ft}^2$$

AREA ⑤

$$35 \times \frac{6}{2} = 105 \text{ ft}^2$$

AREA ⑥

$$15 \times 15 \times \frac{1}{2} = 112.5 \text{ ft}^2$$

AREA ⑦

$$15 \times 30 \times \frac{1}{2} = 225 \text{ ft}^2$$

GABION VOLUME =

$$(7.5 + 10.5 + 21) \times 9 = 29.25 \text{ ft}^2$$

839.25

$$\underline{\underline{\text{TOTAL EXCAVATION AREA} = 535 \text{ ft}^2}}$$

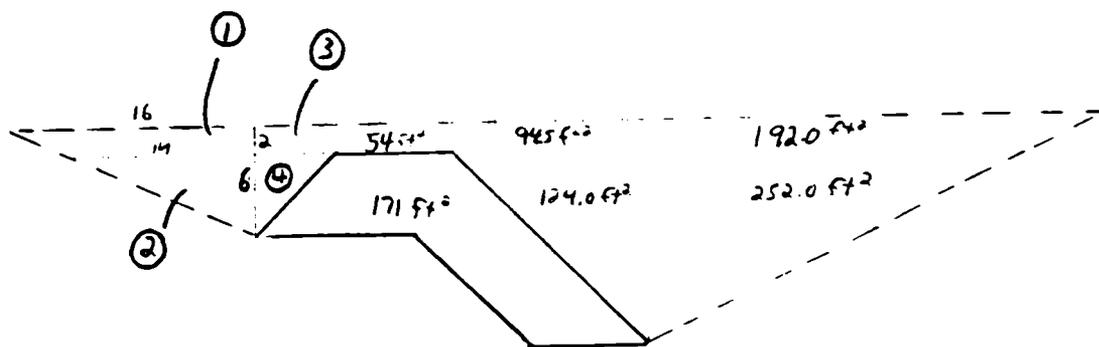
$$\underline{\underline{\text{TOTAL BACKFILL AREA} = 496 \text{ ft}^2}}$$



**MONTGOMERY WATSON**  
Mining Group

Project Name Rio Salado Phase 2  
 Project Number 1046034 Sheet \_\_\_\_\_ of \_\_\_\_\_  
 Prepared By K. Kennecott Date \_\_\_\_\_  
 Checked By \_\_\_\_\_ Date \_\_\_\_\_

### Excavation/Backfill - Section B-B



AREA ①

$$16 \times 6 = 96 \text{ ft}^2$$

AREA ②

$$6 \times 14 \times \frac{1}{2} = 42 \text{ ft}^2$$

AREA ③

$$6 \times 6 = 36 \text{ ft}^2$$

AREA ④

$$6 \times 6 \times \frac{1}{2} = 18 \text{ ft}^2$$

Total AREA =

$$32 + 42 + 12 + 18 + 18 + 171 + 31.5 + 64 + 124 + 252 = 764.5$$

$$\text{EXCAVATION AREA} = \frac{1151.5 \text{ ft}^2}{\cancel{764.5 \text{ ft}^2}}$$

$$\text{BACKFILL AREA} = \frac{593.5 \text{ ft}^2}{\cancel{764.5 \text{ ft}^2}}$$

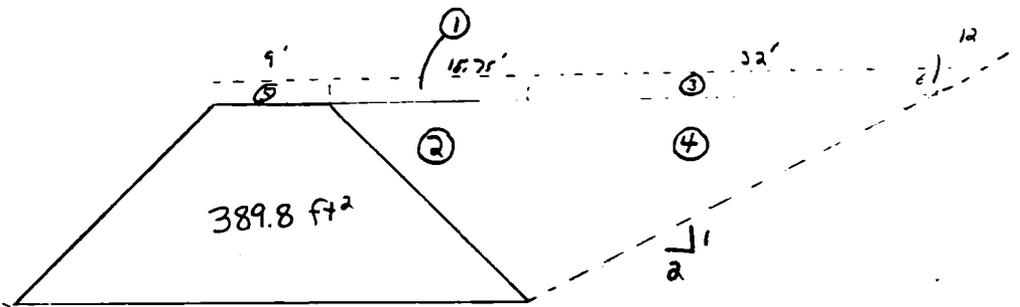
980.5



**MONTGOMERY WATSON**  
Mining Group

Project Name: Rio Salado Phase 2  
 Project Number: 1046034 Sheet: \_\_\_\_\_ of \_\_\_\_\_  
 Prepared By: K. Kammzell Date: \_\_\_\_\_  
 Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

Excavation - Section A-A



AREA ①

$$15.75 \times 6 = 94.5 \text{ ft}^2$$

AREA ②

$$15.75 \times 15.75 \times \frac{1}{2} = 124.0 \text{ ft}^2$$

AREA ③

$$32 \times 6 = 192 \text{ ft}^2$$

AREA ④

$$32 \times 15.75 \times \frac{1}{2} = 252 \text{ ft}^2$$

$$\text{SUM AREA 1-4} = 662.5$$

$$\text{AREA ⑤ } 9 \times 6 = 54 \text{ ft}^2$$

AREA

Tot. AREA =

$$(662.5) \times 2 + 54 + 389.8 = 1768.8$$

$$\underline{\underline{\text{EXCAVATION AREA} = 1,768.8 \text{ ft}^2}}$$

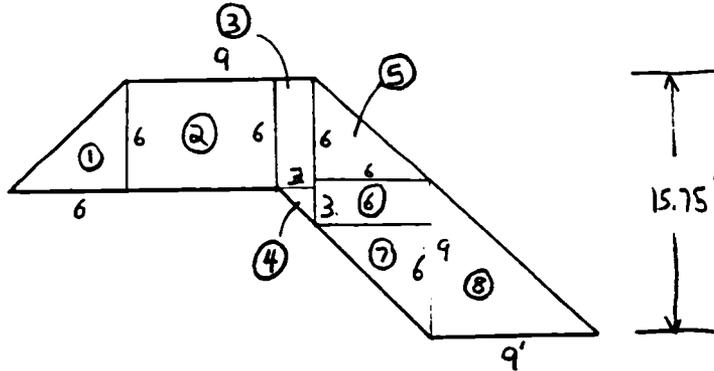
$$\underline{\underline{\text{BACKFILL AREA} = 1379 \text{ ft}^2}}$$



**MONTGOMERY WATSON**  
Mining Group

Project Name: Rio Salado Phase 2  
 Project Number: 1046034 Sheet \_\_\_\_\_ of \_\_\_\_\_  
 Prepared By: K. Kemmerzell Date \_\_\_\_\_  
 Checked By: \_\_\_\_\_ Date \_\_\_\_\_

Type R Guide Dike - Section B-B



Area ①

$$6 \times 6 \times \frac{1}{2} = 18 \text{ ft}^2$$

Area ②

$$6 \times 6 = 36 \text{ ft}^2$$

Area ③

$$3 \times 6 = 18 \text{ ft}^2$$

Area ④

$$3 \times 3 \times \frac{1}{2} = 4.5 \text{ ft}^2$$

Area ⑤

$$6 \times 6 \times \frac{1}{2} = 18 \text{ ft}^2$$

Area ⑥

$$3 \times 6 = 18 \text{ ft}^2$$

Area ⑦

$$6 \times 6 \times \frac{1}{2} = 18 \text{ ft}^2$$

Area ⑧

$$9 \times 9 \times \frac{1}{2} = 40.5 \text{ ft}^2$$

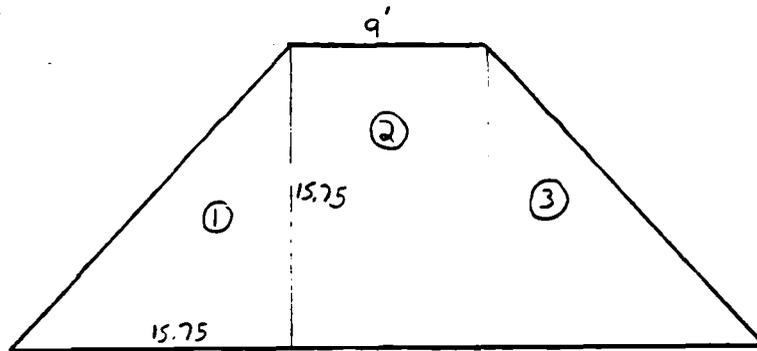
TOTAL AREA = 171.0 ft<sup>2</sup>



**MONTGOMERY WATSON**  
Mining Group

Project Name Rio Salado Phase 2  
Project Number 1046034 Sheet: \_\_\_\_\_ of \_\_\_\_\_  
Prepared By K. Kemmerzell Date \_\_\_\_\_  
Checked By \_\_\_\_\_ Date \_\_\_\_\_

Guide Dike - Section A-A



Area ①

$$15.75 \times 15.75 \times \frac{1}{2} = 124.0$$

Area ②

$$15.75 \times 9 = 141.8 \text{ ft}^2$$

Area ③

$$15.75 \times 15.75 \times \frac{1}{2} = 124.0 \text{ ft}^2$$

$$\underline{\underline{\text{TOTAL AREA} = 389.8 \text{ ft}^2}}$$



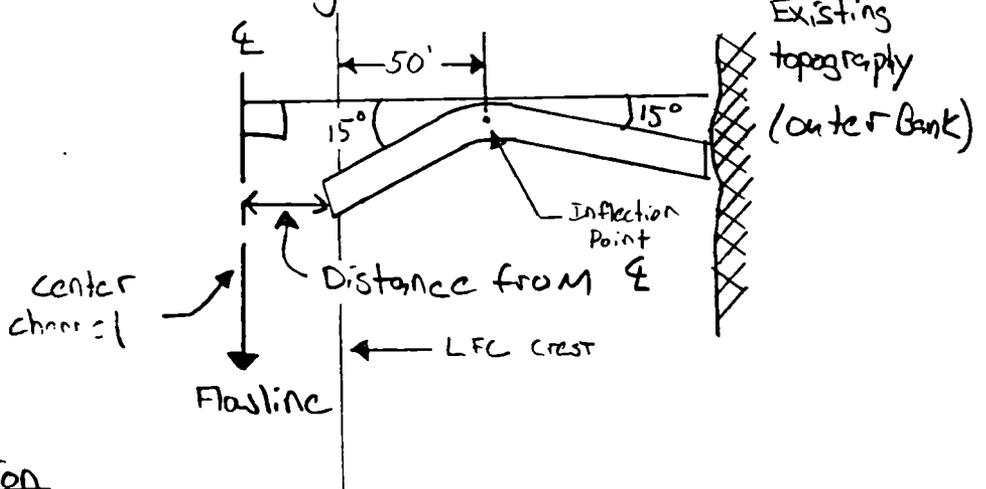
BY Robert Martin DATE 9-29-00 CLIENT Rio Salado Project SHEET 2 OF 3  
 CHKD. BY \_\_\_\_\_ DESCRIPTION COST Estimate Preparation/GDS JOB NO. 1046034

Determine orientation of Guide Dike Structures on low-flow channel of Salt River, Phoenix Reach

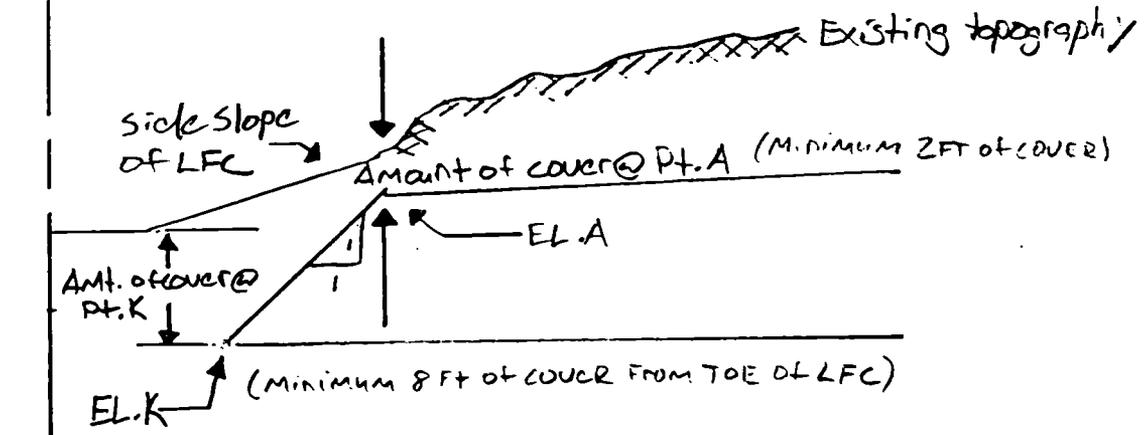
Purpose: Determine Elevations and orientations w/r to low-flow channel

Approach: Use Autocad Plot and section drawings to place GDS according to specifications.

Schematic: Plan



Section





MONTGOMERY WATSON

BY                      DATE 5-17-00 CLIENT RIO SALADO PROJECT SHEET 3 OF 3  
CHKD. BY                      DESCRIPTION COST ESTIMATE PREPARATION JOB NO. 1046034

STA #	GDS #	DIST FROM L (ft)	ELEV. @ Pt. A (ft)	Am. of cover @ Pt. A (ft)	ELEV. @ toe of LFC (ft)	ELEV. @ Pt. K (ft)	Am. of cover @ Pt. K (ft)	∠
127	21	132.60	1037.75	2.00	1030.85	1022.00	8.55	
127	22	170.95	1038.75	2.00	1031.00	1023.00	8.00	14.89°
140	23	157.67	1040.25	2.00	1032.50	1024.50	8.00	14.95°
140	24	136.65	1040.25	2.00	1032.30	1024.50	8.00	
155	25	144.30	1042.25	2.00	1034.50	1026.50	8.00	15.18°
155	26	137.02	1042.00	2.00	1034.25	1026.25	8.00	15.08°
166	27	132.66	1044.75	2.00	1032.00	1029.00	8.00	15.11°
166	28	143.36	1044.75	2.00	1032.00	1029.00	8.00	15.07°
190	29	159.51	1055.75	2.00	1048.00	1040.00	8.00	15.20°
190	30	137.67	1055.75	2.00	1048.00	1040.00	8.00	15.03°
202	31	173.00	1056.00	2.00	1051.00	1040.25	10.75	
202	32	131.86	1052.50	2.00	1051.00	1042.25	14.25	14.91°
217	33	126.43	1051.75	2.00	1055.00	1046.00	9.00	15.11°
217	34	119.41	1058.50	2.00	1055.00	1043.75	12.25	15.06°
228	35	136.04	1063.25	2.00	1057.75	1042.50	10.25	15.14°
228	36	130.59	1064.85	2.00	1057.75	1049.10	8.65	15.05°
245	37	118.93	1072.00	2.00	1064.75	1056.25	8.00	15.04°
245	38	104.07	1069.00	2.00	1064.25	1053.25	11.00	15.06°

Grade Control Structure Calculations

# Montgomery Watson Mining Group

## Calculation Cover Sheet

Sheet 1 of 18

<b>PROJECT TITLE</b>	Rio Salado Project - Cost Estimate Preparation STA 176+39.00
<b>PROJECT NO.</b>	1046034
<b>CALCULATION TITLE</b>	Grade Control Structures - RCC Volumes & Excavation Volumes

	<b>NAME</b>	<b>DATE</b>
<b>PREPARED BY</b>	Robert Martin	10-12-00
<b>CHECKED BY</b>		
<b>REVIEWED BY</b>		

Notes:

Attach all supporting documentation including data and formula sources, references, and previous revisions, as necessary.



MONTGOMERY WATSON

BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 2 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION RIO SALADO/Cost Estimation - GCS JOB NO. 1046034

GRADE CONTROL STRUCTURE VOLUMETRICS STA 176+39.00

OBJECTIVES Determine Quantities of Excavation, Backfill and RCC for each structure

APPROACH : MEASURE Geometries of Grade Control Structure from Scaled plan & section views

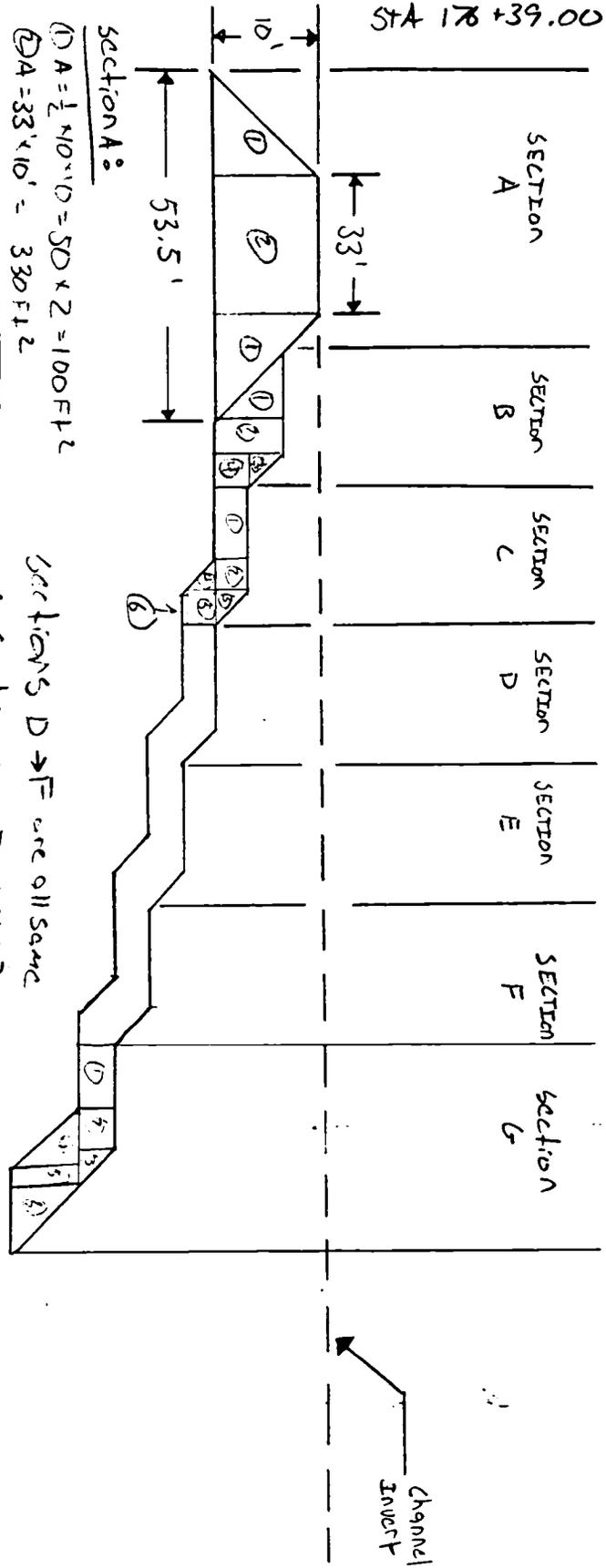
Each Grade control structure was Broken up into three components:

- 1) STEP Portion
- 2) Wing Portion
- 3) Bank Protection

Calculations + Summary on following pages



STA 178 +39.00



DLL Areas STA 176 +39.00

Section A:

① A = 1/2 \* 10 \* 10 = 50 x 2 = 100 Ft<sup>2</sup>

② A = 33 \* 10 = 330 Ft<sup>2</sup>

Σ Section A = 430 Ft<sup>2</sup>

Section B:

① A = 1/2 \* 7 \* 7 = 24.50 Ft<sup>2</sup>

② A = 8 \* 7 = 56.00

③ A = 1/2 \* 3 \* 3 = 4.50

④ A = 4 \* 3 = 12.00

Σ Section B = 97.00

Section C:

① A = 13.5 \* 4 = 54.00 Ft<sup>2</sup>

② A = 4 \* 2 = 8.00

③ A = 1/2 \* 3 \* 3 = 4.50

④ A = 1/2 \* 3 \* 3 = 4.50

⑤ A = 1.5 \* 3 = 4.50

⑥ A = 1 \* 3 = 3.00

Σ Section C = 78.50 Ft<sup>2</sup>

Section D:

① A = 10 \* 4 = 40.00 Ft<sup>2</sup>

② A = 5 \* 4 = 20.00 Ft<sup>2</sup>

③ A = 1/2 \* 4 \* 4 = 8.00 Ft<sup>2</sup>

④ A = 1/2 \* 8 \* 8 = 32.00 Ft<sup>2</sup>

⑤ A = 8 \* 1 = 8.00 Ft<sup>2</sup>

⑥ A = 1/2 \* 8 \* 8 = 32.00 Ft<sup>2</sup>

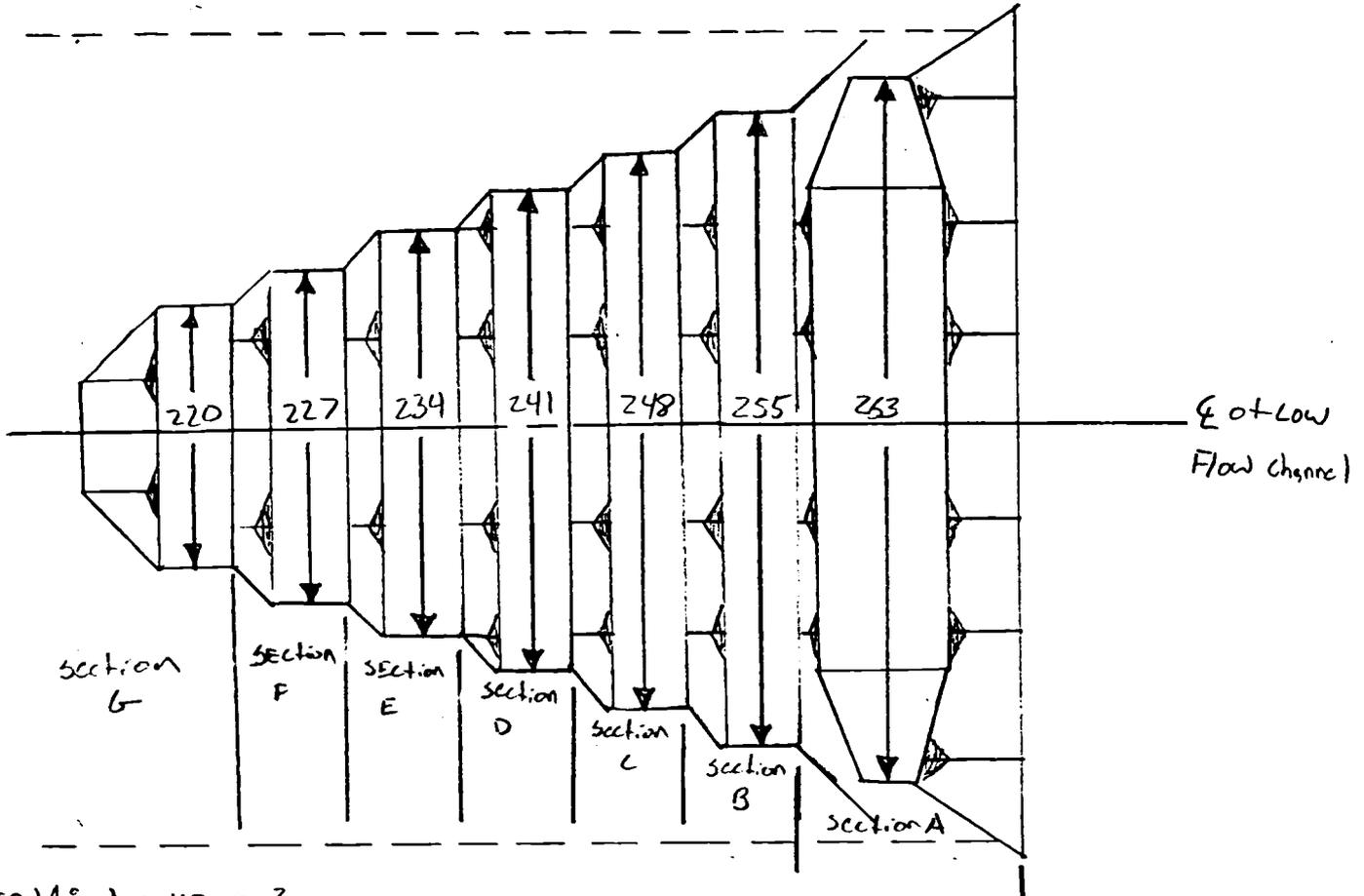
Σ Section D = 140.00 Ft<sup>2</sup>

Sections D → F are all same as Section C = 78.50 Ft<sup>2</sup>

Channel Invert



RCC VOLUMES - STEP PORTION 176 + 39.00



SECTION A:  $A = 430 \text{ Ft}^2$

$V = 263 \times 430 = 113,090 \text{ Ft}^3$

SECTION G:  $A = 140 \text{ Ft}^2$

$V = 220 \times 140 = 30,800 \text{ Ft}^3$

SECTION B:  $A = 97 \text{ Ft}^2$

$V = 255 \times 97 = 24,735 \text{ Ft}^3$

SECTION C:  $A = 78.50$

$V = 248 \times 78.50 = 19,468 \text{ Ft}^3$

SECTION D:  $A = 78.50$

$V = 241 \times 78.50 = 18,918.50 \text{ Ft}^3$

SECTION E:  $A = 78.50$

$V = 234 \times 78.50 = 18,369.00 \text{ Ft}^3$

SECTION F:  $A = 78.50$

$V = 227 \times 78.50 = 17,819.50 \text{ Ft}^3$

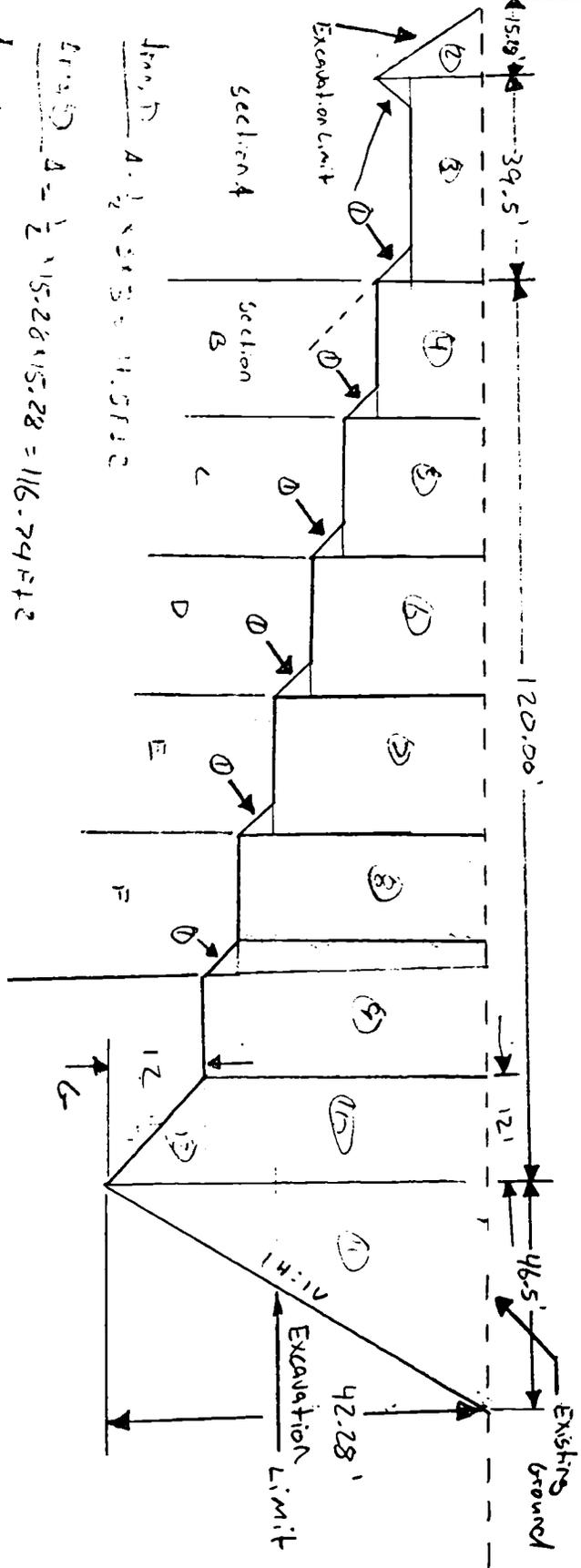
$\Sigma$  of RCC for step portion

$= 243,200 \text{ Ft}^3$

$= 9,007 \text{ YD}^3$



STEP PORTION EXCAVATION AREAS STA 176+39.00



- Area (A)  $A = \frac{1}{2} \times 39.5 \times 39.5 = 1557.25$
- Area (B)  $A = \frac{1}{2} \times 15.28 \times 15.28 = 116.74 \text{ Ft}^2$
- Area (C)  $A = 12.28 \times 39.5 = 485.06 \text{ Ft}^2$
- Area (D)  $A = 15.28 \times 15 = 229.20 \text{ Ft}^2$
- Area (E)  $A = 12.28 \times 15 = 274.20 \text{ Ft}^2$
- Area (F)  $A = 21.58 \times 15 = 319.20 \text{ Ft}^2$
- Area (G)  $A = 24.28 \times 15 = 364.20 \text{ Ft}^2$
- Area (H)  $A = 27.28 \times 15 = 409.20 \text{ Ft}^2$
- Area (I)  $A = 30.28 \times 12 = 353.36 \text{ Ft}^2$
- Area (J)  $A = 30.28 \times 12 = 353.36 \text{ Ft}^2$

Area (K)  $A = \frac{1}{2} \times 42.28 \times 42.28 = 893.80 \text{ Ft}^2$

Area (L)  $A = \frac{1}{2} \times 12 \times 12 = 72.00 \text{ Ft}^2$



BY Robert Martin DATE 10/20/02 CLIENT USACE (LA District) SHEET 6 OF 18  
CHKD. BY DESCRIPTION Rio Salado/contestation - CCS JOB NO. 1046034

STEP Portion - Volume of Excavation  
STA 176+39.00

(Refer to Step Portion Excavation Form & Rec Volume Schematics)

Section A8  $A = 4.5 + 4.5 + 116.74 + 485.06 = 610.80 \text{ FT}^2$   
Areas (1+1+2+3)  $V = 263 \times A = 160,640.40 \text{ FT}^3$

Section B8  $A = 4.5 + 229.20 = 233.70 \text{ FT}^2$   
Areas (1+4)  $V = 255 \times A = 59,593.50 \text{ FT}^3$

Section C8  $A = 4.5 + 271.50 = 276.00 \text{ FT}^2$   
Areas (1+5)  $V = 245 \times A = 69,117.60 \text{ FT}^3$

Section D8  $A = 4.5 + 319.20 = 323.70 \text{ FT}^2$   
Areas (1+6)  $V = 241 \times A = 78,011.70 \text{ FT}^3$

Section E8  $A = 4.5 + 364.20 = 368.70 \text{ FT}^2$   
Areas (1+7)  $V = 234 \times A = 86,275.80 \text{ FT}^3$

Section F8  $A = 4.5 + 409.20 = 413.70 \text{ FT}^2$   
Areas (1+8)  $V = 227 \times A = 93,909.90 \text{ FT}^3$

Section G8  $A = 363.36 + 363.36 + 893.80 + 72 = 1692.52 \text{ FT}^2$   
Areas (9+10+11+12)  $V = 220 \times A = 372,354.40 \text{ FT}^3$

Volume of step Portion

243,200. FT<sup>3</sup>

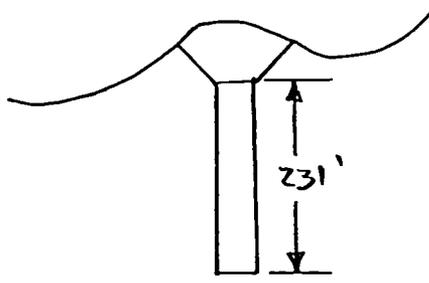
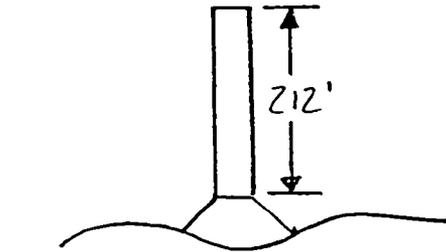
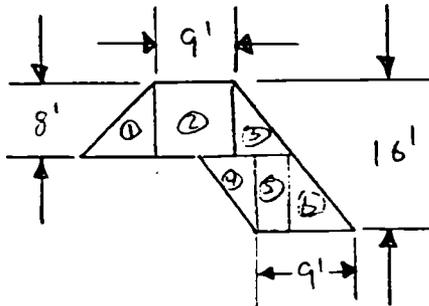
1,163,103 FT<sup>3</sup>

Σ Volume of  
Excavation for step  
Portion

= 43,078 YD<sup>3</sup>



GRADE CONTROL STRUCTURE  
"Wing Portion" Areas & Volumes STA 176+39.00  
(Wing Portion of Weir)



Area 1:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area 2:

$$A = 9 \times 8 = 72 \text{ Ft}^2$$

Area 3:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area 4:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area 5:

$$A = 1 \times 8 = 8 \text{ Ft}^2$$

Area 6:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

$\Sigma$  of Areas 208 Ft<sup>2</sup>

Volume of RCC

North side

$$212' \times 208 \text{ Ft}^2 = 44,096.00 \text{ Ft}^3$$

South side

$$231' \times 208 \text{ Ft}^2 = 48,048.00 \text{ Ft}^3$$

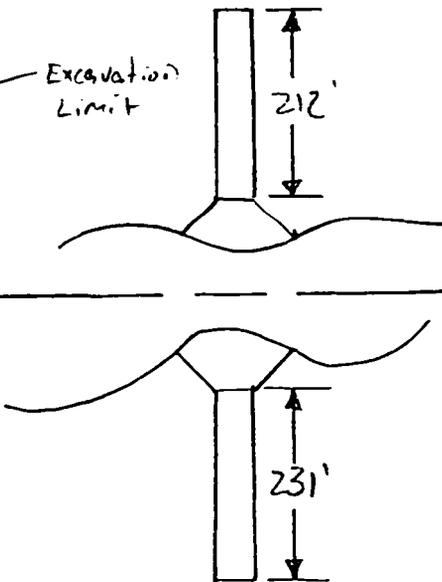
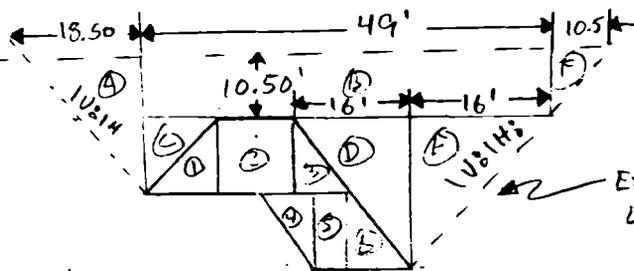
$\Sigma$  volume of RCC 92,144.00 Ft<sup>3</sup>

for wing Portion = 3,413 YD<sup>3</sup>



STA 176+39.00

Area of Excavation - Wing Portion



Area A:  $A = \frac{1}{2} \times 18.50 \times 18.50 = 171.13 \text{ Ft}^2$

Area B:  $A = 10.50 \times 49 = 514.50 \text{ Ft}^2$

Area C:  $A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$

Area D:  $A = \frac{1}{2} \times 16 \times 16 = 128 \text{ Ft}^2$

Area E:  $A = \frac{1}{2} \times 16 \times 16 = 128 \text{ Ft}^2$

Area F:  $A = \frac{1}{2} \times 10.50 \times 10.50 = 55.13 \text{ Ft}^2$

Area of Structure = 208 Ft<sup>2</sup>

Σ Area of Excavation = 1235.76 Ft<sup>2</sup>

Excavation Volume for wings

North side = 212' x 1235.76 = 261,981.12 Ft<sup>3</sup>

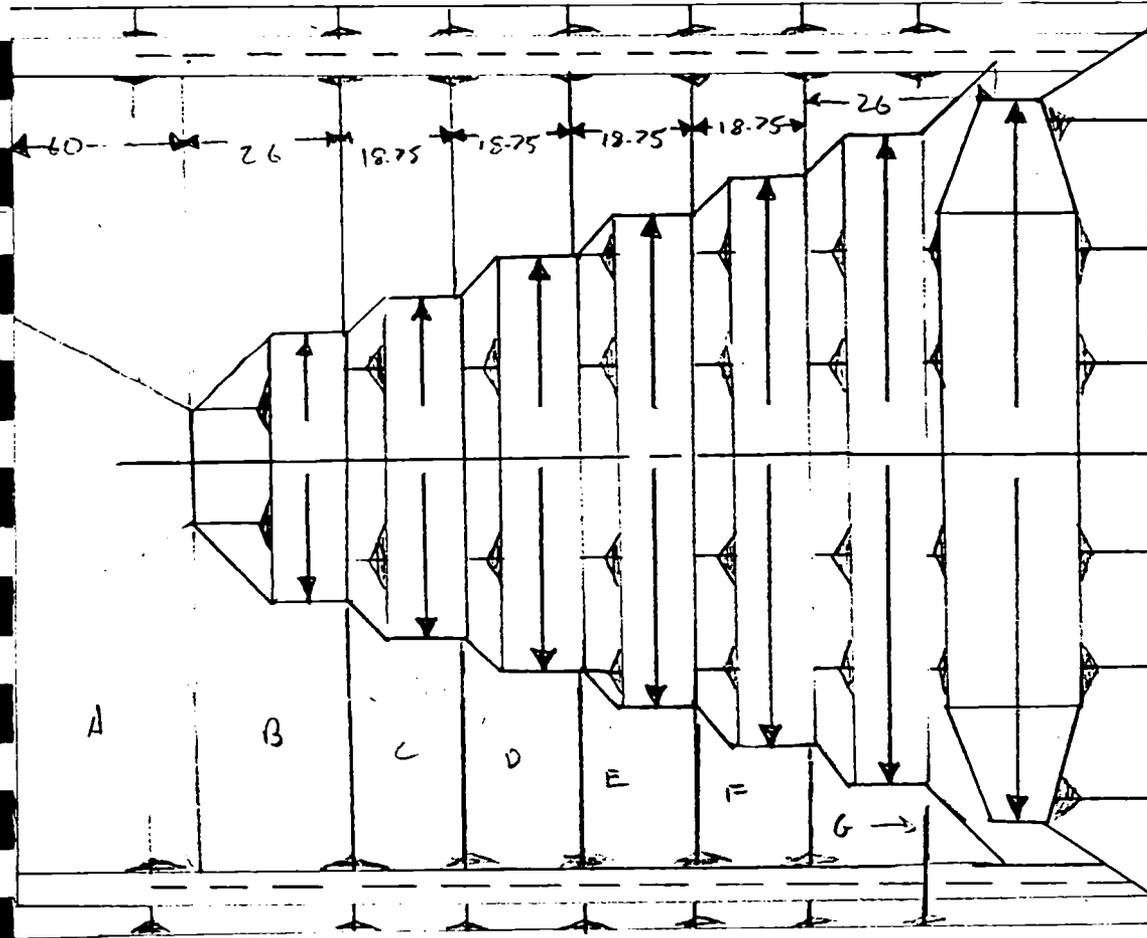
South side = 231' x 1235.76 = 285,460.56 Ft<sup>3</sup>

Σ Volume of 547,442 Ft<sup>3</sup>

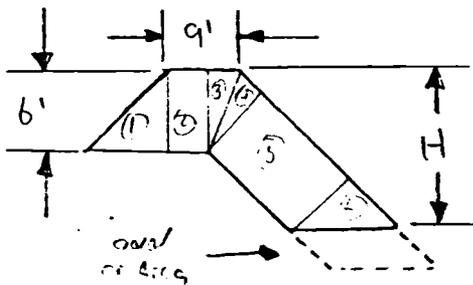
Excavation for wings = 202,76 YD<sup>3</sup>



Bank Protection Areas STA 176 +39.00



E of Low Flow Channel



section	H
G	7.25
F	10.31
E	13.37
D	16.43
C	19.49
B	22.56
A	34.80

Areas  
Common  
to all  
sections

$$\text{Area } \textcircled{1} = A = \frac{1}{2} \times 6 \times 6 = 18 \text{ ft}^2$$

$$\text{Area } \textcircled{2} = A = 6 \times 6 = 36 \text{ ft}^2$$

$$\text{Area } \textcircled{3} = A = \frac{1}{2} \times 6 \times 3 = 9 \text{ ft}^2$$

$$\text{Area } \textcircled{4} = A = \frac{1}{2} \times 6 \times 2 = 6 \text{ ft}^2$$



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 10 OF 18  
 CHKD. BY \_\_\_\_\_ DESCRIPTION RIO Salado / Cost Estimation - GCS JOB NO. 1046034

BANK Protection Areas cont STA 176+39.00

Section G:

$$\text{Area (5)} \quad A = 6.5 \cdot 1.75 = 11.38 \text{ Ft}^2$$

$$\text{Area (6)} \quad A = \frac{1}{2} \times 6.5 \times 6.5 = 21.13 \text{ Ft}^2$$

$$\Sigma \text{ Section G} = 101.51 \text{ Ft}^2$$

Section F:

$$\text{New Area added} \quad A = 10.31 - 7.25 = 3.06 \times 6.50 = 19.89$$

$$\Sigma \text{ Section F} = 121.40 \text{ Ft}^2$$

Section E:

$$\text{New Area added} \quad A = 13.37 - 10.31 = 3.06 \times 6.50 = 19.89$$

$$\Sigma \text{ Section E} = 141.29$$

Section D:

$$\text{New Area added} \quad A = 15.43 - 13.37 = 3.06 \times 6.50 = 19.89$$

$$\Sigma \text{ Section D} = 161.18$$

Section C:

$$\text{New Area added} \quad A = 19.49 - 15.43 = 3.06 \times 6.50 = 19.89$$

$$\Sigma \text{ Section C} = 181.07$$

Section B:

$$\text{New Area added} \quad A = 22.56 - 19.49 = 3.07 \times 6.50 = 19.96$$

$$\Sigma \text{ Section B} = 201.03$$

Section A:

$$\text{New Area added} \quad A = 34.80 - 22.56 = 12.24 \times 6.50 = 79.56$$

$$\Sigma \text{ Section A} = 280.59$$



MONTGOMERY WATSON

BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 11 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION RFD Salcedo/est estimation - GCS JOB NO. 1046034

BANK Protection RCC Volumes STA 176+39.00

Section	Area, (A <sup>2</sup> )	width of section (A)	Volume (Ft <sup>3</sup> )
A	280.59	60	16,835.40
B	201.03	26	5,226.78
C	181.07	18.75	3,395.06
D	161.18	18.75	3022.13
E	141.29	18.75	2649.19
F	121.40	18.75	2276.25
G	101.51	26	2639.26

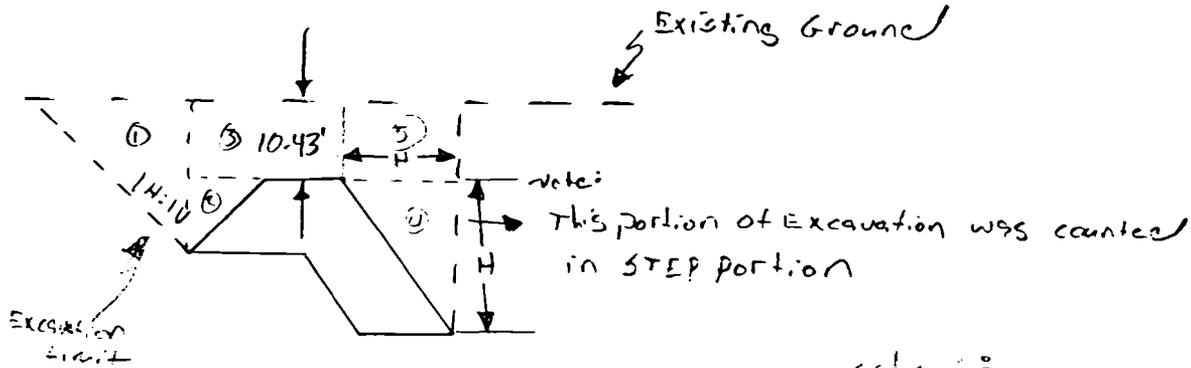
Σ 36,044.07 Ft<sup>3</sup>

X2 Banks = 72,088 Ft<sup>3</sup> ←



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 12 OF 19  
CHKD. BY \_\_\_\_\_ DESCRIPTION REQ Solado/cost estimation - GCS JOB NO. 1046034

BANK Protection Excavation Volumes  
STA 176+39.00



Area  
Area  
Area

Area 1:  $\frac{1}{2} \times 16.43 \times 16.43 = 134.97$

Area 2:  $\frac{1}{2} \times 16.43 \times 10.43 = 85.6$

Area 3:  $10.43 \times 7.25 = 75.62$

Area 4:  $10.43 \times 10.43 = 108.82$

Area 5:  $10.43 \times 10.43 = 108.82$

Section D:

Area 4:  $\frac{1}{2} \times 16.43 \times 16.43 = 134.97$

Area 2:  $\frac{1}{2} \times 16.43 \times 10.43 = 85.6$

---

$\Sigma$  Area Section D = 636.61 FT<sup>2</sup>

Section C:

Area 4:  $\frac{1}{2} \times 19.49 \times 19.49 = 189.93$

Area 5:  $19.49 \times 10.43 = 203.28$

---

$\Sigma$  Area of section C = 723.49 FT<sup>2</sup>

Section F:

Area 4:  $\frac{1}{2} \times 7.25 \times 7.25 = 26.28$

Area 5:  $10.43 \times 7.25 = 75.62$

---

$\Sigma$  Area Section F = 432.18 FT<sup>2</sup>

Section B:

Area 4:  $\frac{1}{2} \times 22.56 \times 22.56 = 254.48$

Area 5:  $22.56 \times 10.43 = 235.30$

---

$\Sigma$  Area of section B = 820.06 FT<sup>2</sup>

Section E:

Area 4:  $\frac{1}{2} \times 10.31 \times 10.31 = 53.15$

Area 5:  $10.31 \times 10.43 = 107.53$

---

$\Sigma$  Area Section E = 490.96 FT<sup>2</sup>

Section A:

Area 4:  $\frac{1}{2} \times 34.80 \times 34.80 = 605.52$

Area 5:  $34.80 \times 10.43 = 362.96$

---

$\Sigma$  Area Section A = 1298.76 FT<sup>2</sup>

Section E:

Area 4:  $\frac{1}{2} \times 13.37 \times 13.37 = 89.38$

Area 5:  $10.43 \times 13.37 = 139.45$

---

$\Sigma$  Area Section E = 559.11 FT<sup>2</sup>



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 13 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION RISoleado / cost estimation - GCS JOB NO. 1046034

BANK Protection Volumes of Excavation STA 176.139.00

Section	Area of Excavation above Structure (Ft <sup>2</sup> )	Area of structure (Ft <sup>2</sup> )	Total area for section (Ft <sup>2</sup> )
A	1298.76	280.59	1579.35
B	820.06	201.03	1021.09
C	723.49	181.07	904.56
D	636.61	161.18	797.79
E	559.11	141.29	700.40
F	490.96	121.40	612.36
G	435.18	101.51	533.69

Section	width of section (Ft)	Total volume Excavated (Ft <sup>3</sup> )
A	60	94761.00
B	26	26,548.34
C	18.75	16,960.50
D	18.75	14,958.56
E	18.75	13,132.50
F	18.75	11,481.75
G	26	13,875.94
		<u>Σ 191,718.59</u>
		X 2 Banks = 383,437 Ft <sup>3</sup> ←



MONTGOMERY WATSON

14 OF 18 SHEET

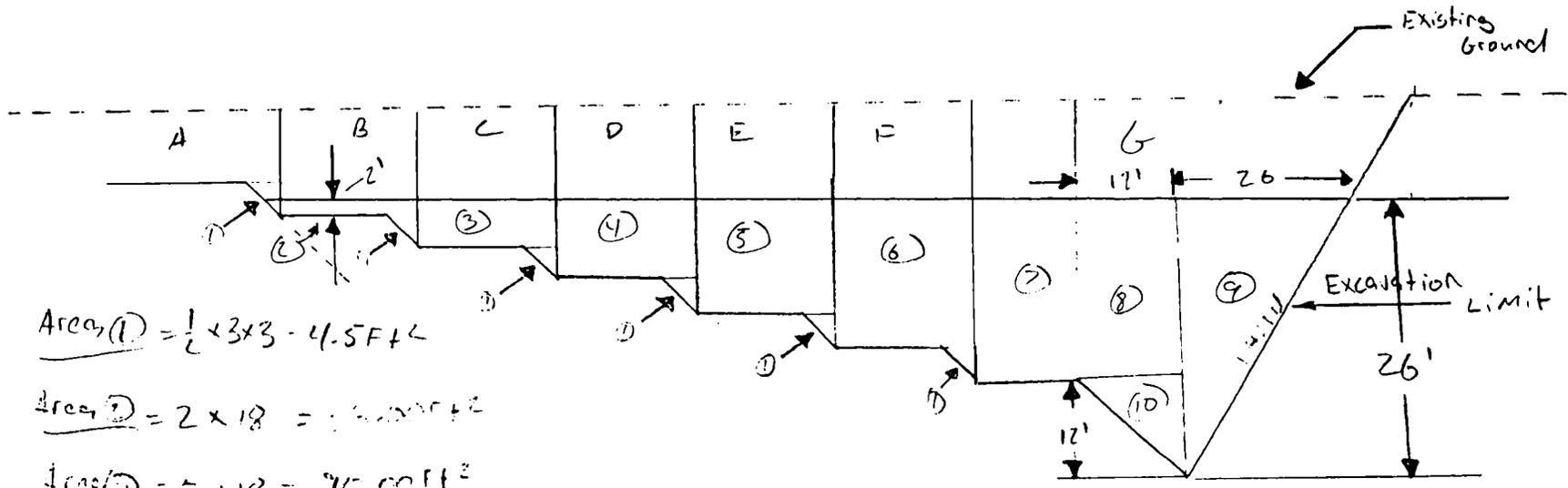
DATE 10/20/00 CLIENT CTD SULLIVAN PROJECT

JOB NO. 1040024

DESCRIPTION COST ESTIMATE PREPARATION / SCS

CHKD. BY

STEP Portion Backfill Areas STA 176+39.00



- Area ① =  $\frac{1}{2} \times 3 \times 3 = 4.5 \text{ FT}^2$
- Area ② =  $2 \times 18 = 36.00 \text{ FT}^2$
- Area ③ =  $5 \times 18 = 90.00 \text{ FT}^2$
- Area ④ =  $8 \times 18 = 144.00 \text{ FT}^2$
- Area ⑤ =  $11 \times 18 = 198.00 \text{ FT}^2$
- Area ⑥ =  $14 \times 18 = 252.00 \text{ FT}^2$
- Area ⑦ =  $17 \times 15 = 255.00 \text{ FT}^2$
- Area ⑧ =  $17 \times 12 = 204.00 \text{ FT}^2$
- Area ⑨ =  $\frac{1}{2} \times 26 \times 26 = 338.00 \text{ FT}^2$
- Area ⑩ =  $\frac{1}{2} \times 12 \times 12 = 72.00 \text{ FT}^2$



BY Robert Martin DATE 10-10-00 CLIENT USAACE (LA District) SHEET 15 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION Rio Salado / cost estimation - CCS JOB NO. 1046034

Back fill volumes - step portion STA 176+39.00

Section A N/A

Section B  $A = 4.5 + 36 = 40.50 \text{ Ft}^2$   
gross (1+2)  $V = 255 \times A = 10,327.50 \text{ Ft}^3$

Section C  $A = 4.5 + 90 = 94.50 \text{ Ft}^2$   
gross (1+3)  $V = 248 \times A = 23,436.00 \text{ Ft}^3$

Section D  $A = 4.5 + 111 = 115.50 \text{ Ft}^2$   
gross (1+4)  $V = 241 \times A = 35,788.50 \text{ Ft}^3$

Section E  $A = 4.5 + 192 = 196.50 \text{ Ft}^2$   
gross (1+5)  $V = 234 \times A = 47,385.00 \text{ Ft}^3$

Section F  $A = 4.5 + 211 = 215.50 \text{ Ft}^2$   
gross (1+6)  $V = 227 \times A = 50,225.50 \text{ Ft}^3$

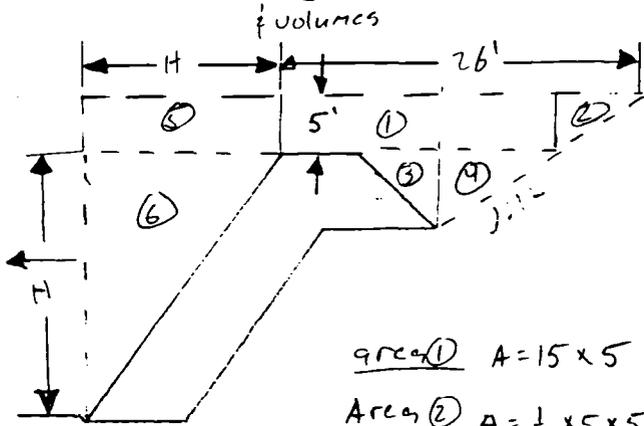
Section G  $A = 255 + 204 + 332 + 72 = 869.00 \text{ Ft}^2$   
gross (2+5+7+10)  $V = 220 \times A = 191,180.00 \text{ Ft}^3$

$\Sigma$  Volume of Backfill - Step Portion = 366,343 Ft<sup>3</sup>



BY Robert Martin DATE 10-20-00 CLIENT USACE (LAD) District SHEET 16 OF 18  
 CHKD. BY \_\_\_\_\_ DESCRIPTION Rep school/cost estimation - GCS JOB NO. 1046034

BACK Fill Areas - Bank Protection STA 176+39.00



This section  
is to be  
used for  
estimation

Section	H
A	34.80
B	22.56
C	19.49
D	16.43
E	13.37
F	10.31
G	7.25

Area ①  $A = 15 \times 5 = 75.00 \text{ FT}^2$   
 Area ②  $A = \frac{1}{2} \times 5 \times 5 = 12.50 \text{ FT}^2$   
 Area ③  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ FT}^2$   
 Area ④  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ FT}^2$

AREAS COMMON  
to all sections

Section	$A = H \times 5$ Area ① (FT <sup>2</sup> )	$A = \frac{1}{2} \times H \times H$ Area ② (FT <sup>2</sup> )	Width of Section (FT)	Total Area (FT <sup>2</sup> )	VOLUME of Bank Fill (FT <sup>3</sup> )
A	174.00	605.52	60	1026.52	61,591.20
B	112.50	254.18	26	490.78	12,760.28
C	97.45	159.93	18.75	410.88	7,704.00
D	52.15	134.97	18.75	340.62	5,356.63
E	61.55	89.38	18.75	279.73	5,244.94
F	51.55	53.15	18.75	225.30	4,278.75
G	31.25	36.22	26	196.03	4,936.78

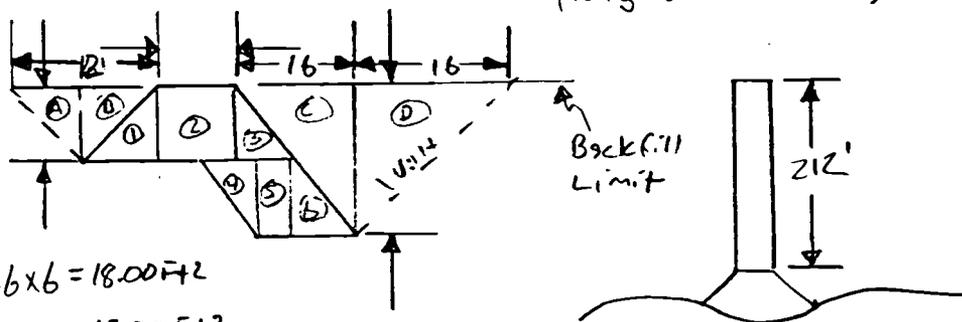
$\Sigma 102,862.58 \text{ FT}^3$

$\times 2 \text{ Banks} = 205,605 \text{ FT}^3$



Backfill

GRADE CONTROL STRUCTURE STA 176+39.00  
"Wing Portion" Areas & Volumes  
(Wing Portion of Weir)



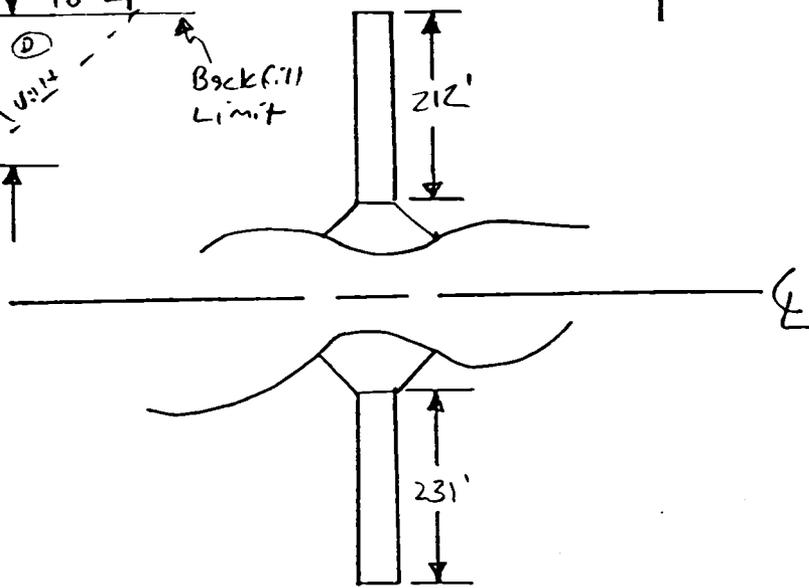
Area A =  $\frac{1}{2} \times 6 \times 6 = 18.00 \text{ Ft}^2$

Area B =  $\frac{1}{2} \times 6 \times 6 = 18.00 \text{ Ft}^2$

Area C =  $\frac{1}{2} \times 16 \times 16 = 128.00 \text{ Ft}^2$

Area D =  $\frac{1}{2} \times 16 \times 16 = 128.00 \text{ Ft}^2$

$\Sigma$  Area of Backfill 292.00 Ft<sup>2</sup>



North Wing Backfill

$292.00 \text{ Ft}^2 \times 212 \text{ Ft} = 61,904.00 \text{ Ft}^3$

South wing Backfill

$292.00 \text{ Ft}^2 \times 231 \text{ Ft} = 67,452.00 \text{ Ft}^3$

$\Sigma$  total Backfill 129,356 .00 Ft<sup>3</sup>  
Wing Portion

## Grade Control Structure Summary

STA 176 + 39.00

Section of GCS	RCC Volume (Yd <sup>3</sup> )	Excavation Volume (Yd <sup>3</sup> )	Backfill Volume (Yd <sup>3</sup> )
Step Portion	8,989.81	43,060.30	13,568.26
Wing Portion	3,400.00	20,406.85	4,790.96
Bank Protection	2,669.93	14,201.37	7,615.00
<b>Totals</b>	<b>15,059.74</b>	<b>77,668.52</b>	<b>25,974.22</b>

# Montgomery Watson Mining Group

## Calculation Cover Sheet

Sheet 1 of 18

<i>PROJECT TITLE</i>	Rio Salado Project – Cost Estimate Preparation STA 237+8.00
<i>PROJECT NO.</i>	1046034
<i>CALCULATION TITLE</i>	Grade Control Structures – RCC Volumes & Excavation Volumes

	<i>NAME</i>	<i>DATE</i>
<i>PREPARED BY</i>	Robert Martin	10-12-00
<i>CHECKED BY</i>		
<i>REVIEWED BY</i>		

Notes:

Attach all supporting documentation including data and formula sources, references, and previous revisions, as necessary.



MONTGOMERY WATSON

BY Robert Martin DATE 10-20-00 CLIENT USACE SHEET 2 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION REO Salgado / Cost Estimation - GCS JOB NO. 1046034

GRADE CONTROL STRUCTURE volumetrics STA 237+8.00

objective : Determine Quantities of Excavation, Backfill and RCC for each structure

approach : Measure geometries of Grade Control Structure from scaled plan & section views

Each Grade Control Structure was Broken up into three components:

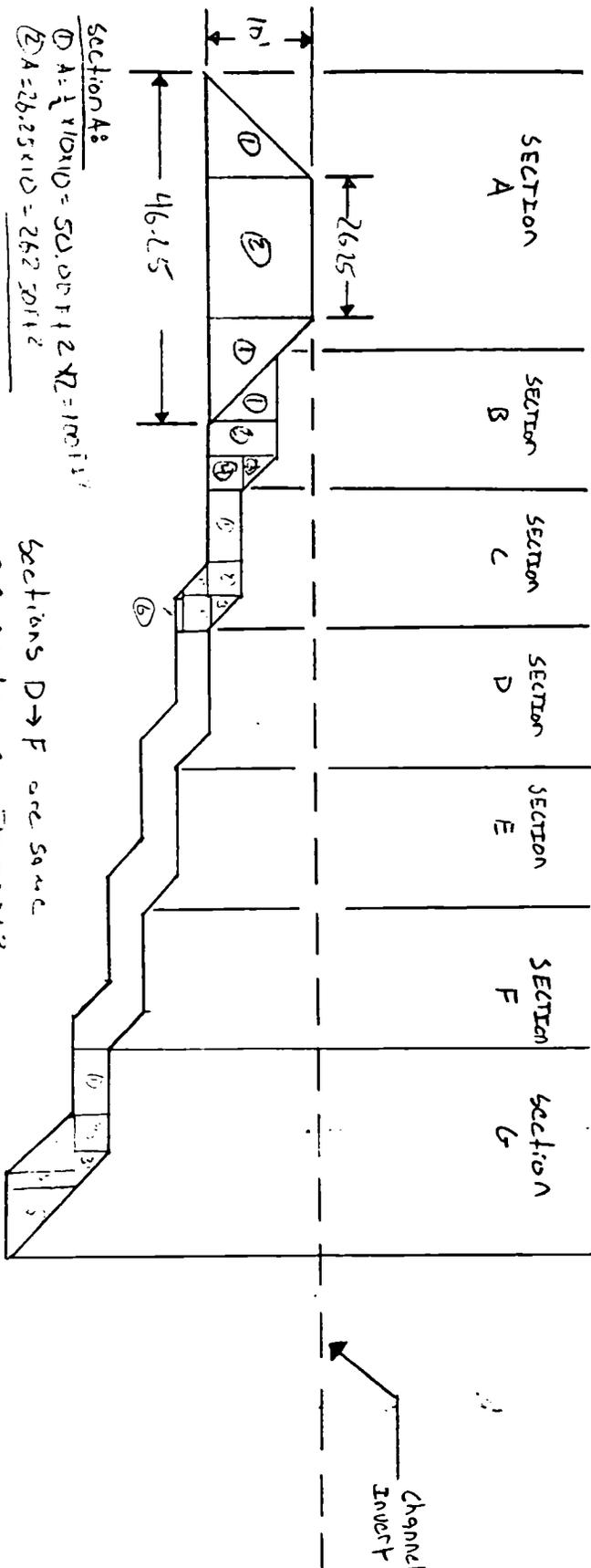
- 1) STEP Portion
- 2) Wing Portion
- 3) Bank Protection

Calculations + Summary on following pages



STEP Section

DLL Area 9.5 STA 237 - 8.00



Section A:  
 ① A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 ② A = 26.25 \* 10 = 262.50 sq ft

Σ Section A = 312.50 sq ft

Section B:  
 ① A = 1/2 \* 26.25 \* 10 = 131.25 sq ft  
 ② A = 26.25 \* 10 = 262.50 sq ft  
 ③ A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 ④ A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 Σ Section B = 493.75 sq ft

Σ Section B = 920.00 sq ft

Section C:  
 ① A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 ② A = 10 \* 10 = 100.00 sq ft  
 ③ A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 ④ A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 ⑤ A = 10 \* 10 = 100.00 sq ft  
 ⑥ A = 10 \* 10 = 100.00 sq ft  
 Σ Section C = 450.00 sq ft

Σ Section C = 78.50 sq ft

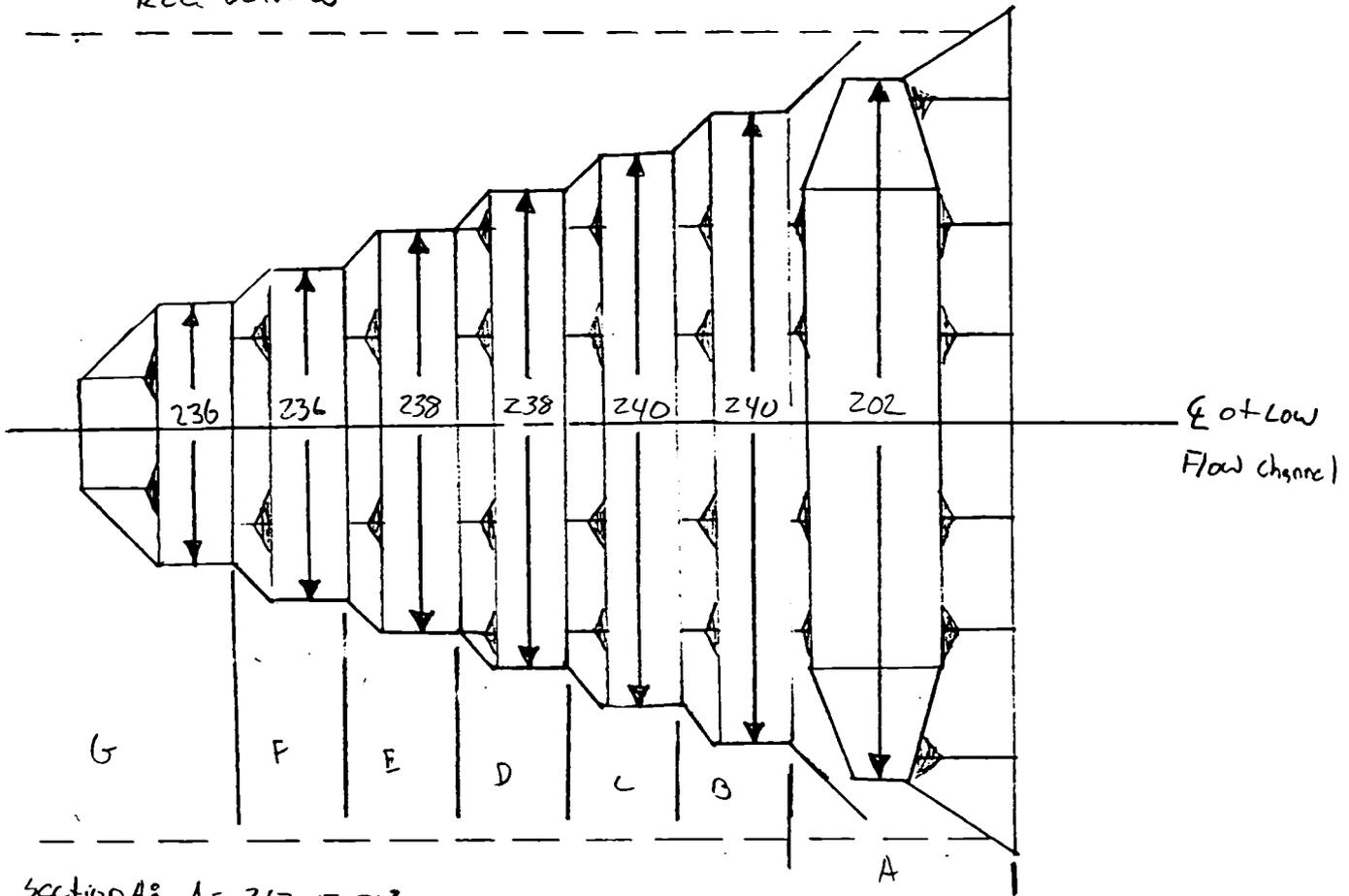
Sections D-F are same  
 9.5 Section C = 78.50 sq ft

Section G:  
 ① A = 10 \* 10 = 100.00 sq ft  
 ② A = 10 \* 10 = 100.00 sq ft  
 ③ A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 ④ A = 1/2 \* 10 \* 10 = 50.00 sq ft  
 Σ Section G = 300.00 sq ft

Σ Section G = 140.00 sq ft



STEP Portion STA 237+8.00  
RCC Volumes



Section A:  $A = 362.50 \text{ ft}^2$

$U = 202 \times A = 73,225.00 \text{ ft}^3$

Section B:  $A = 140.00 \text{ ft}^2$

$U = 236 \times A = 33,040.00 \text{ ft}^3$

Section C:  $A = 97.00 \text{ ft}^2$

$U = 240 \times A = 23,280.00 \text{ ft}^3$

Section D:  $A = 78.50 \text{ ft}^2$

$U = 240 \times A = 18,840.00 \text{ ft}^3$

Section E:  $A = 78.50 \text{ ft}^2$

$U = 238 \times A = 18,683.00 \text{ ft}^3$

Section F:  $A = 78.50 \text{ ft}^2$

$U = 238 \times A = 18,683.00 \text{ ft}^3$

Section G:  $A = 78.50 \text{ ft}^2$

$U = 236 \times A = 18,526.00 \text{ ft}^3$

Σ Volume of RCC for STEP Portion

$= 204,277 \text{ ft}^3$

$= 7,565 \text{ yd}^3$

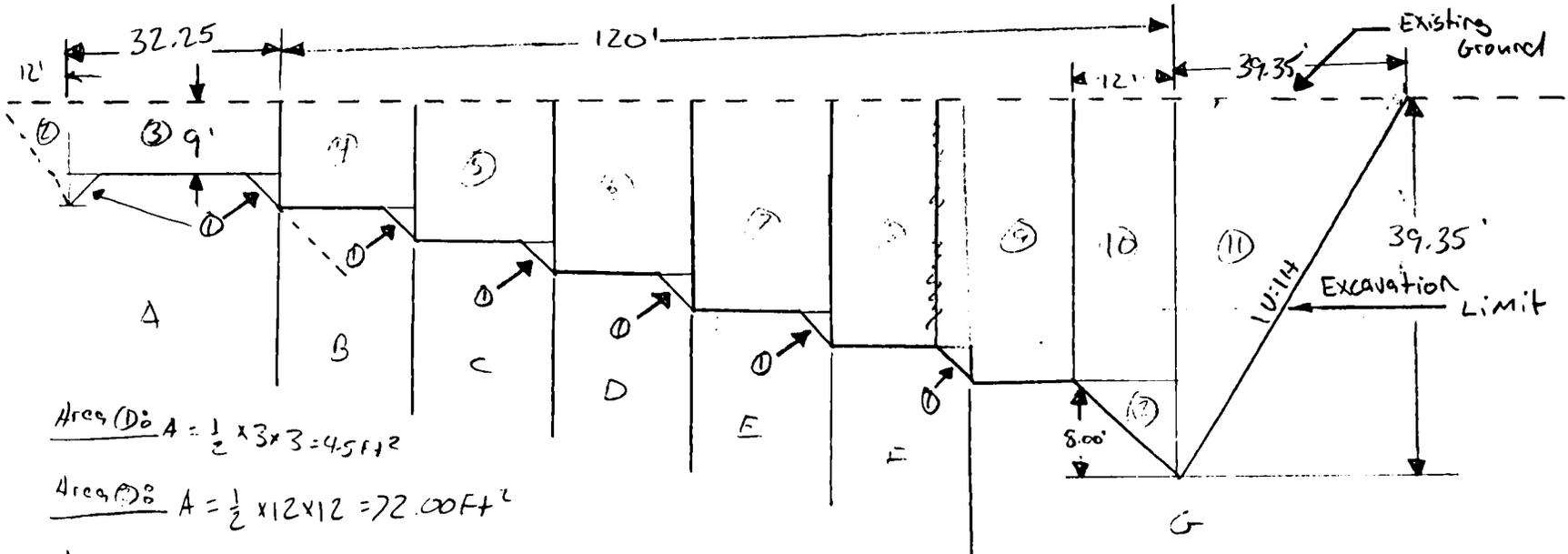


MONTGOMERY WATSON

BY Robert Martin DATE 10-12-00 CLIENT RIO SALADO PROJECT  
CHKD. BY DESCRIPTION COST ESTIMATE PREPARATION / GCS

SHEET 5 OF 18  
JOB NO. 1046034

STEP PORTION EXCAVATION AREAS STA 237+8.00



Area ①:  $A = \frac{1}{2} \times 3 \times 3 = 4.5 \text{ Ft}^2$

Area ②:  $A = \frac{1}{2} \times 12 \times 12 = 72.00 \text{ Ft}^2$

Area ③:  $A = 9 \times 32.25 = 290.25 \text{ Ft}^2$

Area ④:  $A = 12 \times 18 = 216.00 \text{ Ft}^2$

Area ⑤:  $A = 15 \times 18 = 270.00 \text{ Ft}^2$

Area ⑥:  $A = 18 \times 18 = 324.00 \text{ Ft}^2$

Area ⑦:  $A = 21 \times 18 = 378.00 \text{ Ft}^2$

Area ⑧:  $A = 24 \times 18 = 432.00 \text{ Ft}^2$

Area ⑨:  $A = 27 \times 15 = 405.00 \text{ Ft}^2$

Area ⑩:  $A = 27 \times 12 = 324.00 \text{ Ft}^2$

Area ⑪:  $A = \frac{1}{2} \times 39.35 \times 39.35 = 774.21 \text{ Ft}^2$

Area ⑫:  $A = \frac{1}{2} \times 18 \times 12 = 108.00 \text{ Ft}^2$



Volume of Excavation

STEP Portion

STA 237+8.00

(Refer to step portion Excavation Areas & Rec Volume Schematics)

Section A<sub>0</sub> A = 4.5 + 4.5 + 72 + 290.25 = 371.25 Ft<sup>2</sup>  
 areas (1-1 + 2+3)  
 V = 202 x A = 74,992.50 Ft<sup>3</sup>

Section B<sub>0</sub> A = 4.5 + 216 = 220.50 Ft<sup>2</sup>  
 areas (1+4)  
 V = 240 x A = 52,920.00 Ft<sup>3</sup>

Section C<sub>0</sub> A = 4.5 + 270 = 274.50 Ft<sup>2</sup>  
 areas (1+5)  
 V = 240 x A = 65,880.00 Ft<sup>3</sup>

Section D<sub>0</sub> A = 4.5 + 324 = 328.50 Ft<sup>2</sup>  
 areas (1+6)  
 V = 238 x A = 78,183.00 Ft<sup>3</sup>

Section E<sub>0</sub> A = 4.5 + 378 = 382.50 Ft<sup>2</sup>  
 areas (1+7)  
 V = 238 x A = 91,035.00 Ft<sup>3</sup>

Section F<sub>0</sub> A = 4.5 + 432 = 436.50 Ft<sup>2</sup>  
 areas (1+8)  
 V = 236 x A = 103,014.00 Ft<sup>3</sup>

Section G<sub>0</sub> A = 405 + 324 + 774.21 + 48 = 1551.21 Ft<sup>2</sup>  
 areas (9+10+11+12)  
 V = 236 x A = 366,085.56 Ft<sup>3</sup>

Volume of step portion

204,277 Ft<sup>3</sup>

Σ Volume of  
 Excavation for  
 STEP Portion = 1,036,087 Ft<sup>3</sup>  
 = 38,385 YD<sup>3</sup>



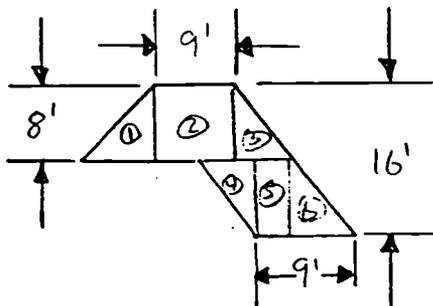
BY Robert Martin DATE 10-12-00 CLIENT ZED SALADO PROJECT

SHEET 7 OF 18

CHKD. BY \_\_\_\_\_ DESCRIPTION COST ESTIMATE PREPARATION

JOB NO. 1046034

GRADE CONTROL STRUCTURE  
"Wing Portion" Areas & Volumes STA 237+43.00  
(Wing Portion of Weir)



Area ①

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area ②

$$A = 9 \times 8 = 72 \text{ Ft}^2$$

Area ③

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area ④

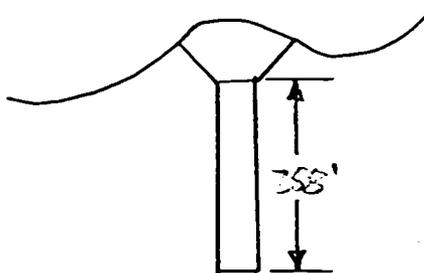
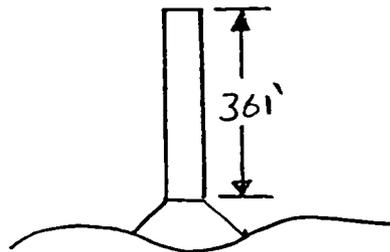
$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area ⑤

$$A = 1 \times 8 = 8 \text{ Ft}^2$$

Area ⑥  $A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$

$$\sum \text{of Areas} = 208 \text{ Ft}^2$$



Volume of RCC

North side

$$361' \times 208 \text{ Ft}^2 = 75,088 \text{ Ft}^3$$

South side

$$255' \times 208 \text{ Ft}^2 = 52,904 \text{ Ft}^3$$

$$\sum \text{Volume of RCC} = 127,992 \text{ Ft}^3$$

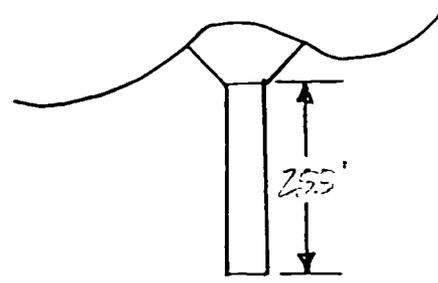
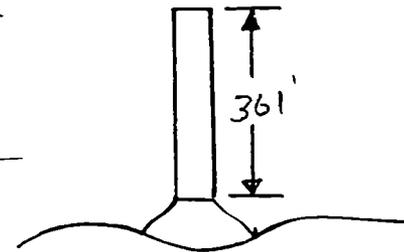
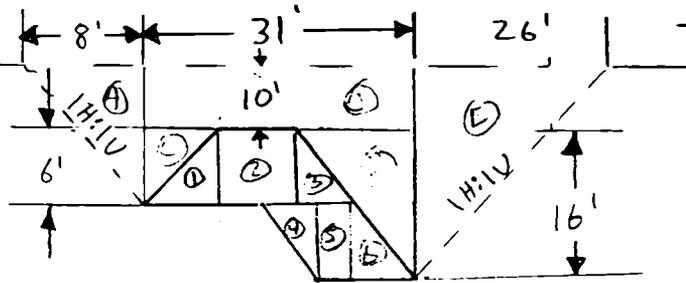
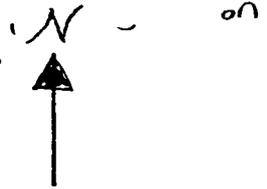
for wing Portion

$$= 4,999 \text{ Ft}^3$$



Area of Excavation - wing Area

STA 237 + 8.00



Area A:  $A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$

Area B:  $A = 31 \times 10 = 310 \text{ Ft}^2$

Area C:  $A = \frac{1}{2} \times 6 \times 6 = 18 \text{ Ft}^2$

Area D:  $A = \frac{1}{2} \times 16 \times 16 = 128 \text{ Ft}^2$

Area E:  $A = \frac{1}{2} \times 26 \times 26 = 338 \text{ Ft}^2$

Area of Structure = 208 Ft<sup>2</sup>

Excavation = 1034.00 Ft<sup>2</sup>

Excavation Volume for Wings

north side = 361' x 1034.00 = 373,274 Ft<sup>3</sup>

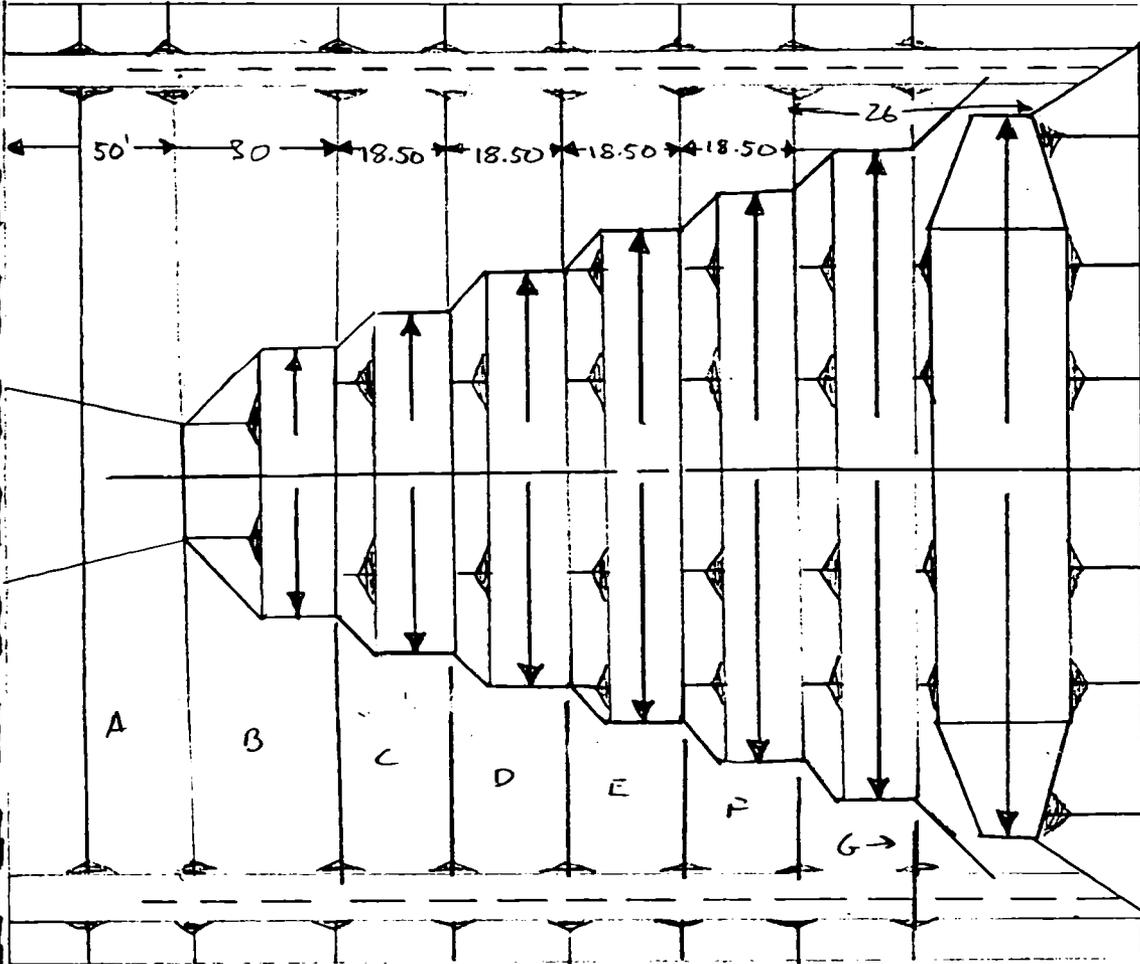
south side = 288 x 1034.00 = 297,792 Ft<sup>3</sup>

Excavation Total volume for wings = 671,066 Ft<sup>3</sup>

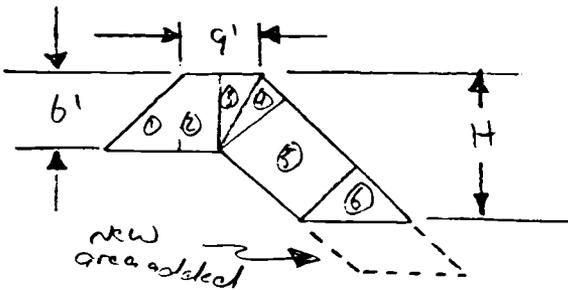
= 24,854 YD<sup>3</sup>



BANK Protection Areas STA 237+8.00



E of Low Flow channel



Section	H
A	35-27
B	25-13
C	22-13
D	19-13
E	16-13
F	13-13
G	10-13

Area 1:  $A = \frac{1}{2} \times 6 \times 6 = 18 \text{ Ft}^2$

Area 2:  $A = 6 \times 6 = 36 \text{ Ft}^2$

Area 3:  $A = \frac{1}{2} \times 6 \times 3 = 9 \text{ Ft}^2$

Area 4:  $A = \frac{1}{2} \times 6 \times 2 = 6 \text{ Ft}^2$

areas common to all sections



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 10 OF 18  
 CHKD. BY \_\_\_\_\_ DESCRIPTION RIO SALADO/COST ESTIMATION - GCS JOB NO. 1046034

BANK Protection Areas CONT STA 237+8.00

Section G:

Area (5)  $A = 6.5 \times 5.83 = 37.90 \text{ Ft}^2$

Area (6)  $A = \frac{1}{2} \times 6.5 \times 6.5 = 21.13 \text{ Ft}^2$

$\Sigma$  Section G = 128.03  $\text{Ft}^2$

Section F:

new area added  $A = 13.13 - 10.13 = 3.00 \times 6.50 = 19.50$

$\Sigma$  Section F = 147.53  $\text{Ft}^2$

Section E:

new area added  $A = 16.13 - 13.13 = 3.00 \times 6.50 = 19.50$

$\Sigma$  Section E = 167.03  $\text{Ft}^2$

Section D:

new area added  $A = 19.13 - 16.13 = 3.00 \times 6.50 = 19.50$

$\Sigma$  Section D = 186.53  $\text{Ft}^2$

Section C:

new area added  $A = 22.13 - 19.13 = 3.00 \times 6.50 = 19.50$

$\Sigma$  Section C = 206.03  $\text{Ft}^2$

Section B:

new area added  $A = 25.13 - 22.13 = 3.00 \times 6.50 = 19.50$

$\Sigma$  Section B = 225.53  $\text{Ft}^2$

Section A:

new area added  $A = 35.27 - 25.13 = 10.14 \times 6.50 = 65.91$

$\Sigma$  Section A = 291.44  $\text{Ft}^2$



MONTGOMERY WATSON

BY Robert Martin DATE 10-20-00 CLIENT USAACE (LA District) SHEET 11 OF 18  
CHKD. BY DESCRIPTION REO SALADO / COST ESTIMATION - GCS JOB NO. 1046034

BANK Protection Rec volumes STA 237+8.00

Section	Area (F <sup>2</sup> )	width of section (F)	Volume (F <sup>3</sup> )
A	291.44	50.00	14,572.00
B	225.53	30.00	6765.90
L	206.03	18.50	3811.56
D	186.53	18.50	3450.81
E	167.03	18.50	3090.06
F	147.53	18.50	2729.31
G	128.03	26.00	3328.78

Σ 37748.42 F<sup>3</sup>

x 2 Banks = 75,497 F<sup>3</sup>



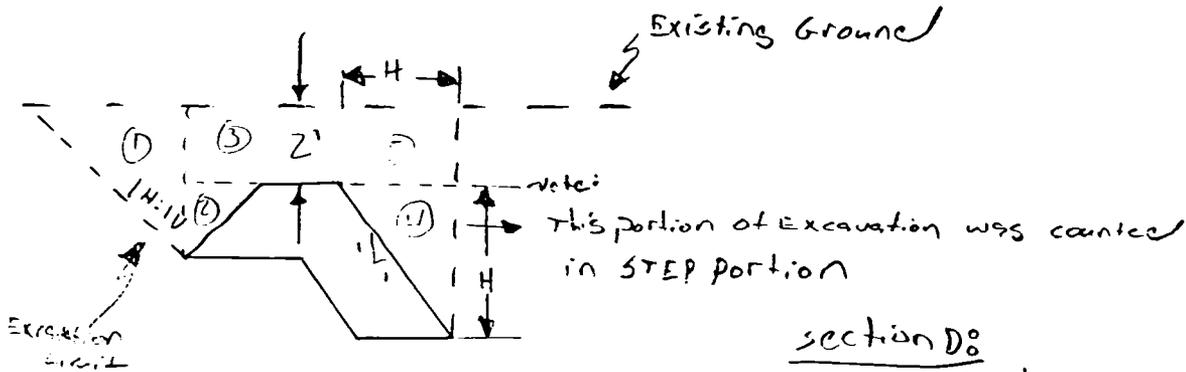
BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District)

SHEET 12 OF 18

CHKD. BY \_\_\_\_\_ DESCRIPTION RTO Salgado/COST ESTIMATION - GCS

JOB NO. 1046034

BANK Protection Excavation Volumes  
STA 237+8.00



Area ①:  $A = \frac{1}{2} \times 8 \times 8 = 32.00 \text{ Ft}^2$

Area ②:  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ Ft}^2$

Area ③:  $A = 2 \times 17 = 34.00 \text{ Ft}^2$

areas  
common  
to all  
sections

section D:

area ④:  $\frac{1}{2} \times 19.13 \times 19.13 = 182.98$

area ⑤:  $19.13 \times 2 = 38.26$

Σ area section D 305.24 Ft<sup>2</sup>

section C:

area ④:  $\frac{1}{2} \times 22.13 \times 22.13 = 244.87$

area ⑤:  $22.13 \times 2 = 44.26$

Σ area section C 373.13 Ft<sup>2</sup>

section B:

area ④:  $\frac{1}{2} \times 25.13 \times 25.13 = 315.76$

area ⑤:  $25.13 \times 2 = 50.26$

Σ area section B 450.02 Ft<sup>2</sup>

section A:

area ④:  $\frac{1}{2} \times 35.27 \times 35.27 = 621.99$

area ⑤:  $35.27 \times 2 = 70.54$

Σ area section A 776.53 Ft<sup>2</sup>

section G:

area ④:  $\frac{1}{2} \times 10.13 \times 10.13 = 51.31$

area ⑤:  $10.13 \times 2 = 20.26$

Σ Area section G 155.57 Ft<sup>2</sup>

section F:

area ④:  $\frac{1}{2} \times 13.13 \times 13.13 = 86.20$

area ⑤:  $13.13 \times 2 = 26.26$

Σ Area section F 196.46 Ft<sup>2</sup>

section E:

area ④:  $\frac{1}{2} \times 16.13 \times 16.13 = 130.09$

area ⑤:  $16.13 \times 2 = 32.26$

Σ Area section E 246.35



MONTGOMERY WATSON

BY Robert Martin DATE 10-20-00 CLIENT USACE ILA District SHEET 13 OF 18  
CHKD. BY DESCRIPTION RIO Salado/Cost Estimation -GCS JOB NO. 1046034

BANK Protection Volumes of Excavation STA 237+8.00

Section	Area of Excavation above Structure (Ft <sup>2</sup> )	Area of Structure (Ft <sup>2</sup> )	Total area for section (Ft <sup>2</sup> )
A	776.53	291.44	1067.97
B	450.02	225.53	675.55
C	373.13	206.03	579.16
D	305.24	186.53	491.77
E	246.35	167.03	413.38
F	196.46	147.53	343.99
G	155.57	128.03	283.60

Section	Width of section (Ft)	Total Volume Excavated (Ft <sup>3</sup> )
A	60.00	64,078.20
B	30.00	20,266.50
C	18.50	10,714.46
D	18.50	9,097.75
E	18.50	7,647.53
F	18.50	6,363.82
G	26.00	7,373.60
		Σ 125,541.86 Ft <sup>3</sup>

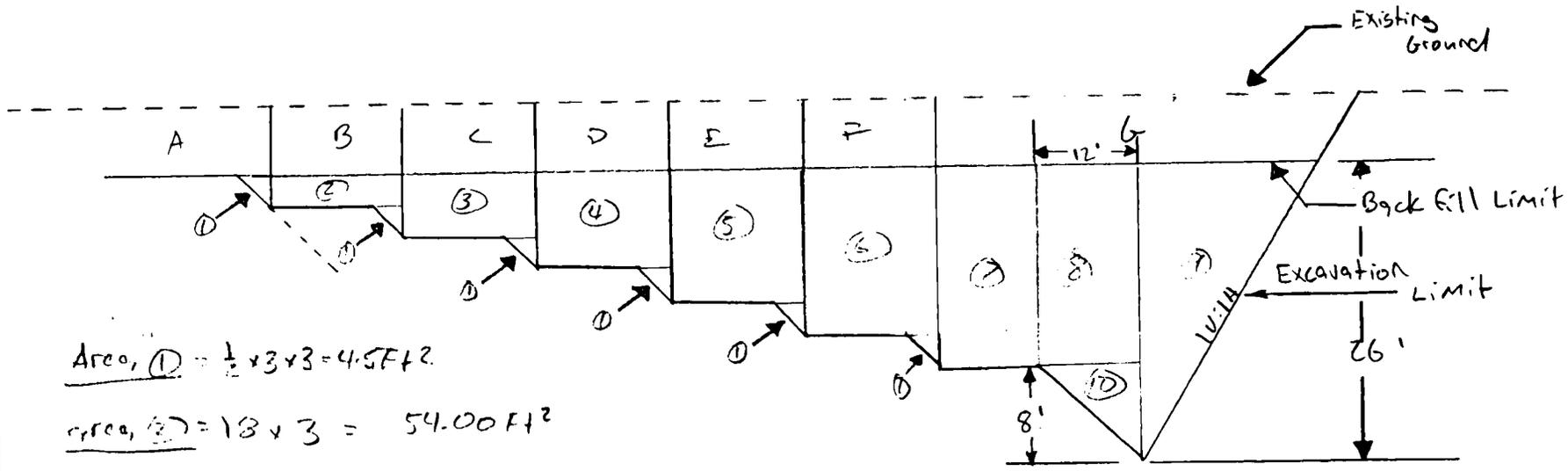
X 2 Banks = 251,084 Ft<sup>3</sup>



MONTGOMERY WATSON

BY C. Best Martin DATE 10-12-00 CLIENT RIO SALADO PROJECT SHEET 14 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION COST ESTIMATE PREPARATION / GCS JOB NO. 1043034

STEP Portion BACK Fill Areas STA 237+8.00



- Area ① =  $\frac{1}{2} \times 3 \times 3 = 4.5 \text{ FT}^2$
- Area ② =  $18 \times 3 = 54.00 \text{ FT}^2$
- Area ③ =  $18 \times 6 = 108.00 \text{ FT}^2$
- Area ④ =  $18 \times 9 = 162.00 \text{ FT}^2$
- Area ⑤ =  $18 \times 12 = 216.00 \text{ FT}^2$
- Area ⑥ =  $18 \times 15 = 270.00 \text{ FT}^2$
- Area ⑦ =  $15 \times 18 = 270.00 \text{ FT}^2$
- Area ⑧ =  $15 \times 12 = 180.00 \text{ FT}^2$
- Area ⑨ =  $\frac{1}{2} \times 26 \times 26 = 338.00 \text{ FT}^2$
- Area ⑩ =  $\frac{1}{2} \times 8 \times 12 = 48.00 \text{ FT}^2$



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 5 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION RIO Salado / cost estimation - GC 5 JOB NO. 1046034

BACK FILL VOLUMES - STEP Portion STA 237+8.00

Section A  
gross (1)

$$A = 4.5F + 2$$

$$V = 202 \times A = 909.00 \text{ Ft}^3$$

Section B  
gross (1+2)

$$A = 4.5 + 54.00 = 58.50 \text{ Ft}^2$$

$$V = 240 \times A = 14,040.00 \text{ Ft}^3$$

Section C  
gross (1+3)

$$A = 4.5 + 108.00 = 112.50 \text{ Ft}^2$$

$$V = 240 \times A = 27,000.00 \text{ Ft}^3$$

Section D  
gross (1+4)

$$A = 4.5 + 162.00 = 166.50 \text{ Ft}^2$$

$$V = 238 \times A = 39,627.00 \text{ Ft}^3$$

Section E  
gross (1+5)

$$A = 4.5 + 216.00 = 220.50 \text{ Ft}^2$$

$$V = 238 \times A = 52,479.00 \text{ Ft}^3$$

Section F  
gross (1+6)

$$A = 4.5 + 270.00 = 274.50 \text{ Ft}^2$$

$$V = 236 \times A = 64,782.00 \text{ Ft}^3$$

Section G  
gross (7.5' x 20.0')

$$A = 270.00 + 20 \times 33.8 \times 1.5 = 836.00 \text{ Ft}^2$$

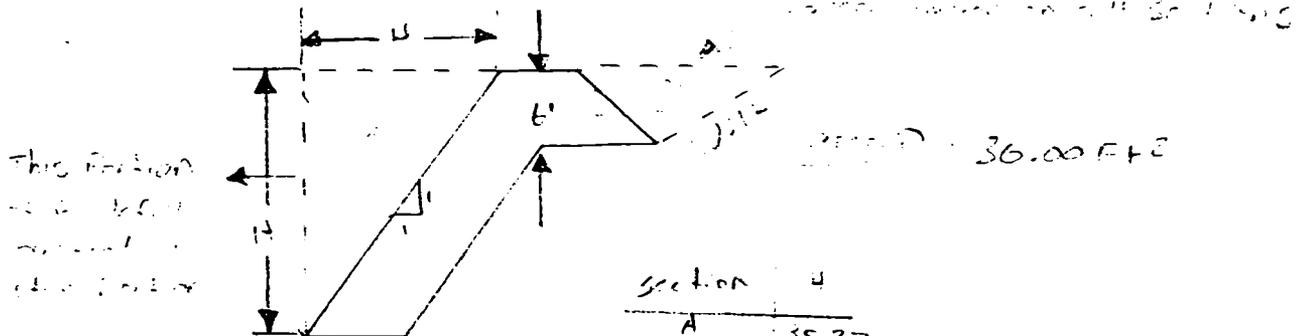
$$V = 235 \times A = 197,296.00 \text{ Ft}^3$$

$\Sigma$  Backfill volume step portion 396,133 Ft<sup>3</sup> ←



BY Robert Merita DATE 10-20-08 CLIENT USACE (LA District) SHEET 16 OF 18  
 CHKD. BY \_\_\_\_\_ DESCRIPTION RIO Sabalo / cost estimation - GCS JOB NO. 1046034

BACK Fill Areas - Bank Protection STA 237+8.00  
 & Volumes



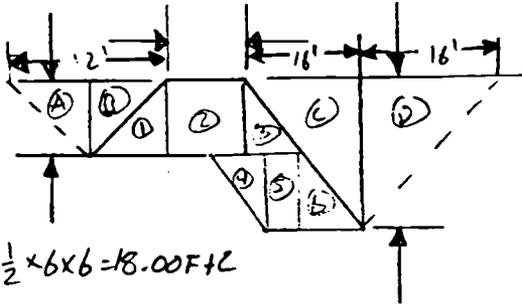
Section	$A = \frac{1}{2} \times H \times U$ Area (FT <sup>2</sup> )	Width of Section (FT)	Volume of Backfill (FT <sup>3</sup> )
A	657.99	50	32,899.52 FT <sup>3</sup>
B	351.76	30	10,552.75
C	280.87	18.50	5,196.07
D	218.98	18.50	4,051.10
E	166.09	18.50	3,072.64
F	122.20	18.50	2,260.67
G	87.31	26	2,270.02
		$\Sigma$	60,302.57 FT <sup>3</sup>
			X2 Banks = 120,605 FT <sup>3</sup> ←



Backfill

GRADE CONTROL STRUCTURE STA 237+8.00  
"Wing Portion" Areas & Volumes

(Wing Portion of weir)



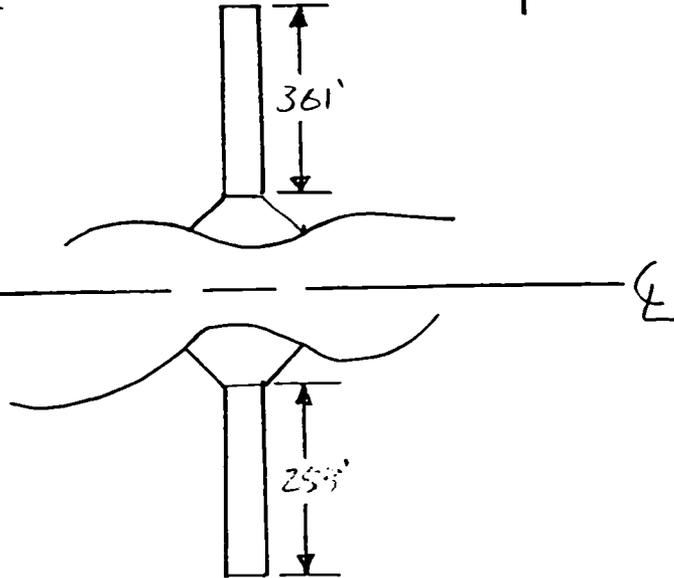
Area A:  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ FT}^2$

Area B:  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ FT}^2$

Area C:  $A = \frac{1}{2} \times 16 \times 16 = 128.00 \text{ FT}^2$

Area D:  $A = \frac{1}{2} \times 16 \times 16 = 128.00 \text{ FT}^2$

$\Sigma$  Area of Backfill = 292.00 FT<sup>2</sup>



Backfill volume north wing

$292.00 \text{ FT}^2 \times 361 \text{ FT} = 105,412.00 \text{ FT}^3$

Backfill volume south wing

$292.00 \text{ FT}^2 \times 288 \text{ FT} = 84,096.00 \text{ FT}^3$

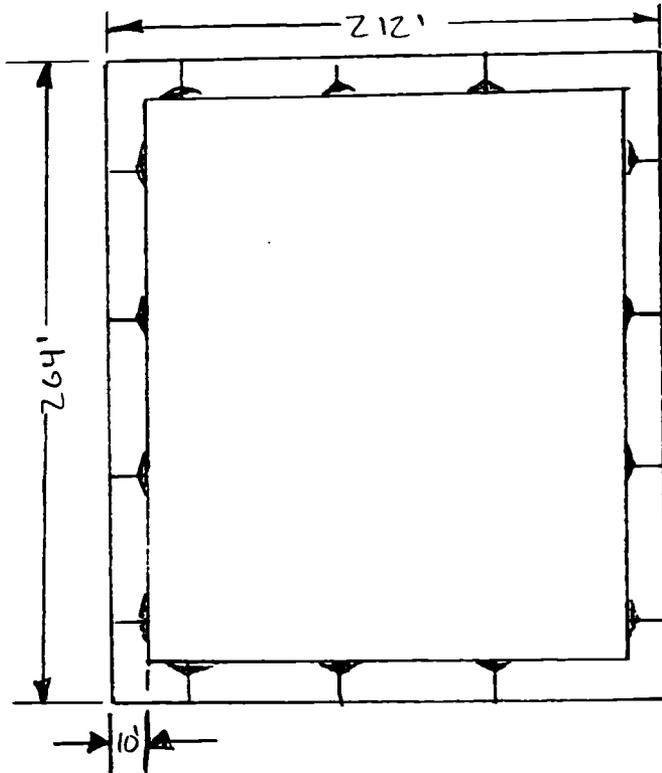
$\Sigma$  Volume of Backfill

Wing Portion = 189,508.00 FT<sup>3</sup>

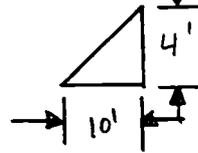


BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET \_\_\_\_\_ OF \_\_\_\_\_  
CHKD. BY \_\_\_\_\_ DESCRIPTION RIO Sedado/cost estimation - GCS JOB NO. 1046034

RCC volume for scour control apron STA 237+8.00



area of slope



$Area = \frac{1}{2} \times 4 \times 10$   
 $= 20.00 \text{ Ft}^2$

Volume of slope

$20.00 \text{ Ft}^2 \times 264 \text{ Ft} = 5280.00 \text{ Ft}^3$   
 $\times 2 = 10,560 \text{ Ft}^3$

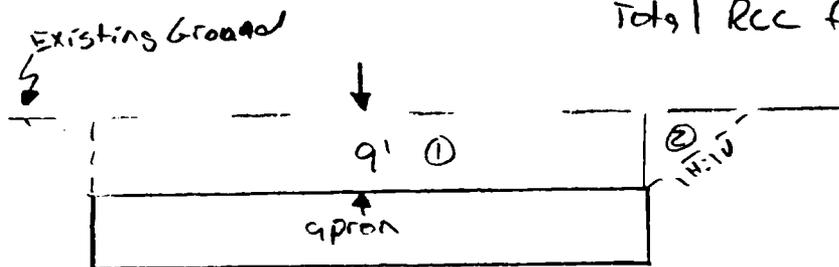
$20.00 \text{ Ft}^2 \times 192 \text{ Ft} = 3840.00 \text{ Ft}^3$   
 $\times 2 = 7680.00 \text{ Ft}^3$

$\Sigma$  volume of slope = 18,240 Ft<sup>3</sup>

Area of pad

$192' \times 244' = 46,848.00 \times 4' \text{ thick} = 187,392 \text{ Ft}^3$

Excavation volume



Total RCC for apron = 205,632 Ft<sup>3</sup>

Area ①  $A = 9' \times 212' = 1908 \text{ Ft}^2 \times 264 \text{ Ft} = 503,712.00 \text{ Ft}^3$

Area ②  $A = \frac{1}{2} \times 9 \times 9 = 40.50 \text{ Ft}^2 \times 264 \text{ Ft} = 10,692.00 \text{ Ft}^3$

$\Sigma$  volume of excavation = 514,404.00 Ft<sup>3</sup>

## Grade Control Structure Summary

STA 237 + 8.00

Section of GCS	RCC Volume (Yd <sup>3</sup> )	Excavation Volume (Yd <sup>3</sup> )	Backfill Volume (Yd <sup>3</sup> )
Step Portion	7,174.11	37,993.00	14,671.59
Wing Portion	5,192.00	25,046.59	7,018.81
Bank Protection	2,796.19	9,299.41	4,466.85
Scour Control Apron	7,616.00	19,052.00	
Totals	22,778.30	91,391.00	26,157.26

# Montgomery Watson Mining Group

## Calculation Cover Sheet

Sheet 1 of 18

<b>PROJECT TITLE</b>	Rio Salado Project – Cost Estimate Preparation <i>STA 260+82.00</i>
<b>PROJECT NO.</b>	1046034
<b>CALCULATION TITLE</b>	Grade Control Structures – RCC Volumes & Excavation Volumes

	<b>NAME</b>	<b>DATE</b>
<b>PREPARED BY</b>	Robert Martin	10-12-00
<b>CHECKED BY</b>		
<b>REVIEWED BY</b>		

Notes:

Attach all supporting documentation including data and formula sources, references, and previous revisions, as necessary.



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 2 OF 15  
CHKD. BY \_\_\_\_\_ DESCRIPTION PID Subjob/cost estimation - GCS JOB NO. 1046034

GRADE CONTROL STRUCTURE VOLUMETRICS STA 260.82

OBJECTIVES Determine Quantities of Excavation, Backfill and RCC for each structure

APPROACH : MEASURE Geometries of Grade Control Structure from Scaled plan & section views

Each Grade control structure was Broken up into three components:

- 1) STEP Portion
- 2) Wing Portion
- 3) Bank Protection

Calculations + Summary on following pages



MONTGOMERY WATSON

BY Robert Watson DATE 9-29-00 CLIENT Rio Sabalo  
 CHKD. BY \_\_\_\_\_ DESCRIPTION Cost Estimate Preparation

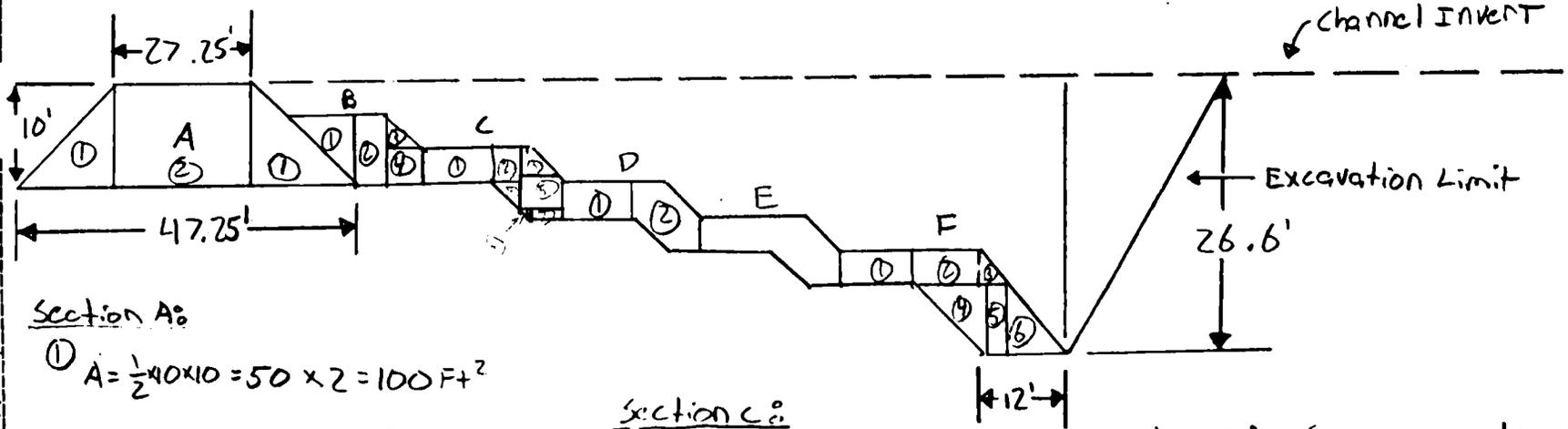
SHEET

3 OF 18

JOB NO. 1016034

STEP PORTION OF GCS

RCC Areas  
(Sta. 260.82)



Section A:

①  $A = \frac{1}{2} \times 10 \times 10 = 50 \times 2 = 100 \text{ Ft}^2$   
 ②  $27.25 \times 10 = 272.50 \text{ Ft}^2$   
 Section A:  $A = 372.50 \text{ Ft}^2$

Section B:

①  $A = \frac{1}{2} \times 7 \times 7 = 24.5 \text{ Ft}^2$   
 ②  $A = 8 \times 7 = 56 \text{ Ft}^2$   
 ③  $A = \frac{1}{2} \times 3 \times 3 = 4.5 \text{ Ft}^2$   
 ④  $A = 4 \times 3 = 12 \text{ Ft}^2$   
 Section B:  $A = 97 \text{ Ft}^2$

Section C:

①  $A = 13.5 \times 4 = 54 \text{ Ft}^2$   
 ②  $A = 4 \times 1.75 = 7 \text{ Ft}^2$   
 ③  $A = \frac{1}{2} \times 1.75 \times 1 = 0.875 \text{ Ft}^2$   
 ④  $A = \frac{1}{2} \times 3 \times 3 = 4.5 \text{ Ft}^2$   
 ⑤  $A = 2 \times 3 = 6 \text{ Ft}^2$   
 ⑥  $A = \frac{1}{2} \times 1 \times 1 = 0.5 \text{ Ft}^2$   
 ⑦  $A = 1.5 \times 1.5 = 2.25 \text{ Ft}^2$   
 Section C:  $A = 75.125 \text{ Ft}^2$

Section D: Same as section C

$A = 75.125 \text{ Ft}^2$

Section E: Same as section C

$A = 75.125 \text{ Ft}^2$



BY Robert Martin DATE 9-29-00 CLIENT Rio Salgado SHEET 4 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION COST Estimate Preparation JOB NO. 1046034

STEP PORTION of GCS  
RCC Area 5  
(STA. 260.82)

Section F's

- ①  $A = 10 \times 4 = 40 \text{ Ft}^2$
- ②  $A = 5 \times 4 = 20 \text{ Ft}^2$
- ③  $A = \frac{1}{2} \times 4 \times 4 = 8 \text{ Ft}^2$
- ④  $A = \frac{1}{2} \times 8 \times 8.13 = 32.52 \text{ Ft}^2$
- ⑤  $A = 1 \times 8.13 = 8.13 \text{ Ft}^2$
- ⑥  $A = \frac{1}{2} \times 8 \times 8.13 = \underline{32.52 \text{ Ft}^2}$

Section F: A =  $141.17 \text{ Ft}^2$

→ Total For sections A:  $372.50 \text{ Ft}^2$

B:  $97.00 \text{ Ft}^2$

C:  $75.125 \text{ Ft}^2$

D:  $75.125 \text{ Ft}^2$

E:  $75.125 \text{ Ft}^2$

F:  $141.17 \text{ Ft}^2$

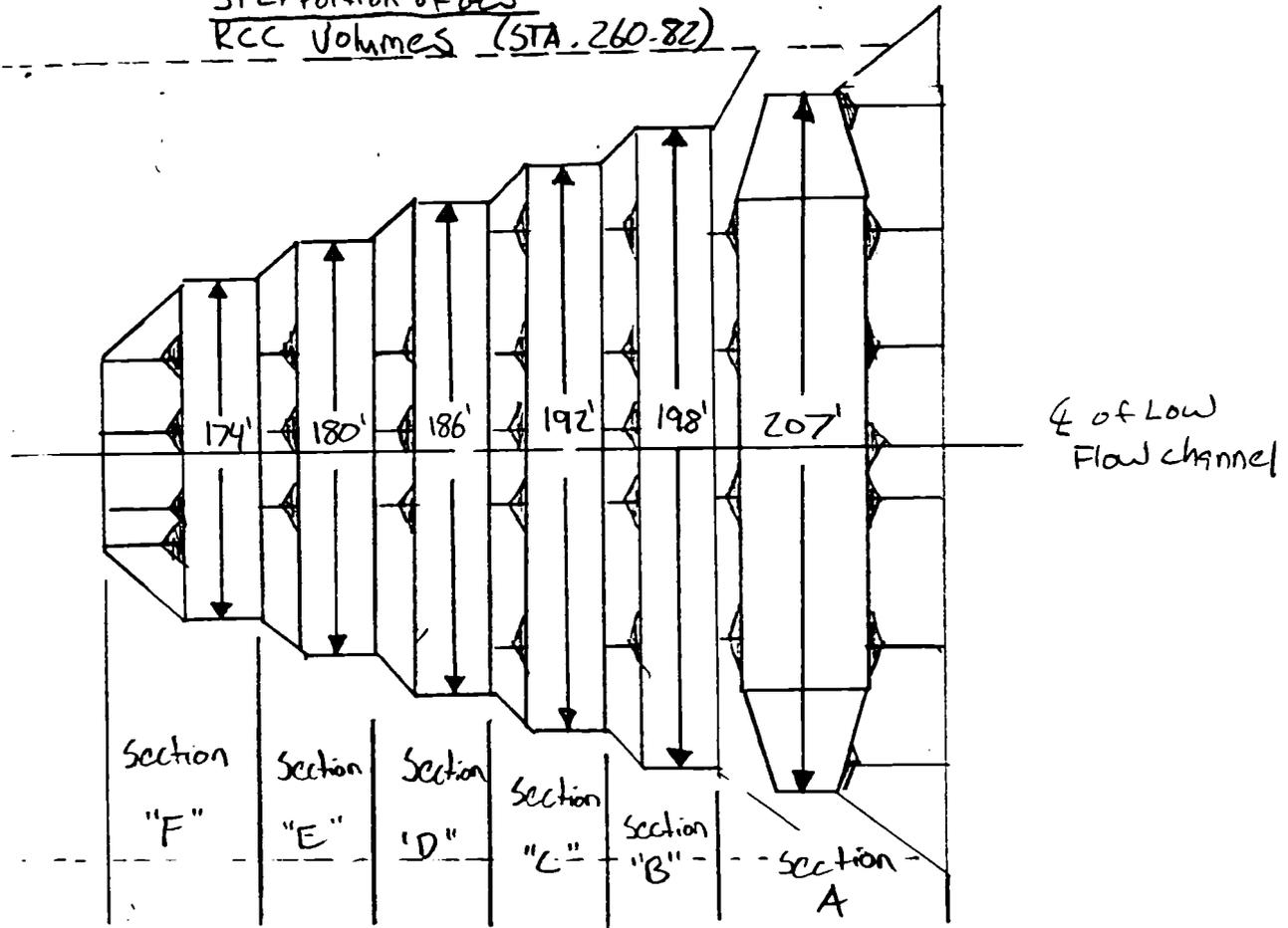
→  $836.05 \text{ Ft}^2$



BY Robert Martin DATE 9-29-00 CLIENT Rio Salgado  
CHKD. BY \_\_\_\_\_ DESCRIPTION Cost Estimate Preparation

SHEET 5 OF 13  
JOB NO. 1046034

STEP Portion of GCS  
RCC Volumes (STA. 260-82)



Section A:  $A = 372.50 \text{ Ft}^2$

$V = 207 \times A = 77107.50 \text{ Ft}^3$

Section B:

$A = 97 \text{ Ft}^2$

$V = 198 \times A = 19206.00 \text{ Ft}^3$

Section C:

$A = 75.125 \text{ Ft}^2$

$V = 192 \times A = 14424.00 \text{ Ft}^3$

Section D:

$A = 75.125 \text{ Ft}^2$

$V = 186 \times A = 13973.25 \text{ Ft}^3$

Section E:

$A = 75.125 \text{ Ft}^2$

$V = 180 \times A = 13522.50 \text{ Ft}^3$

Section F:

Area  $(7+8+9+10)$

$A = 141.17 \text{ Ft}^2$

$V = 174 \times A$

$= 24563.58 \text{ Ft}^3$

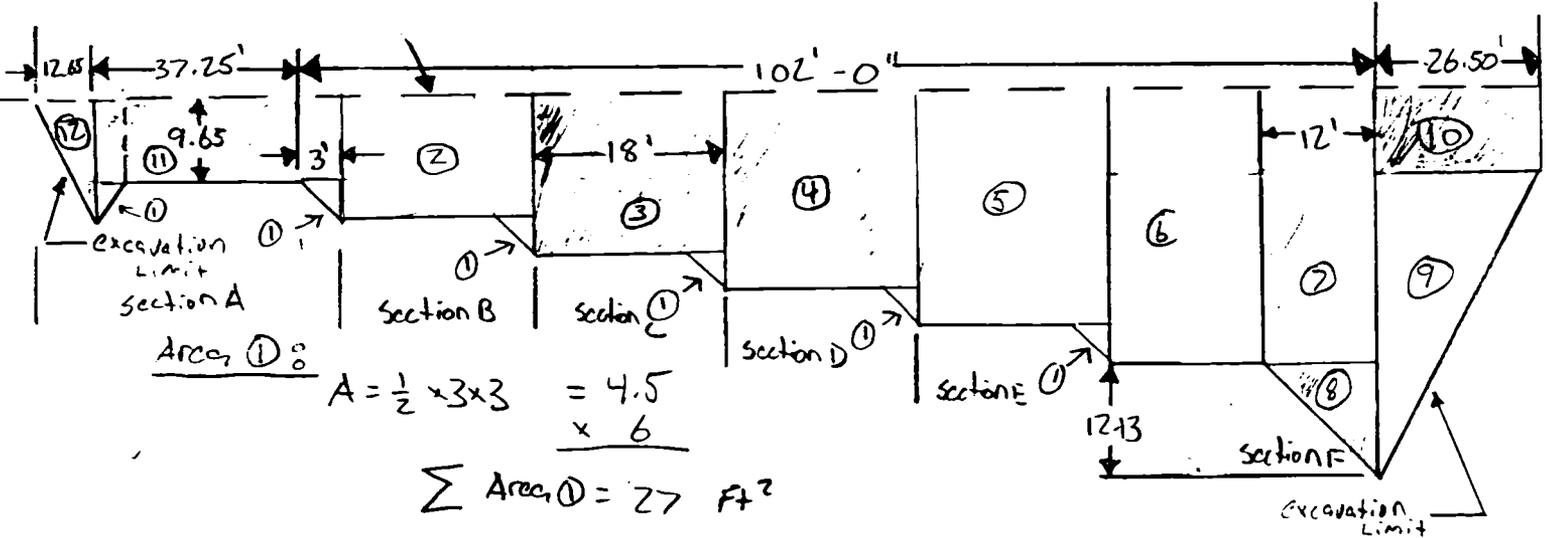
$\Sigma$  of RCC Volume

$162,796.83 \text{ Ft}^3$

$\rightarrow 162,800 \text{ Ft}^3$



STEP PORTION of GCS  
Area of Excavation (STA. 260.82)



Area ①:

$$A = \frac{1}{2} \times 3 \times 3 = 4.5 \times 6$$

$$\sum \text{Area ①} = 27 \text{ Ft}^2$$

Area ②:

$$A = 18 \times 12.65 = 227.70 \text{ Ft}^2$$

Area ③:

$$A = 18 \times 15.65 = 281.70 \text{ Ft}^2$$

Area ④:

$$A = 18 \times 18.65 = 335.70 \text{ Ft}^2$$

Area ⑤:

$$A = 18 \times 21.65 = 389.70 \text{ Ft}^2$$

Area ⑥:

$$A = 15 \times 24.65 = 369.75 \text{ Ft}^2$$

Area ⑦:

$$A = 12 \times 24.65 = 295.80 \text{ Ft}^2$$

Area ⑧:

$$A = \frac{1}{2} \times 12 \times 12.13 = 72.78 \text{ Ft}^2$$

Area ⑨:

$$A = \frac{1}{2} \times 26.50 \times 27.13 = 359.47 \text{ Ft}^2$$

Area ⑩:

$$A = 26.50 \times 9.65 = 255.73 \text{ Ft}^2$$

Area ⑪:

$$A = 9.65 \times 40.25 = 388.41 \text{ Ft}^2$$

Area ⑫:

$$A = \frac{1}{2} \times 12.65 \times 12.65 = 80.01 \text{ Ft}^2$$



BY Robert Martin DATE 9-29-00 CLIENT Rio Salgado SHEET 2 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION Cost Estimate Preparation JOB NO. 1046034

STEP Portion of GCS

Volume of Excavation (STA. 260.82)

(Refer to Rec Volume schematic & Area of Excavation schematic)

Section A:

Areas (1+1+12+1)  $A = 4.5 \times 4.5 + 80.01 + 388.41 = 477.42$   
 $V = 207 \times A = 99,826 \text{ Ft}^3$

Section B:

Areas (2+1)  $A = 227.70 + 4.5 = 232.20$   
 $V = 198 \times A = 45,976 \text{ Ft}^3$

Section C:

Areas (3+1)  $A = 281.70 + 4.5 = 286.20$   
 $V = 192 \times A = 54,950 \text{ Ft}^3$

Section D:

Areas (4+1)  $A = 335.70 + 4.5 = 340.20$   
 $V = 186 \times A = 63,277 \text{ Ft}^3$

Section E:

Areas (5+1)  $A = 389.70 + 4.5 = 394.20$   
 $V = 180 \times A = 70,956 \text{ Ft}^3$

Section F:

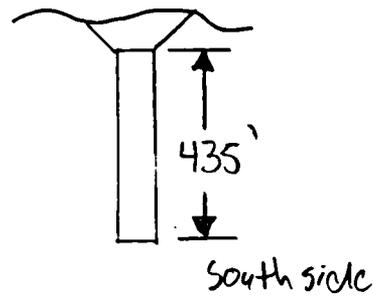
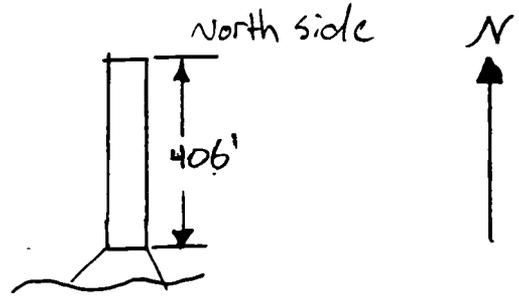
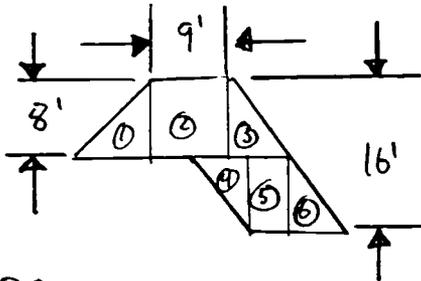
Areas (6+7+8+9+6)  $A = 369.75 + 295.80 + 72.78 + 359.47$   
 $+ 255.73 = 1353.53$

$V = 174 \times A = 235,514 \text{ Ft}^3$   
Volume of STEP Portion = 162,800 Ft<sup>3</sup>

→  $\Sigma$  Volume of Excavation for STEP Portion = 732,299 Ft<sup>3</sup>



WING Areas and VOLUMES (STA. 260.82)  
(Wing Portion of Weir)



Area ①:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area ②:

$$A = 9 \times 8 = 72 \text{ Ft}^2$$

Area ③:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area ④:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

Area ⑤:

$$A = 1 \times 8 = 8 \text{ Ft}^2$$

Area ⑥:

$$A = \frac{1}{2} \times 8 \times 8 = 32 \text{ Ft}^2$$

$\Sigma$  of Areas 208 Ft<sup>2</sup> (For one wing)

Volume of RCC

North side:

$$406' \times 208 \text{ Ft}^2 = 84,448 \text{ Ft}^3$$

South side:

$$435' \times 208 \text{ Ft}^2 = 90,480 \text{ Ft}^3$$

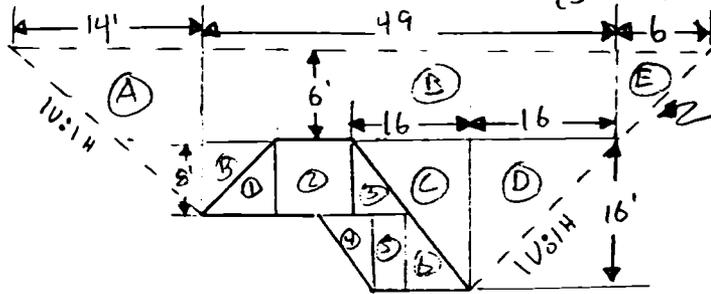
$\Sigma$  Volume of RCC for  
Wing Portion

$$= 174,928 \text{ Ft}^3$$

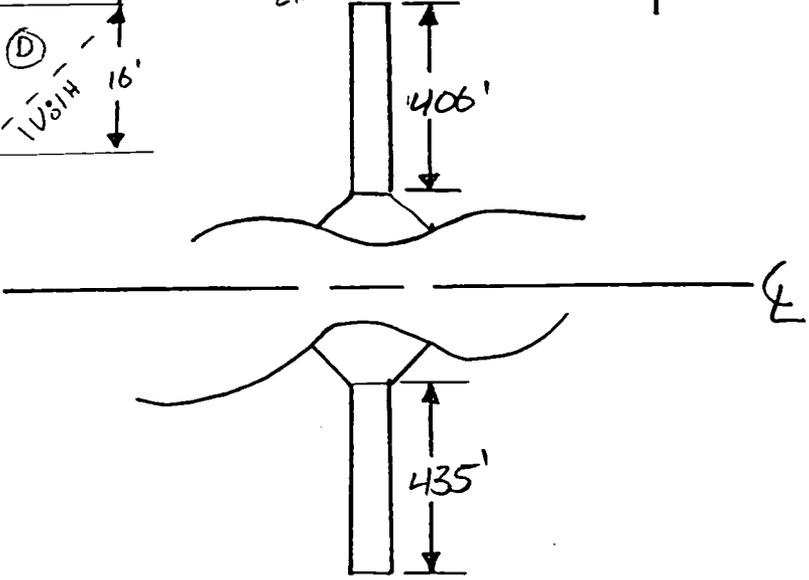
$$= \underline{\underline{6,479 \text{ YD}^3}}$$



EXCAVATION - Wing Area (STA. 260-82)



Excavation Limit



Area A = 1/2 \* 14 \* 14 = 98 Ft<sup>2</sup>

Area B = 49 \* 6 = 294 Ft<sup>2</sup>  
1/2 \* 8 \* 8 = 32 Ft<sup>2</sup>

Area C = 1/2 \* 16 \* 16 = 128 Ft<sup>2</sup>

Area D = 1/2 \* 16 \* 16 = 128 Ft<sup>2</sup>

Area E = 1/2 \* 6 \* 6 = 18 Ft<sup>2</sup>

Area of structure = 208 Ft<sup>2</sup>

Σ Area of Excavation = 906.00 Ft<sup>2</sup>

Excavation volume for wings

North side = 406' \* 906' = 367,836 Ft<sup>3</sup>

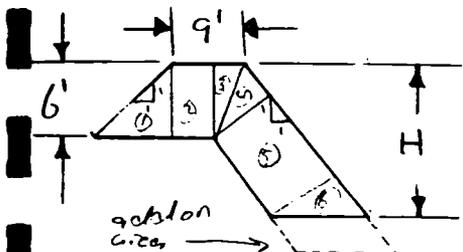
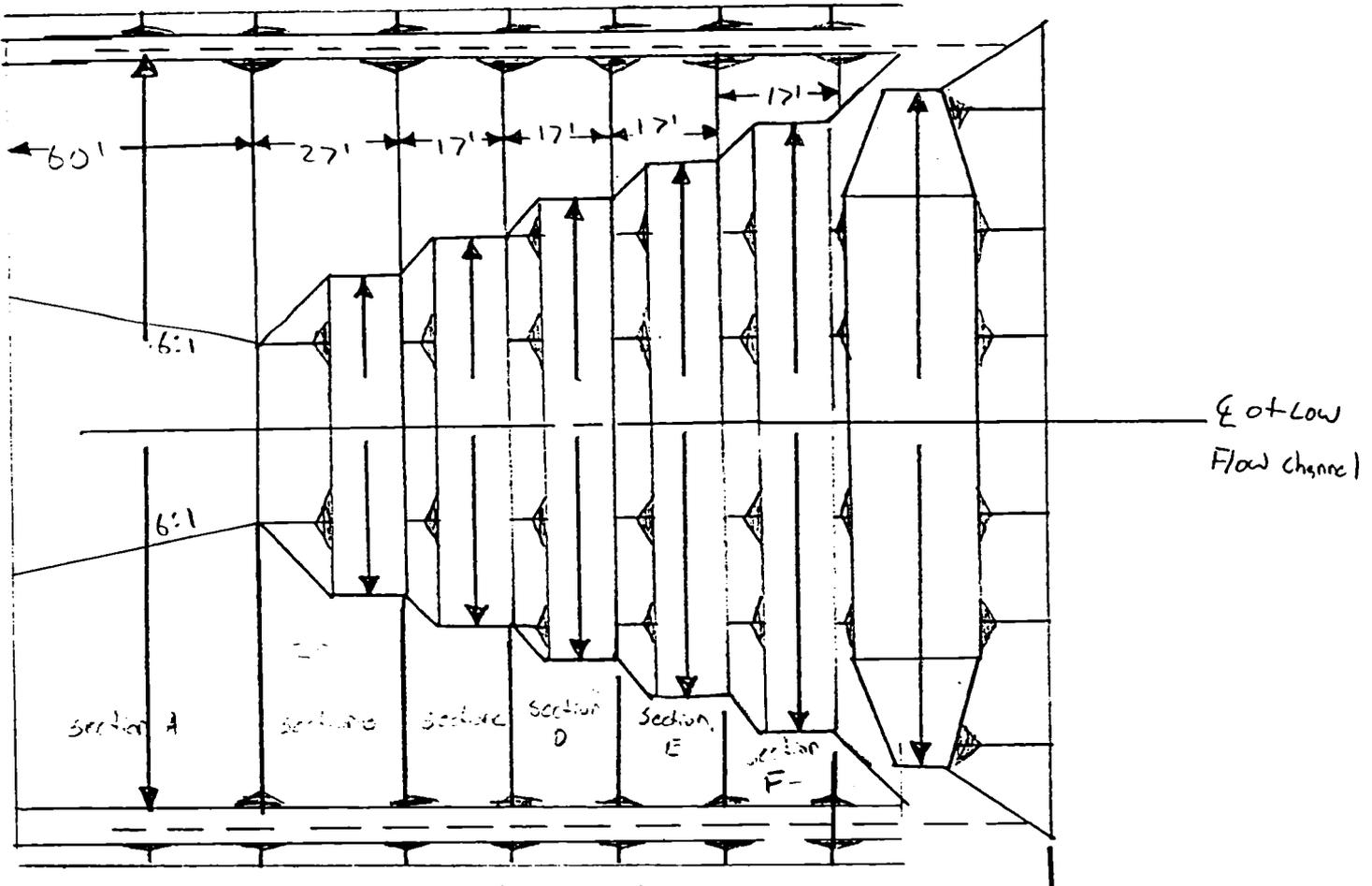
South side = 435' \* 906' = 394,110 Ft<sup>3</sup>

Σ Total for wings = 761,946 Ft<sup>3</sup>

28,220 YD<sup>3</sup>



BANK Protection Areas STA 260.82



Area ①:  $A = \frac{1}{2} \times 6 \times 6 = 18 \text{ Ft}^2$   
 Area ②:  $A = 6 \times 6 = 36 \text{ Ft}^2$   
 Area ③:  $A = \frac{1}{2} \times 6 \times 2 = 6 \text{ Ft}^2$   
 Area ④:  $A = \frac{1}{2} \times 6 \times 2 = 6 \text{ Ft}^2$

Areas common to all sections

Section	H
A	32.6
B	26.3
C	23.3
D	20.2
E	17.2
F	14.1

Section F  
 Area ①:  $A = 4 \times 6 = 24 \text{ Ft}^2$   
 Area ②:  $A = \frac{1}{2} \times 6 \times 5 = 15 \text{ Ft}^2$   
 $\Sigma$  Section F 105.00 Ft<sup>2</sup>

Section E: new area added  
 $17.2 - 14.1 = 3.10 \times 6.00 = 18.60 \text{ Ft}^2$   
 $\Sigma$  Section E = 105.00 + 18.60 = 123.60 Ft<sup>2</sup>

Section D: new area added  
 $20.2 - 17.2 = 3.00 \times 6.00 = 18.00 \text{ Ft}^2$   
 $\Sigma$  Section D = 141.60 Ft<sup>2</sup>



BANK Protection Areas CONT STA 260.82

Section C: new area added

$$23.3-20.2 = 3.10 \times 6.00 = 18.60 \text{ Ft}^2$$

$$\begin{aligned} \Sigma \text{Section E} &= 141.60 + 18.60 \\ &= 160.20 \text{ Ft}^2 \end{aligned}$$

Section B: new area added

$$26.3-23.3 = 3.00 \times 6.00 = 18.00 \text{ Ft}^2$$

$$\begin{aligned} \Sigma \text{Section B} &= 160.20 + 18.00 \\ &= 178.20 \text{ Ft}^2 \end{aligned}$$

Section A: new area added

$$32.6-26.3 = 6.30 \times 6.00 = 37.80 \text{ Ft}^2$$

$$\begin{aligned} \Sigma \text{Section A} &= 178.20 + 37.80 \\ &= 216.00 \text{ Ft}^2 \end{aligned}$$

Volume of RCC (Area  $\times$  width of section)

$$\text{Section A: } 216.00 \text{ Ft}^2 \times 60 \text{ Ft} = 12,960.00 \text{ Ft}^3$$

$$\text{Section B: } 178.20 \text{ Ft}^2 \times 24 \text{ Ft} = 4,276.80 \text{ Ft}^3$$

$$\text{Section C: } 142.20 \text{ Ft}^2 \times 17 \text{ Ft} = 2,417.40 \text{ Ft}^3$$

$$\text{Section D: } 141.60 \text{ Ft}^2 \times 17 \text{ Ft} = 2,407.20 \text{ Ft}^3$$

$$\text{Section E: } 123.60 \text{ Ft}^2 \times 17 \text{ Ft} = 2,101.20 \text{ Ft}^3$$

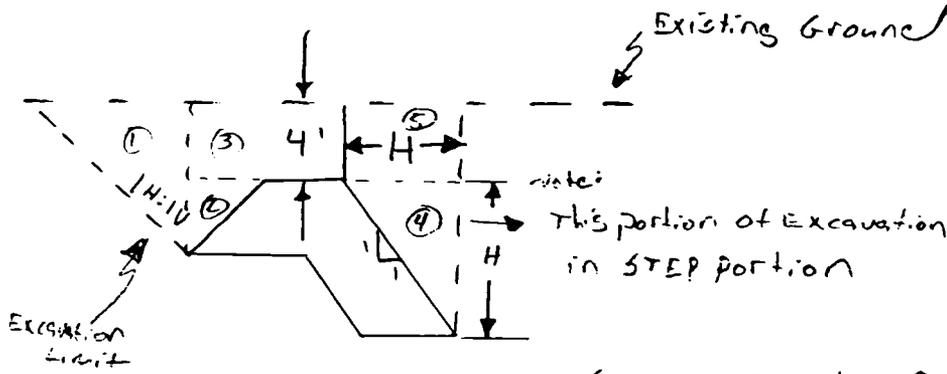
$$\text{Section F: } 105.00 \text{ Ft}^2 \times 17 \text{ Ft} = 1,785.00 \text{ Ft}^3$$

$$24916.20 \times 2 \text{ Banks}$$

$$\Sigma \text{ Bank protection Volume of RCC} = 49,832 \text{ Ft}^3 \leftarrow$$



Bank protection Excavation STA 260.82  
Access



Area D:  
 $Area = \frac{1}{2} \times 10 \times 10 = 50.00 \text{ Ft}^2$

Area D:  
 $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ Ft}^2$

Area B:  
 $A = 4 \times 17 = 68.00 \text{ Ft}^2$

↑ Areas common to each section

Section F:

Area (4) =  $\frac{1}{2} \times 14.1 \times 14.1 = 99.41 \text{ Ft}^2$

Area (5) =  $4 \times 14.1 = 56.40 \text{ Ft}^2$

$\Sigma$  Areas - Section F 291.81 Ft<sup>2</sup>

SECTION E:

Area (4) =  $\frac{1}{2} \times 17.2 \times 17.2 = 147.92 \text{ Ft}^2$

Area (5) =  $4 \times 17.2 = 68.80 \text{ Ft}^2$

$\Sigma$  Areas - Section E 352.72 Ft<sup>2</sup>

SECTION D: Area (4) =  $\frac{1}{2} \times 20.2 \times 20.2 = 204.02 \text{ Ft}^2$

Area (5) =  $4 \times 20.2 = 80.80 \text{ Ft}^2$

$\Sigma$  Areas - Section D 420.82 Ft<sup>2</sup>

SECTION C:

Area (4) =  $\frac{1}{2} \times 23.3 \times 23.3 = 271.45 \text{ Ft}^2$

Area (5) =  $4 \times 23.3 = 93.20 \text{ Ft}^2$

$\Sigma$  Areas - Section C 500.65 Ft<sup>2</sup>

Section B:

Area (4) =  $\frac{1}{2} \times 26.3 \times 26.3 = 345.85$

Area (5) =  $4 \times 26.3 = 105.20 \text{ Ft}^2$

$\Sigma$  Areas - Section B 587.05 Ft<sup>2</sup>

Section A:

Area (4) =  $\frac{1}{2} \times 32.6 \times 32.6 = 531.38 \text{ Ft}^2$

Area (5) =  $4 \times 32.6 = 130.40 \text{ Ft}^2$

$\Sigma$  Areas - Section A 797.78 Ft<sup>2</sup>



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 13 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION QSO Salado/Cost estimation - GCS JOB NO. \_\_\_\_\_

BANK Protection Volumes of Excavation

Section	Area of Excavation above Structure (Ft <sup>2</sup> )	Area of Structure (Ft <sup>2</sup> )	Total area for section (Ft <sup>2</sup> )
A	797.78	216.00	1013.78
B	587.05	178.00	765.05
C	500.65	160.20	660.85
D	420.82	141.60	562.42
E	352.72	123.60	476.32
F	291.81	105.00	396.81

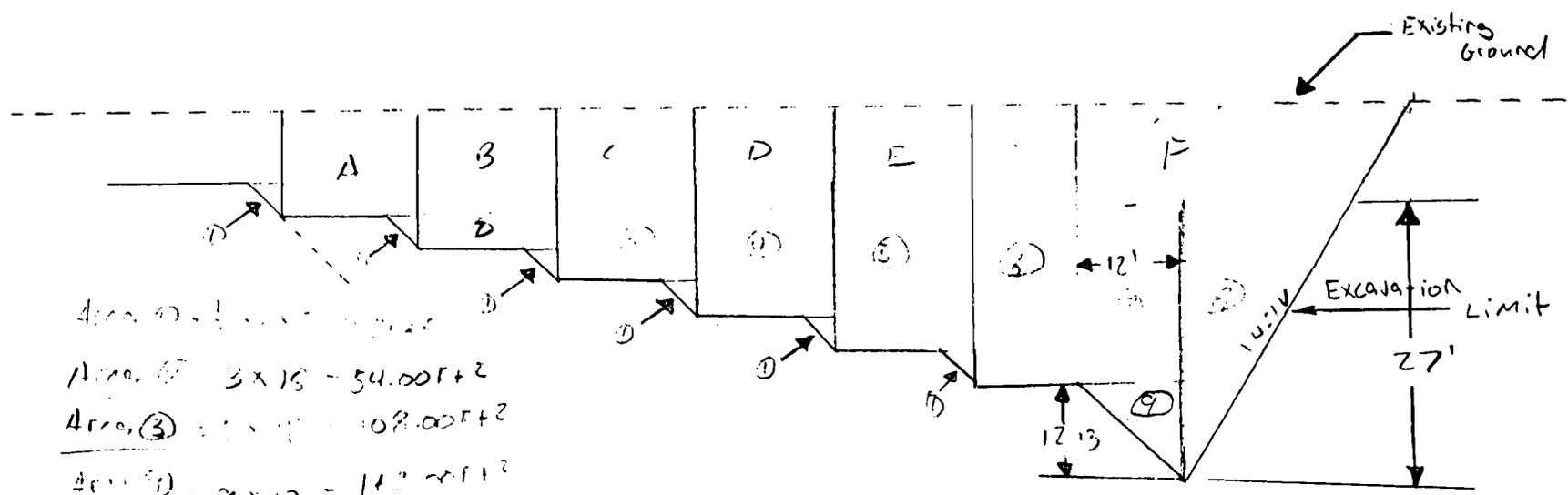
Section	width of section (ft)	Total volume Excavated
A	60	60,826.80 Ft <sup>3</sup>
B	27	20,661.75 Ft <sup>3</sup>
C	17	11,234.45 Ft <sup>3</sup>
D	17	9,561.14 Ft <sup>3</sup>
E	17	8,097.44 Ft <sup>3</sup>
F	17	6,745.77 Ft <sup>3</sup>
		E 102,284.14 Ft <sup>3</sup>
		X 2 Banks = 204,568 Ft <sup>3</sup> ←



MONTGOMERY WATSON

BY                      DATE 01-11-00 CLIENT RED SAILING COMPANY SHEET 14 OF 18  
 CHKD. BY                      DESCRIPTION COST ESTIMATE PREPARATION / SCS JOB NO. 10410254

Backfill areas Step Retention STA = 40+32.2, etc



- Area ① = 1/2 \* 15 \* 15 = 112.50 FT<sup>2</sup>
- Area ② = 3 \* 15 = 45.00 FT<sup>2</sup>
- Area ③ = 15 \* 12 = 180.00 FT<sup>2</sup>
- Area ④ = 9 \* 12 = 108.00 FT<sup>2</sup>
- Area ⑤ = 12 \* 15 = 180.00 FT<sup>2</sup>
- Area ⑥ = 1/2 \* 27 \* 27 = 364.50 FT<sup>2</sup>
- Area ⑦ = 1/2 \* 12 \* 12.13 = 72.78 FT<sup>2</sup>



BY Robert Markin DATE 10-20-00 CLIENT USACE (LA District) SHEET 15 OF 18  
CHKD. BY \_\_\_\_\_ DESCRIPTION RED S&L 010 / cost estimation - GCS JOB NO. 1046034

Backfill volumes - Strip portion STA 260+82.00

Section A  $A = 4.5 \text{ FT}^2$   
gross (1)  $V = 207 \times A = 931.50 \text{ FT}^3$

Section B  $A = 4.5 + 54 = 58.50 \text{ FT}^2$   
gross (1+2)  $V = 198 \times A = 11,583.00 \text{ FT}^3$

Section C  $A = 11.5 + 108 = 112.50 \text{ FT}^2$   
gross (1+3)  $V = 192 \times A = 21,600.00 \text{ FT}^3$

Section D  $A = 4.5 + 162 = 166.50$   
gross (1+4)  $V = 186 \times A = 30,969.00 \text{ FT}^3$

Section E  $A = 4.5 + 213 = 220.50$   
gross (1+5)  $V = 180 \times A = 39,690.00 \text{ FT}^3$

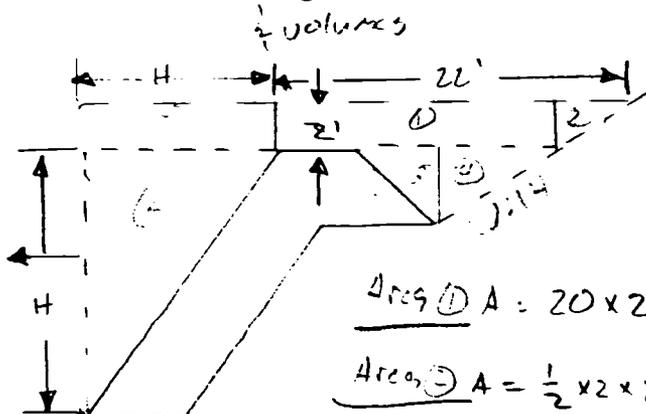
Section F  $A = 225 + 180 + 364.50 + 72.78$   
gross (6+7+8+9)  $= 842.28$   
 $V = 174 \times A = 146,556.72 \text{ FT}^3$

$\Sigma$  Volumes of  
backfill for  
strip portion 251,330 FT<sup>3</sup>



BY Robert Martin DATE 10-20-00 CLIENT USACE (LA District) SHEET 16 OF 18  
 CHKD. BY \_\_\_\_\_ DESCRIPTION QTO Solado/Cost Estimation - CCS JOB NO. 1046034

BACK Fill Areas - Bank Protection STA 260+82.00



This Section  
is for back  
fill volume  
of this section

Section	H
A	32.6
B	26.5
L	23.0
D	20.7
E	17.7
F	14.1

Area ①  $A = 20 \times 2 = 40.00 \text{ FT}^2$   
 Area ②  $A = \frac{1}{2} \times 2 \times 2 = 2.00 \text{ FT}^2$   
 Area ③  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ FT}^2$   
 Area ④  $A = \frac{1}{2} \times 6 \times 6 = 18.00 \text{ FT}^2$

Areas 1, 2, 3, 4  
are  
sections

Section	$A = 2 \times H$ Area (ft <sup>2</sup> )	$A = \frac{1}{2} H \times H$ Area (ft <sup>2</sup> )	Number of Sections	Total Area (ft <sup>2</sup> )	Volume of Backfill (FT <sup>3</sup> )
A	65.20	531.58	60	674.58	40,474.80
B	52.60	345.85	27	476.45	12,564.02
L	46.60	274.45	17	396.05	5,733.77
D	40.40	204.02	17	338.12	5,151.41
E	34.10	147.92	17	260.32	4,125.44
F	28.20	99.11	17	205.61	3,495.29
					$\Sigma$ 73,173.46
					$\times 2 \text{ Banks} = 146,946.91 \text{ FT}^3$



BY Robert Martin DATE 10-12-00 CLIENT ZED SALADO PROJECT

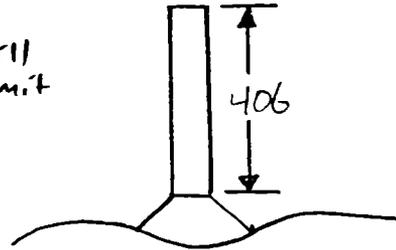
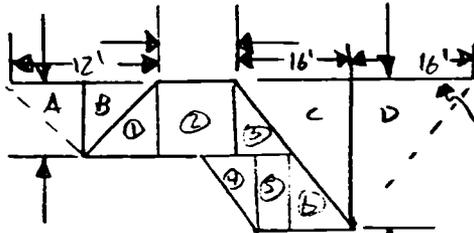
SHEET 17 OF 18

CHKD. BY \_\_\_\_\_ DESCRIPTION COST ESTIMATE PREPARATION

JOB NO. 1046034

Backfill

GRADE CONTROL STRUCTURE STA 260+82.00  
"Wing Portion" Areas & Volumes  
(Wing Portion of Weir)



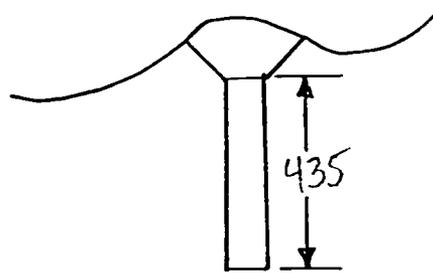
Area ① =  $\frac{1}{2} \times 6 \times 6 = 18.00 \text{ Ft}^2$

Area ② =  $\frac{1}{2} \times 6 \times 6 = 18.00 \text{ Ft}^2$

Area ③ =  $\frac{1}{2} \times 16 \times 16 = 128.00 \text{ Ft}^2$

Area ④ =  $\frac{1}{2} \times 16 \times 16 = 128.00 \text{ Ft}^2$

$\Sigma$  Backfill area 292.00 Ft<sup>2</sup>



Backfill volume north wing

$292.00 \text{ Ft}^2 \times 406 \text{ Ft} = 118,552.00 \text{ Ft}^3$

Backfill volume south wing

$292.00 \text{ Ft}^2 \times 435 \text{ Ft} = 127,020.00 \text{ Ft}^3$

total Backfill volume  
wing portion = 245,572.00 Ft<sup>3</sup>

## Grade Control Structure Summary

STA 260 + 82.00

Section of GCS	RCC Volume (Yd <sup>3</sup> )	Excavation Volume (Yd <sup>3</sup> )	Backfill Volume (Yd <sup>3</sup> )
Step Portion	6,029.63	27,122.19	9,308.52
Wing Portion	6,728.00	28,469.41	9,095.26
Bank Protection	1,845.63	7,576.59	5,442.48
Totals	14,603.26	63,168.19	23,846.26

**ESTIMATED CONSTRUCTION SCHEDULE**

**RIO SALADO LOW FLOW CHANNEL – PHASE 2  
CONSTRUCTION SCHEDULE  
MONTGOMERY WATSON  
OCTOBER 2000**

Notice to proceed for Phase 2 of the Rio Salado Low Flow Channel was assumed to occur the first week of January, 2001. Mobilization and processing initial submittals will take approximately one month. Clearing and grubbing is expected to take two weeks. Very little brush or vegetation was observed in the work area. The total area of clearing and grubbing was estimated to be 20 acres.

The construction of the Low Flow Channel, Phase 2, is primarily dependent on the production rate of the main channel excavation. Work was assumed to start at the downstream end of the project. Four scrapers that can move 35 cubic yards per cycle, working 8 cycles per hour, 8 hours a day can excavate 8,960 cubic yards per day. The same four scrapers could achieve slightly more production based on 10 cycles per hour and 30 cubic yards per cycle. The excavated material will either be dropped off and left at an appropriate stockpile site or loaded onto trucks by 7 cubic yard loaders and taken to another site. Presently the channel, guide dike and control structure excavation is estimated at 1,145,000 cubic yards. At a rate of 8,960 yards per day, the excavation can be accomplished in 130 working days or 6.4 months. The schedule assumes 7 months, or 140 working days.

The excavation and backfill of the guide dike and grade control structures can be done independently of the main channel excavation. Crews can work ahead of the main channel work or come back once the main channel excavation has passed by. 79,195 cubic yards of roller compacted concrete (RCC) have to be placed at eighteen guide dike structures (about 3,000 cubic yards per structure), three grade control structures (approximately 15,000 cubic yards per structure), and the scour protection apron for the 24<sup>th</sup> street bridge (6,000 cubic yards). According to contractors, up to 3,000 tons, or 1,500 yards of RCC can be placed in a day. The schedule is based on 720 cubic yards placed per day, or approximately 100 days total. Based on these assumptions, as long as the guide dike and grade control structure construction is coordinated properly, it should not affect the critical path.

Gabion placement will take place concurrently and independently of the main channel excavation and is not a critical path item. The same is true of rubble removal and rip rap placement.

Weather delays due to rain are factored into the schedule. Up to one month of construction time may be delayed due to rain or flooding.

Project closeout and miscellaneous surface restoration items are scheduled to take 15 working days after completion of the main channel excavation. Demobilization is scheduled to take 15 working days.

The total duration of the project is 315 calendar days.

