# Golden Eagle

# Park Dam

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

## Appendix B:

### Other Material

ADWR Permit
Project Cost and ADWR Permit Fee Calculation
Box Culvert Design Changes
Construction Survey
Dewatering
Construction Meetings
Partnering Meetings
Construction Schedules
Other Changes and Requests For Information
Submittals

*PREPARED BY:*
STANTEC CONSULTING INC.
8211 South 48th Street
Phoenix, Arizona 85044.
(602) 438-2200

March 2001
Project No. 82000157

# ADWR CONSTRUCTION PERMIT

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**SURFACE WATER MANAGEMENT DIVISION**
**DAM SAFETY AND FLOOD MITIGATION SECTIONS**
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2445
Fax (602) 417-2423

MAY 0 4 2000

JANE D. HULL
Governor

RITA P. PEARSON
Director

## FACSIMILE TRANSMITTAL COVER SHEET

**DATE:** May 4, 2000

| | |
|---|---|
| **TO (Company):** Stantec | **ATTN:** Mr. Chuck Gopperton |
| **COMPANY FAX NUMBER:** (602) 431-9562 | **COMPANY PHONE NUMBER:** (602) 438-2200 |
| **FROM:** Jerry Cox | **DAM SAFETY AND FLOOD MITIGATIONS SEC.** |
| **OFFICE PHONE NO:** (602) 417-2445 | **FACSIMILE NO:** (602) 417-2423 |

**COMMENTS:**

RE: GOLDEN EAGLE PARK DAM (07.33)
LETTER OF APPROVAL OF APPLICATION FOR ALTERATION

I'll send the original letter with the enclosure documents when they have been stamped with our approval stamp.

3 **PAGES TRANSMITTED INCLUDING COVER SHEET.**

**IF ALL OF THE PAGES ARE NOT RECEIVED, PLEASE CALL ADWR:**
**SENDER -** Jerry Cox

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2445
Fax (602) 417-2423

May 3, 2000

**JANE DEE HULL**
**Governor**

**RITA P. PEARSON**
**Director**

Mr. Charles V. Gopperton, P.E.
Project Engineer
Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355

**Subject: Golden Eagle Park Dam (07.33)**
**Approval of Application for Alteration**

Dear Mr. Gopperton:

The Department has concluded the administrative completeness review of the above referenced application and has determined that the application is complete, pursuant to A.R.S. § 41-1074. We have also concluded that the application meets the substantive requirements of A.R.S. § 45-1203. Therefore, your application to alter Golden Eagle Park Dam has been approved subject to the following conditions:

1. Construction work shall be started within one (1) year from date of approval.

2. No foundations or abutments shall be covered by the material of the dam until the Department has been given an opportunity to inspect and approve the same.

3. Drawing Nos. D4 and D6 must be revised and submitted, with supporting calculations, for review and approval by the Department prior to the start of construction of the Auxiliary Outlet Works Inlet and Outlet Structures.

4. Drawing No. D9 must be revised and submitted, with supporting calculations, for review and approval by the Department prior to the start of construction of the Principal Outlet Works Inlet Structure.

5. A Construction Quality Assurance Plan must be submitted for review and approval by the Department prior to the start of construction.

6. An Emergency Action Plan for Golden Eagle Park Dam must be approved by the Department before a License of Approval to operate the dam can be issued to the owner.

Enclosed are one copy each of the following Department stamped and approved project documents: Application, Drawings, Specifications, Addendum No. 1, Addendum No. 2 and Addendum No. 3.

Also enclosed for your information is "Requirements During and Following Dam Construction" which lists items required of all applicants. Please read the document carefully because the items described in it must be fulfilled before the Department can issue the owner a License of Approval to operate the dam.

Please note that any changes proposed to the approved design during construction must have Department approval prior to implementation.

Please also note that this approval is limited to the Department's responsibilities and authority as described in the Arizona Revised Statutes, Title 45 – Waters, Chapter 6, Article I, Supervision of Dams, Reservoirs and Projects. This approval in no way relieves the owner of responsibility for securing other required permits, approvals or permissions from other jurisdictional agencies before commencement of construction.

If you or anyone connected with the construction of this project have any questions regarding this approval, please contact Gerald Cox at (602) 417-2445. Thank you for your cooperation during the review of your application.

Sincerely,

Jon M. Benoist, P.E.
Supervisor
Dam Safety Section

Enclosures

cc: Tom Ward, Town of Fountain Hills, w/o encl.
Tom Renckly, FCDMC, w/o encl.

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2445
Fax (602) 417-2423

**JANE DEE HULL**
**Governor**

**RITA PEARSON MAGUIRE**
**Director**

## LETTER OF TRANSMITTAL

To: Mr. Charles V. Gopperton, P.E.
Project Engineer
Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355

Date: May 13, 2000
File Name: Golden Eagle Park Dam
File No.: 07.33

Attention:

Sent Via: ☐ U.S. Mail ☐ Express Mail ☒ Messenger

☐ Fax: Phone #_____ No. Pages (Attached):_____

We Are Sending The Following:

| DESCRIPTION | DATED | COPIES |
|---|---|---|
| ADWR Letter Approving Application for Alteration , with encl. | May 3, 2000 | 1 |
| ADWR Letter of Approval of Revised Documents | May 13, 2000 | 1 |
| ADWR Approved Construction Drawings, 36 sheets | May 3, 2000 | 1 |
| ADWR Approved Construction Specifications, with Addenda | May 3, 2000 | 1 |

These Are Transmitted:

☒ For Your Use ☐ For Review & Comment
☐ As Requested ☐ For Your Information
☐ _____

Remarks:

cc: 1. Tom Renckly, FCDMC

2. _____

3. _____

Fax: _____

_____

Signed: Gerald Cox
Gerald Cox

# ARIZONA DEPARTMENT OF WATER RESOURCES

**Dam Safety Section**

500 North Third Street, Phoenix, Arizona 85004

Telephone (602) 417-2445

Fax (602) 417-2423


May 3, 2000


**JANE DEE HULL**
**Governor**

**RITA P. PEARSON**
**Director**


Mr. Charles V. Gopperton, P.E.
Project Engineer
Stantec Consulting, Inc.
8211 South 48th Street
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Jon M. Benoist, P.E.
Supervisor
Dam Safety Section

Enclosures

cc: Tom Ward, Town of Fountain Hills, w/o encl.
Tom Renckly, FCDMC, w/o encl.

ARIZONA DEPARTMENT OF WATER RESOURCES
SURFACE WATER MANAGEMENT DIVISION
Dam Safety Section

Application No. 07.33 Filed March 23, 2000
(Applicant shall not fill in above blanks)

JANE DEE HULL
Governor

RITA P. PEARSON
Director

# APPLICATION for APPROVAL of the PLANS and SPECIFICATIONS for the CONSTRUCTION, ENLARGEMENT, REPAIR, ALTERATION or REMOVAL of a DAM and RESERVOIR

This application is for the Improvements (Construction, Enlargement, Repair, etc.) to the Golden Eagle Park (Name of Dam) Dam.

## LOCATION OF DAM

This dam is in Maricopa County, in the NE ¼, Sec. 9 and the NW ¼, Sec. 10, Twp. 3N, Rge. 6E, G&SR B&M, at North Latitude 33° 37' 7" and West Longitude 111° 44' 6", on USGS Quad Granite Reef Dam and is located on Ashbrook Wash (Wash, Creek, River or Watershed), tributary to Verde River (Wash, Creek or River)

## OWNER

Name: Town of Fountain Hills Telephone: (480) 816-5141

Mailing Address: 16836 E. Palisades, PO Box 17958, Fountain Hills, Arizona 85269

and

Name: Fountain Hills Unified School District Telephone: (480) 837-0690

Mailing Address: 14605 N. Del Combre, Fountain Hills, AZ 85208

If this application is for construction of a new dam complete all items (1 through 21) except item 12. For enlargement, repair, alteration or removal, complete items 12 through 21 and those other items where a change is being made.

## DESCRIPTION OF DAM AND RESERVOIR

1. Type of dam zoned earth embankment. (Earth, Rock, Concrete Gravity, etc.) Purpose of dam Flood Control.

2. Dam crest elevation Existing - 1721.5', Proposed 1726.5' feet. Spillway crest elev. Existing 1714.9', Proposed 1714.9' with fuseplug notch at 1712.9' feet. Outlet invert elev. Principal Outlet - 1695', Auxiliary Outlet - 1695' feet.

3. Dam height is Existing 26.8', Proposed 31.8' feet (Measured from the lowest elevation of the outside limit of the dam at its intersection with the natural ground surface to the crest of the spillway - ARS 45-1201.2).

4. Dam crest length Existing 660', Proposed 570' feet. Dam crest width 12' feet. Dam Crest Camber (if any) none feet.

5. Dam slope: Upstream 2.0 : 1 (horizontal:vertical); Downstream 2.0 : 1 (horizontal:vertical).

. Spillway (type, dimensions, control(s), design capacity, flow depth, etc.): Existing spillway is an earthen broad crested weir with concrete cutoff wall. Length of 266' to be increased to 356' by construction of a 2' lower fuseplug notch, 90' long. Maximum water surface elevation for the IDF peak flow rate of 25,597 cfs is 1723.39'. Flow depth over the modified spillway is 8.5' and 10.5' in the notched fuseplug section.

7. Outlet (type, internal diameter, dimensions, control(s), capacity, trashrack, energy dissipater): The existing Principal Outlet Works is an ungated, 2 barrel, 60" diameter concrete pipe through the dam. One barrel will be grouted shut. Maximum capacity at a water surface elevation of 1723.39' is 483 cfs. The proposed Auxiliary Outlet Works is an ungated 10' x 4' concrete box culvert through the dam. Maximum capacity at a water surface elevation of 1723.39' is 1,075 cfs. Total capacity is 1,558 cfs. Both outlet works will be fitted with steel bar trashracks at the inlet headwall. Both outlet works discharge to concrete aprons with an end sill to force a hydraulic jump.

8. Reservoir at spillway crest elevation: Storage capacity 101 acre-feet; Surface area 16.8 acres.
Reservoir at dam crest elevation: Storage capacity 344 acre-feet; Surface area 23.0 acres.

## HYDROLOGIC DATA

9. Drainage area 7.13 square miles. Names of upstream dams Aspen Dam (Dam 6), North Heights Dam (Dam 11), SunRidge Canyon Dam (Dam 7)

10. Downstream Hazard: Fountain Hills High School is built immediately downstream of the dam and spillway ; the dam is within the Town of Fountain Hills and Ashbrook Wash flows through Fountain Hills. The area downstream of the dam is a fully developed residential area. The hazard potential is high.
(Nearest downstream town, population, distance, other inhabitants or development, Downstream Hazard Potential Classification)

11. Inflow design flood: 0.5 PMF . Duration 6 hours. Precipitation 13.7 inches.
(100-year, 0.5 PMF, PMF)

Peak inflow rate 26,516 cfs. Water surface elevation is 1723.39' feet at the time of the maximum spillway discharge of 25,597 cfs during routing of the Inflow Design Flood.

## GENERAL INFORMATION

12. Description of Work (enlargement, repair, alteration, etc.): Enlarge spillway, raise dam, construct auxiliary outlet works, modify principal outlet works, add erosion protection up and downstream of dam and spillway, construct spillway floodwall.

13. Type of stored water: none . Use of stored water: N/A .
(surface, groundwater, effluent, etc.)

Existing water rights claims/filings associated with water to be stored: N/A
Has primary storage permit application been made? _____ Yes _____ No

14. Other federal, state or local permits (to be) applied for; Give details, include date(s):
USACOE - 404 Permit - NWP 26, File No. 1999-16097-AP, authorized 10 February, 2000
ADWR - Permit to Withdraw Groundwater For Temporary Dewatering - Permit No. 59-578325, issued 29 February, 2000

15. Describe provisions to divert flood flows during construction; include frequency (years) and flow rate (cfs): Stream diversion plan is to be designed by the contractor and will take advantage of the existing and proposed ungated outlet works, however, the following is the capacity of the existing and proposed outlet works and spillway to pass flood flows:
- The existing Principal Outlet works will pass up to a maximum of 750 cfs (headwater at spillway crest elevation) during construction of the Auxiliary Outlet Works.
- The Auxiliary Outlet works will pass up to a maximum of 880 cfs (headwater at spillway crest elevation) cfs during construction of the modified Principal Outlet Works.
- The combined flow through both outlet works is up to 1,285 cfs (at spillway crest elevation) during embankment raising and spillway construction. They are designed to pass the 100 year flow.
- During all construction, a 200 foot wide section of the spillway and spillway channel is to remain unblocked. This will pass 75% of the existing capacity of the spillway or approximately 9,560 cfs, plus additional flow through the outlet works.

16. Construction is expected to begin May 2000 (Month and Year) Estimated completion December, 2000 (Month and Year).

17. Estimated cost of dam, reservoir and appurtenances (ARS 45-1204.A): Design - $484,137 Construction - $930,639 Total - $1,414,776

18. Fees accompanying this application (fees based on cost; R12-15-151): $15,073.88

19. Investigations, design, drawings and specifications prepared by (identify firm and Engineer of Record; attach resume highlighting dam design experience): Stantec Consulting Inc. - Charles V. Gopperton, PE

20. Construction Quality Assurance & Quality Control to be performed by (identify firm, Site Engineer, and Engineer of Record; attach resume(s) highlighting dam construction experience): AGRA Earth and Environmental, Inc. - Norman H. Wetz, PE

21. Emergency Action Plan prepared by: Stantec Consulting Inc.

Application submitted by (signature): Thomas A. Ward Date: 4-12-00

Name: Tom Ward, Interim Town Engineer – Town of Fountain Hills
Mailing Address: 16836 E. Palisades, PO Box 17958, Fountain Hills, Arizona 85269

Legal capacity if other than owner: _____

## APPROVAL OF APPLICATION No. 07.33

This is to certify that Application No. 07.33, including the drawings and specifications for Golden Eagle Park Dam and Reservoir has been examined and the same is hereby approved, subject to the following terms and limitations:

1. Construction work shall be started within one (1) year from date.

2. No foundations or abutments shall be covered by the material of the dam until the Department has been given an opportunity to inspect and approve the same.

3. Those additional conditions listed in the Department's letter of Approval of Application for Alteration, dated May 3, 2000.

Dated this 3rd day of May, 20 00

J Darrell Jordan

J. Darrell Jordan
Assistant Director, Surface Water Management Division

APPLI: Rev 04/98, Page 2 0f 2 (File: j:\engineer\inforpkt\current\app0498.wpd)

# ARIZONA DEPARTMENT OF WATER RESOURCES

## SURFACE WATER MANAGEMENT DIVISION

### Dam Safety Section

# REQUIREMENTS

# DURING AND FOLLOWING

# DAM CONSTRUCTION

LICENSE: Rev 07/99
(File: j:\engineer\inforpkt\draft\lic07/99.doc)

# REQUIREMENTS DURING DAM CONSTRUCTION

Arizona Revised Statutes require that the Department supervise, for safety, the construction of jurisdictional dams. Construction may not commence until the Director has approved the owner's application. Approval is provided in writing.

Once an application is approved, it is valid for a one-year period in which construction must begin. If construction does not begin within one year, the Department must review the application again in light of changes that may have occurred since the approval was originally given. Upon written request and good cause shown by the owner, the time for commencing construction may be extended.

## Pre-construction Conference

The Department encourages the owner to hold a pre-construction conference prior to commencement of construction activities. From the Department's perspective, the conference provides a final forum for communication of regulatory requirements so that the contractor can plan construction activities accordingly. All involved regulatory agencies, the prime contractor and all sub-contractors should be invited.

## Construction Control

The owner and the owner's engineer must oversee construction of a new dam, or enlargement, repair, alteration or removal of an existing dam. Failure to perform the construction in accordance with the plans and specifications approved by the Director shall render the approval revocable. Construction supervision shall be under the direction of a registered professional engineer having proficiency in the design and construction of dams. The owner's engineer shall be independent of the contractor.

The Dam Safety Section will periodically inspect construction to confirm that it is proceeding according to the approved design and to confirm that the owner's engineer is exercising proper construction control. The owner (or the owner's engineer) must remedy any unsatisfactory condition with the contractor.

The Department shall have access to the dam site for purposes of inspecting all phases of construction including (but not necessarily limited to) the foundation, embankment or concrete placement, inspection and test records, and mechanical installations. At a frequency approved by the Department, the owner's engineer will submit summary reports of construction activities and test results.

The owner or his engineer shall immediately report to the Department any condition encountered during construction that requires a deviation from the approved plans and specifications. The owner or the owner's engineer must promptly submit a written request for approval of any necessary change and sufficient data to justify the proposed change. Construction pursuant to the proposed change may not commence without the written approval of the Director.

## Completion of Construction

Upon completion of construction, the Department should be notified to that effect in writing. A final inspection will be made as soon as practicable. Any deficiencies noted during the final inspection must be corrected as soon as possible.

Use of the reservoir requires written permission from the Department.

## REQUIREMENTS FOLLOWING COMPLETION OF DAM CONSTRUCTION

As soon as possible after completion of the construction work and final inspection by an engineer from the Dam Safety Section, the owner or his engineer must file the following:

- An Affidavit of the actual cost of construction. Attach a detailed breakdown of the costs, including all engineering costs (see paragraph on fee requirements). A sample Affidavit is included in this section.

- An additional application fee or refund request, as appropriate (see **Fee Requirements**).

- One set of full sized as-constructed plans, in the form of paper prints. As-constructed plans must show confirmation survey points and elevations for the dam and appurtenant structures made during and after completion of construction. If changes were made to the approved drawings during construction, supplemental drawings showing the dam and appurtenances as actually constructed must be included.

- Construction records such as grouting, materials testing, locations and elevations of specific construction, and baseline readings for permanent benchmarks and other instrumentation.

- A brief completion report summarizing the significant features of the project, including a description of and causes for any changes or deviations from the approved drawings and specifications which were made during the construction phase.

- The addition to the dam Operation and Maintenance Plan of any operating and maintenance information provided by manufacturers for equipment and instrumentation installed during construction.

Upon completion of these items and finding that the dam has been constructed in accordance with the approved plans and specifications, a license of final approval will be issued. Pending issuance of a license, use of the reservoir shall require written permission from the Department.

**Fee Requirements**

Upon completion of the project, the total actual costs related to construction shall be tabulated and the fee recomputed for this amount in accordance with the schedule as shown below. Payment of the application fee is required for all new construction, alteration, repair, enlargement or removal applications for dams. The fee is based upon the total project costs associated with construction of the dam and appurtenant works integral to the design and operation of the dam. Preliminary investigations and surveys, engineering designs, ADWR application requirements, administration and supervision of construction, and any other engineering costs related to construction must also be included.

If the recomputed fee for actual costs exceeds the estimated fee paid with the application filing by $50.00 or more, then the owner will pay the difference between the fee already paid and the recomputed fee. If the recomputed fee is less than the original fee by an amount of $50.00 or more, then the owner is entitled to a refund by the amount of the difference between the fee already paid and the recomputed fee.

A refund may be obtained by requesting it in writing with supporting documentation. The Department will review the final cost statement and initiate the refund process if a refund is indicated.

**Example Final Fee Calculation**

Based upon the actual total costs the fee will be computed according to the following schedule:

- For the first $100,000 of the estimated cost, two (2 %) percent.
- For the next $400,000, one and one-half (1.5 %) percent.
- For the next $500,000, one (1 %) percent.
- For all costs in excess of $1,000,000, one-half of one (0.5 %) percent.

*ESTIMATED FEE CALCULATION FOR SUBMITTAL WITH THE APPLICATION:*

| | |
|---|---|
| *ESTIMATED COST* | $6,420,000.00 |
| 2% x $100,000 | 2,000.00 |
| 1.5% x $400,000 | 6,000.00 |
| 1% x $500,000 | 5,000.00 |
| 0.5% x $5,420,000 | 27,100.00 |
| *ESTIMATED FEE* | $40,100.00 |

*RECOMPUTED FEE CALCULATION FOR ACTUAL PROJECT COST IN ACCORDANCE WITH THE AFFIDAVIT OF TOTAL COST:*

| | | |
|---|---|---|
| *ACTUAL COST* | $6,482,500.00 | |
| 2% x $100,000 | 2,000.00 | |
| 1.5% x $400,000 | 6,000.00 | |
| 1% x $500,000 | 5,000.00 | |
| 0.5% x $5,482,500 | 27,412.50 | |
| *RECOMPUTED ACTUAL FEE* | $40,412.50 | |
| Original Estimated Fee | | - 40,100.00 |
| ADDITIONAL *FEE* | *$312.50* | |

In the example the owner would be required to pay an additional fee of $312.50. If the actual cost were $6,320,000.00, then the recomputed fee would be $39,600.00. The difference of $500.00 would be an over payment and the owner would be entitled to a refund of $500.00.

**Sample Affidavit of Total Cost** (place on applicant□s letterhead)

Arizona Department of Water Resources
Surface Water Management Division
Dam Safety Section
500 North Third Street
Phoenix, Arizona 85004-3903

Director:

I, _____ am the _____
(Name) (Owner or Authorized Agent of Owner)
of the _____.
(Name of Dam and Reservoir)

The final actual total cost of the construction (or enlargement, repair, alteration, or removal, as appropriate) of the dam and appurtenant works to completion thereof is as follows:

* 1. **ENGINEERING**

1.1 Preliminary investigations, surveys and design..... $ _____

1.2 Final investigations, surveys, design, and ADWR application requirements ..... $ _____

1.3 Contract administration, construction supervision..... $ _____

1.4 Construction quality control testing..... $ _____

*TOTAL ENGINEERING* ..... $ _____

* 2. **CONSTRUCTION CONTRACT PAYMENTS**

** 2.1 Final payment for contract bid quantity list..... $ _____

** 2.2 Final payment for change orders to bid quantity list..... $ _____

*TOTAL CONSTRUCTION CONTRACTS*..... $ _____

*TOTAL CONSTRUCTION COST* (Engineering + Construction Contracts)..... $ _____

I hereby declare under penalty of perjury that, to the best of my knowledge and belief, the above statement is true and correct.

Executed on _____ at _____, Arizona.

_____
(Owner's Signature)

_____
(Notary) (Date)

* The cost breakdown must include all applicable costs as indicated. For projects with two or more features, an allocation of total project cost items to each appropriate feature may be made. Allocations of project cost items may be combined when properly identified to fit the individual circumstances.

** Attach forms showing contract bid quantities with prices and final pay quantities, including change order items.

# PROJECT COST

# AND

# CHANGE ORDERS

**BID TAB**

**Contract FCD 1999C071, Golden Eagle Park Dam Modification**

**Bid Opening: May 4, 2000**

| | | | | ENGINEER | | HUNTER | | ARCHON | | NA OBERSTROM | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Engineer Estimate | | Bidder Quotation | | | | | |
| | DESCRIPTION | UNIT | QTY | UNIT PRICE | TOTAL | UNIT PRICE | TOTAL | UNIT PRICE | TOTAL | UNIT PRICE | TOTAL |
| 105-1 | Partnering 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 |
| 107-1 | NPDES / SWPPP | LS | 1 | $ 6,000.00 | $ 6,000.00 | $ 10,000.00 | $ 10,000.00 | $ 5,000.00 | $ 5,000.00 | $ 5,000.00 | $ 5,000.00 |
| 107-2 | Public Information And Notification 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 |
| 107-3 | Project Signs Allowance | LS | 1 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 | $ 2,000.00 |
| 107-4 | Diversion and Care of Water | LS | 1 | $ 10,000.00 | $ 10,000.00 | $ 15,000.00 | $ 15,000.00 | $ 2,000.00 | $ 2,000.00 | $ 4,000.00 | $ 4,000.00 |
| 107-5 | Dewatering | MG | 2 | $ 700.00 | $ 1,400.00 | $ 4,600.00 | $ 9,200.00 | $ 500.00 | $ 1,000.00 | $ 50.00 | $ 100.00 |
| 112-1 | Mobilization | LS | 1 | $ 28,565.00 | $ 28,565.00 | $ 20,000.00 | $ 20,000.00 | $ 8,000.00 | $ 8,000.00 | $ 32,000.00 | $ 32,000.00 |
| 201-1 | Clear and Grub | LS | 1 | $ 4,500.00 | $ 4,500.00 | $ 25,000.00 | $ 25,000.00 | $ 10,000.00 | $ 10,000.00 | $ 58,000.00 | $ 58,000.00 |
| 203-1 | Excavation, Common | CY | 16093 | $ 5.40 | $ 86,902.20 | $ 13.00 | $ 209,209.00 | $ 20.00 | $ 321,860.00 | $ 6.30 | $ 101,385.90 |
| 203-2 | Excavation, Rock | CY | 25 | $ 50.00 | $ 1,250.00 | $ 25.00 | $ 625.00 | $ 200.00 | $ 5,000.00 | $ 125.00 | $ 3,125.00 |
| 204-1 | Preliminary Cleanup | SY | 20 | $ 20.00 | $ 400.00 | $ 35.00 | $ 700.00 | $ 180.00 | $ 3,600.00 | $ 8.50 | $ 170.00 |
| 204-2 | Final Cleanup | SY | 20 | $ 20.00 | $ 400.00 | $ 35.00 | $ 700.00 | $ 180.00 | $ 3,600.00 | $ 5.00 | $ 100.00 |
| 204-3 | Foundation Preparation | SY | 20 | $ 20.00 | $ 400.00 | $ 35.00 | $ 700.00 | $ 180.00 | $ 3,600.00 | $ 5.00 | $ 100.00 |
| 204-4 | Dental Concrete | CY | 5 | $ 500.00 | $ 2,500.00 | $ 140.00 | $ 700.00 | $ 1,000.00 | $ 5,000.00 | $ 300.00 | $ 1,500.00 |
| 204-5 | Dental Mortar | CY | 1 | $ 500.00 | $ 500.00 | $ 175.00 | $ 175.00 | $ 2,000.00 | $ 2,000.00 | $ 350.00 | $ 350.00 |
| 205-1 | Compacted Fill, Impervious | CY | 7682 | $ 17.50 | $ 134,435.00 | $ 11.00 | $ 84,502.00 | $ 10.00 | $ 76,820.00 | $ 52.00 | $ 399,464.00 |
| 205-2 | Compacted Fill, Pervious | CY | 7680 | $ 17.80 | $ 136,704.00 | $ 6.00 | $ 46,080.00 | $ 10.00 | $ 76,800.00 | $ 17.00 | $ 130,560.00 |
| 205-3 | Compacted Fill, Random | CY | 1196 | $ 5.00 | $ 5,980.00 | $ 5.00 | $ 5,980.00 | $ 10.00 | $ 11,960.00 | $ 16.00 | $ 19,136.00 |
| 205-4 | Filter, Sand | CY | 452 | $ 40.00 | $ 18,080.00 | $ 35.00 | $ 15,820.00 | $ 60.00 | $ 27,120.00 | $ 35.00 | $ 15,820.00 |
| 205-5 | Riprap D50 = 12" | CY | 910 | $ 50.00 | $ 45,500.00 | $ 22.00 | $ 20,020.00 | $ 80.00 | $ 72,800.00 | $ 35.00 | $ 31,850.00 |
| 205-6 | Riprap D50 = 18" | CY | 906 | $ 50.00 | $ 45,300.00 | $ 22.00 | $ 19,932.00 | $ 90.00 | $ 81,540.00 | $ 35.00 | $ 31,710.00 |
| 205-7 | Fuseplug Fill | CY | 175 | $ 50.00 | $ 8,750.00 | $ 18.00 | $ 3,150.00 | $ 60.00 | $ 10,500.00 | $ 15.00 | $ 2,625.00 |
| 205-8 | Repair Erosion Damage on Dam | SY | 1850 | $ 5.00 | $ 9,250.00 | $ 2.50 | $ 4,625.00 | $ 5.00 | $ 9,250.00 | $ 1.00 | $ 1,850.00 |
| 221-1 | Gabions | CY | 730 | $ 113.00 | $ 82,490.00 | $ 130.00 | $ 94,900.00 | $ 120.00 | $ 87,600.00 | $ 140.00 | $ 102,200.00 |
| 222-1 | Filter Fabric | SY | 4030 | $ 1.25 | $ 5,037.50 | $ 1.50 | $ 6,045.00 | $ 2.00 | $ 8,060.00 | $ 1.00 | $ 4,030.00 |
| 223-1 | Gravel Mulch | SY | 1500 | $ 2.25 | $ 3,375.00 | $ 2.50 | $ 3,750.00 | $ 3.00 | $ 4,500.00 | $ 2.00 | $ 3,000.00 |
| 310-1 | Untreated Base | TON | 840 | $ 15.00 | $ 12,600.00 | $ 15.00 | $ 12,600.00 | $ 30.00 | $ 25,200.00 | $ 15.00 | $ 12,600.00 |
| 321-1 | Asphalt Concrete C-3/4 | TON | 170 | $ 45.00 | $ 7,650.00 | $ 35.00 | $ 5,950.00 | $ 55.00 | $ 9,350.00 | $ 65.00 | $ 11,050.00 |
| 321-2 | Asphalt Concrete D-1/2 | TON | 170 | $ 45.00 | $ 7,650.00 | $ 35.00 | $ 5,950.00 | $ 55.00 | $ 9,350.00 | $ 65.00 | $ 11,050.00 |
| 340-1 | Concrete Sidewalk, MAG 230 modified | SF | 1950 | $ 1.90 | $ 3,705.00 | $ 2.60 | $ 5,070.00 | $ 10.00 | $ 19,500.00 | $ 2.50 | $ 4,875.00 |
| 340-2 | Concrete Curb, MAG 222 Type B | LF | 120 | $ 10.00 | $ 1,200.00 | $ 10.00 | $ 1,200.00 | $ 15.00 | $ 1,800.00 | $ 12.50 | $ 1,500.00 |
| 350-1 | Remove Existing Retaining Walls | LF | 394 | $ 2.00 | $ 788.00 | $ 16.00 | $ 6,304.00 | $ 10.00 | $ 3,940.00 | $ 8.00 | $ 3,152.00 |
| 350-2 | Remove Existing Trash Rack | LS | 1 | $ 300.00 | $ 300.00 | $ 210.00 | $ 210.00 | $ 800.00 | $ 800.00 | $ 700.00 | $ 700.00 |
| 350-3 | Sawcut and Remove Asphalt Concrete Pavement | SY | 3100 | $ 1.00 | $ 3,100.00 | $ 2.20 | $ 6,820.00 | $ 2.00 | $ 6,200.00 | $ 2.50 | $ 7,750.00 |
| 350-4 | Cut and Remove Concrete Sidewalk | LF | 470 | $ 1.30 | $ 611.00 | $ 6.50 | $ 3,055.00 | $ 3.00 | $ 1,410.00 | $ 2.50 | $ 1,175.00 |
| 350-5 | Cut and Remove Concrete Curb | LF | 188 | $ 1.00 | $ 188.00 | $ 4.00 | $ 752.00 | $ 4.50 | $ 846.00 | $ 2.00 | $ 376.00 |
| 350-6 | Cut and Remove Concrete Cutoff Wall | LF | 32 | $ 12.50 | $ 400.00 | $ 10.00 | $ 320.00 | $ 120.00 | $ 3,840.00 | $ 9.00 | $ 288.00 |
| 350-7 | Cut and Remove Shotcrete | SY | 490 | $ 3.00 | $ 1,470.00 | $ 3.50 | $ 1,715.00 | $ 1.00 | $ 490.00 | $ 3.00 | $ 1,470.00 |
| 350-8 | Cut and Remove Fence | LF | 255 | $ 2.00 | $ 510.00 | $ 2.50 | $ 637.50 | $ 4.00 | $ 1,020.00 | $ 3.00 | $ 765.00 |
| 350-9 | Remove and Salvage Riprap | CY | 96 | $ 5.00 | $ 480.00 | $ 13.00 | $ 1,248.00 | $ 20.00 | $ 1,920.00 | $ 11.00 | $ 1,056.00 |
| 420-1 | 6' Chain Link Fence | LF | 667 | $ 27.30 | $ 18,209.10 | $ 10.00 | $ 6,670.00 | $ 15.00 | $ 10,005.00 | $ 12.80 | $ 8,537.60 |
| 420-2 | 8' Chain Link Fence | LF | 76 | $ 20.00 | $ 1,520.00 | $ 24.00 | $ 1,824.00 | $ 30.00 | $ 2,280.00 | $ 30.00 | $ 2,280.00 |
| 420-3 | 6' Chain Link X 4' Single Leaf Gate | EA | 1 | $ 120.00 | $ 120.00 | $ 525.00 | $ 525.00 | $ 700.00 | $ 700.00 | $ 650.00 | $ 650.00 |
| 420-4 | 6' Chain Link X 12' Double Leaf Gate | EA | 1 | $ 360.00 | $ 360.00 | $ 670.00 | $ 670.00 | $ 900.00 | $ 900.00 | $ 850.00 | $ 850.00 |
| 420-5 | Breakaway Fence at Principal Outlet Works | EA | 1 | $ 3,100.00 | $ 3,100.00 | $ 3,400.00 | $ 3,400.00 | $ 4,500.00 | $ 4,500.00 | $ 4,250.00 | $ 4,250.00 |
| 420-6 | Breakaway Fence at Auxilixiary Outlet Works | EA | 1 | $ 2,300.00 | $ 2,300.00 | $ 1,800.00 | $ 1,800.00 | $ 2,300.00 | $ 2,300.00 | $ 2,250.00 | $ 2,250.00 |
| 425-1 | Topsoil | LS | 1 | $ 2,000.00 | $ 2,000.00 | $ 7,370.00 | $ 7,370.00 | $ 8,000.00 | $ 8,000.00 | $ 42,000.00 | $ 42,000.00 |
| 430-1 | Type 1 Seeding | AC | 2.00 | $ 2,000.00 | $ 4,000.00 | $ 4,800.00 | $ 9,600.00 | $ 2,000.00 | $ 4,000.00 | $ 1,850.00 | $ 3,700.00 |
| 430-2 | Type 2 Seeding | AC | 1.00 | $ 2,000.00 | $ 2,000.00 | $ 4,800.00 | $ 4,800.00 | $ 2,000.00 | $ 2,000.00 | $ 2,250.00 | $ 2,250.00 |
| 430-3 | Remove and Replace Turf Lawn | SY | 1900 | $ 0.50 | $ 950.00 | $ 6.00 | $ 11,400.00 | $ 15.00 | $ 28,500.00 | $ 7.50 | $ 14,250.00 |
| 430-4 | Blue Paloverde, 5 Gal. | EA | 5 | $ 100.00 | $ 500.00 | $ 30.00 | $ 150.00 | $ 50.00 | $ 250.00 | $ 160.00 | $ 800.00 |

BIDS RECEIVED

**BID TAB**

**Contract FCD 1999C071, Golden Eagle Park Dam Modification**

**Bid Opening: May 4, 2000**

| | | | | Engineer's Estimate | | Ultimate Construction | | [illegible] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | DESCRIPTION | UNIT | QTY | UNIT PRICE | TOTAL | UNIT PRICE | TOTAL | UNIT PRICE | TOTAL | UNIT PRICE | TOTAL |
| 430-5 | Freemont Cottonwood, 5 Gal. | EA | 30 | $ 100.00 | $ 3,000.00 | $ 30.00 | $ 900.00 | $ 50.00 | $ 1,500.00 | $ 60.00 | $ 1,800.00 |
| 430-6 | Goodding Willow, 5 Gal. | EA | 7 | $ 100.00 | $ 700.00 | $ 30.00 | $ 210.00 | $ 60.00 | $ 420.00 | $ 60.00 | $ 420.00 |
| 440-1 | Remove & Replace Turf Irrigation System | LS | 1 | $ 500.00 | $ 500.00 | $ 6,000.00 | $ 6,000.00 | $ 6,000.00 | $ 6,000.00 | $ 1,250.00 | $ 1,250.00 |
| 440-2 | Nursery Stock Drip Irrigation System | LS | 1 | $ 1,000.00 | $ 1,000.00 | $ 6,000.00 | $ 6,000.00 | $ 6,000.00 | $ 6,000.00 | $ 4,000.00 | $ 4,000.00 |
| 505-1 | Concrete, Class AA (F'c = 4,000 Psi) | CY | 388.1 | $ 340.00 | $ 131,954.00 | $ 430.00 | $ 166,883.00 | $ 350.00 | $ 135,835.00 | $ 450.00 | $ 174,645.00 |
| 505-2 | Concrete, Class C (F'c = 2,000 Psi) | CY | 35 | $ 100.00 | $ 3,500.00 | $ 74.00 | $ 2,590.00 | $ 200.00 | $ 7,000.00 | $ 150.00 | $ 5,250.00 |
| 505-3 | 10'x 4' Box Culvert (ADOT B-02.10) | LF | 117 | $ 600.00 | $ 70,200.00 | $ 450.00 | $ 52,650.00 | $ 600.00 | $ 70,200.00 | $ 1,400.00 | $ 163,800.00 |
| 505-4 | Concrete Steps | LS | 1 | $ 500.00 | $ 500.00 | $ 500.00 | $ 500.00 | $ 1,500.00 | $ 1,500.00 | $ 550.00 | $ 550.00 |
| 510-1 | 4 Course Block Wall | LF | 54 | $ 12.30 | $ 664.20 | $ 45.00 | $ 2,430.00 | $ 70.00 | $ 3,780.00 | $ 50.00 | $ 2,700.00 |
| 510-2 | 3 Course Block Wall | LF | 6 | $ 8.50 | $ 51.00 | $ 40.00 | $ 240.00 | $ 55.00 | $ 330.00 | $ 37.00 | $ 222.00 |
| 510-3 | 2 Course Block Wall | LF | 108 | $ 5.80 | $ 626.40 | $ 35.00 | $ 3,780.00 | $ 40.00 | $ 4,320.00 | $ 25.00 | $ 2,700.00 |
| 510-4 | 1 Course Block Wall | LF | 32 | $ 3.20 | $ 102.40 | $ 30.00 | $ 960.00 | $ 30.00 | $ 960.00 | $ 16.00 | $ 512.00 |
| 510-5 | Masonry Retaining Wall | LF | 93 | $ 60.00 | $ 5,580.00 | $ 150.00 | $ 13,950.00 | $ 175.00 | $ 16,275.00 | $ 212.00 | $ 19,716.00 |
| 515-1 | Trashrack at Principal Outlet Works | LS | 1 | $ 6,400.00 | $ 6,400.00 | $ 8,000.00 | $ 8,000.00 | $ 4,000.00 | $ 4,000.00 | $ 9,350.00 | $ 9,350.00 |
| 515-2 | Trashrack at Auxiliary Outlet Works | LS | 1 | $ 6,500.00 | $ 6,500.00 | $ 8,000.00 | $ 8,000.00 | $ 2,500.00 | $ 2,500.00 | $ 12,500.00 | $ 12,500.00 |
| 515-3 | Steel Handrail | LF | 40 | $ 30.00 | $ 1,200.00 | $ 35.00 | $ 1,400.00 | $ 40.00 | $ 1,600.00 | $ 35.00 | $ 1,400.00 |
| 540-1 | Desert Varnish | LS | 1 | $ 1,000.00 | $ 1,000.00 | $ 5,000.00 | $ 5,000.00 | $ 4,000.00 | $ 4,000.00 | $ 12,500.00 | $ 12,500.00 |
| 618-1 | 24" RCP | LF | 120 | $ 66.00 | $ 7,920.00 | $ 135.00 | $ 16,200.00 | $ 150.00 | $ 18,000.00 | $ 56.00 | $ 6,720.00 |
| 618-2 | 60" RCP | LF | 20 | $ 455.00 | $ 9,100.00 | $ 240.00 | $ 4,800.00 | $ 250.00 | $ 5,000.00 | $ 142.00 | $ 2,840.00 |
| 618-3 | 24" Pipe Plug, MAG 427 | EA | 2 | $ 100.00 | $ 200.00 | $ 500.00 | $ 1,000.00 | $ 300.00 | $ 600.00 | $ 160.00 | $ 320.00 |
| 618-4 | 60" Pipe Plug, MAG 427 | EA | 2 | $ 300.00 | $ 600.00 | $ 500.00 | $ 1,000.00 | $ 600.00 | $ 1,200.00 | $ 400.00 | $ 800.00 |
| | **TOTAL DOLLARS** | | | | $ 986,727.80 | | $ 1,021,346.50 | | $ 1,299,731.00 | | $ 1,533,195.50 |
| | **DIFFERENCE IN DOLLARS FROM ENGINEER'S ESTIMATE** | | | | | | $ 34,618.70 | | $ 313,003.20 | | $ 546,467.70 |
| | **DIFFERENCE IN DOLLARS FROM LOW BID** | | | | | | | | $ 278,384.50 | | $ 511,849.00 |

# FLOOD CONTROL DISTRICT

## PROGRESS REPORT

## AND ESTIMATE

| | | | |
|---|---|---|---|
| Est. #7 | FCD Contract #1999C071 | Final Payment | Page 5 |
| Contractor: | Hunter Contracting Co. | | |
| Project: | Golden Eagle Park Dam Modifications | | |
| Covering Period From: | 1/1/2001 to 1/31/2001 | | |
| NTP Start Date: 6/5/00 | Completion Date: | 12/22/00 | |
| Original Contract Amount: | $1,021,346.50 | Complete: | 100% |
| Current Contract Amount: | $1,003,047.95 | Thru C.O. 2 | |

| Bid Item No. | Description | Unit | Unit Price | Bid Quantity | Quantity This Period | Quantity Complete | Amt. Earned This Period | Total Earned To Date |
|---|---|---|---|---|---|---|---|---|
| 105-1 | Partnering Allowance | LS | $ 10,000.00 | 1 | 12.2322% | 58.3003% | $1,223.22 | $5,830.03 |
| 107-1 | NPDES / SWPPP | LS | $ 10,000.00 | 1 | 1 | 1 | $10,000.00 | $10,000.00 |
| 107-2 | Public Information And Notification Allowance | LS | $ 10,000.00 | 1 | 4.875% | 86.0601% | $487.50 | $8,606.01 |
| 107-3 | Project Signs Allowance | LS | $ 2,000.00 | 1 | 50% | 100% | $1,000.00 | $2,000.00 |
| 107-4 | Diversion and Care of Water | LS | $ 15,000.00 | 1 | 0 | 100% | $0.00 | $15,000.00 |
| 107-5 | Dewatering | MG | $ 4,600.00 | 2 | 0.18 | 0.18 | $828.00 | $828.00 |

The undersigned contractor certifies to the best of his knowledge, information, and belief, the work covered by this application for payment has been completed in accordance with the contract documents and pursuant to A.R.S. 34-221. The Contractor in making this application for payment, also certifies that it has applied the proceeds of previous payments to pay all subcontractors and material suppliers then due and owing. Further, it will make the payment to subcontractors in material suppliers within seven (7) days of receipt for the sums due and owing them through this progress payment.

| | |
|---|---|
| TOTAL EARNED BY CONTRACTOR | $1,003,047.95 |
| Securities in lieu of retention | |
| NET AMOUNT DUE CONTRACTOR | $1,003,047.95 |
| DEDUCT PREVIOUS PAYMENTS | $859,909.82 |
| OTHER DEDUCTIONS | $0.00 |
| TOTAL DEDUCTIONS | $859,909.82 |
| AMOUNT TO BE PAID THIS ESTIMATE | $143,138.13 |
| DATE | |

Authorized Contractor's Signature: [signature]

Title: PROJECT MANAGER Date: 1/24/01

| | NAME / TITLE / ORGANIZATION | | |
|---|---|---|---|
| PREPARED BY (ENGINEER) | Shewa Shivaswamy, Resident Enginner, FCD | [signature] | Jan. 24, 2001 |
| SUBMITTED BY (CONTRACTOR) | Hunter Contracting Co. | [signature] | 1/24/01 |
| REVIEWED BY CHIEF CONST. INSP. | Fritz Huber, Const. Branch Mgr., Flood Control Dist. | [signature] | 1-24-01 |
| APPROVED BY PPM DIV. MGR. | Tom Johnson, PPM Div. Mgr., Flood Control Dist. | [signature] | 1-24-01 |

for

PAY ESTIMATE (FINAL)

1/5

**FLOOD CONTROL DISTRICT**

**PROGRESS REPORT**

| | | |
|---|---|---|
| Estimate #7 | FCD Contract #1999C071 | Final Payment |
| Contractor: | Hunter Contracting Co. | |
| Project: | Golden Eagle Park Dam Modifications | |
| Covering Period From: | 1/1/2001 to 1/31/2001 | |

| Bid Item No. | Description | Unit | Unit Price | Bid Quantity | Quantity This Period | Quantity Complete | Amt. Earned This Period | Total Earned To Date |
|---|---|---|---|---|---|---|---|---|
| 112-1 | Mobilization | LS | $ 20,000.00 | 1 | 0 | 1 | $0.00 | $20,000.00 |
| 201-1 | Clear and Grub | LS | $ 25,000.00 | 1 | 0 | 1 | $0.00 | $25,000.00 |
| 203-1 | Excavation, Common | CY | $ 13.00 | 16,093 | 0 | 16,093 | $0.00 | $209,209.00 |
| 203-2 | Excavation, Rock | CY | $ 25.00 | 25 | 0 | 0 | $0.00 | $0.00 |
| 204-1 | Preliminary Cleanup | SY | $ 35.00 | 20 | 0 | 0 | $0.00 | $0.00 |
| 204-2 | Final Cleanup | SY | $ 35.00 | 20 | 0 | 0 | $0.00 | $0.00 |
| 204-3 | Foundation Preparation | SY | $ 35.00 | 20 | 0 | 0 | $0.00 | $0.00 |
| 204-4 | Dental Concrete | CY | $ 140.00 | 5 | 0 | 0 | $0.00 | $0.00 |
| 204-5 | Dental Mortar | CY | $ 175.00 | 1 | 0 | 0 | $0.00 | $0.00 |
| 205-1 | Compacted Fill, Impervious | CY | $ 11.00 | 7682 | 0 | 7,682 | $0.00 | $84,502.00 |
| 205-2 | Compacted Fill, Pervious | CY | $ 6.00 | 7680 | 0 | 7,680 | $0.00 | $46,080.00 |
| 205-3 | Compacted Fill, Random | CY | $ 5.00 | 1196 | 1196 | 1196 | $5,980.00 | $5,980.00 |
| 205-4 | Filter, Sand | CY | $ 35.00 | 452 | 0 | 452 | $0.00 | $15,820.00 |
| 205-5 | Riprap D50 = 12" | CY | $ 22.00 | 910 | 0 | 910 | $0.00 | $20,020.00 |
| 205-6 | Riprap D50 = 18" | CY | $ 22.00 | 906 | 0 | 906 | $0.00 | $19,932.00 |
| 205-7 | Fuseplug Fill | CY | $ 18.00 | 175 | 175 | 175 | $3,150.00 | $3,150.00 |
| 205-8 | Repair Erosion Damage on Dam | SY | $ 2.50 | 1850 | 1850 | 1850 | $4,625.00 | $4,625.00 |
| 221-1 | Gabions | CY | $ 130.00 | 730 | 100 | 730 | $13,000.00 | $94,900.00 |
| | | | | | | | **$26,755.00** | **$549,218.00** |

2/2

**FLOOD CONTROL DISTRICT**

**PROGRESS REPORT**

| | | | |
|---|---|---|---|
| Estimate #7 | FCD Contract #1999C071 | | Final Payment |
| Contractor: | Hunter Contracting Co. | | |
| Project: | Golden Eagle Park Dam Modifications | | |
| Covering Period From: | 1/1/2001 to 1/31/2001 | | |

| Bid Item No. | Description | Unit | Unit Price | Bid Quantity | Quantity This Period | Quantity Complete | Amt. Earned This Period | Total Earned To Date |
|---|---|---|---|---|---|---|---|---|
| 222-1 | Filter Fabric | SY | $ 1.50 | 4030 | 530 | 4,030 | $795.00 | $6,045.00 |
| 223-1 | Gravel Mulch | SY | $ 2.50 | 1500 | 921 | 1671 | $2,302.50 | $4,177.50 |
| 310-1 | Untreated Base | TON | $ 15.00 | 840 | 0 | 0 | $0.00 | $0.00 |
| 321-1 | Asphalt Concrete C-3/4 | TON | $ 35.00 | 170 | 0 | 0 | $0.00 | $0.00 |
| 321-2 | Asphalt Concrete D-1/2 | TON | $ 35.00 | 170 | 62 | 62 | $2,170.00 | $2,170.00 |
| 340-1 | Concrete Sidewalk, MAG 230 modified | SF | $ 2.60 | 1950 | 1,778 | 1,778 | $4,622.80 | $4,622.80 |
| 340-2 | Concrete Curb, MAG 222 Type B | LF | $ 10.00 | 120 | 0 | 0 | $0.00 | $0.00 |
| 350-1 | Remove Existing Retaining Walls | LF | $ 16.00 | 394 | 0 | 371 | $0.00 | $5,936.00 |
| 350-2 | Remove Existing Trash Rack | LS | $ 210.00 | 1 | 0 | 1 | $0.00 | $210.00 |
| 350-3 | Sawcut and Remove Asphalt Concrete Pavement | SY | $ 2.20 | 3100 | 240 | 240 | $528.00 | $528.00 |
| 350-4 | Cut and Remove Concrete Sidewalk | LF | $ 6.50 | 470 | 0 | 300 | $0.00 | $1,950.00 |
| 350-5 | Cut and Remove Concrete Curb | LF | $ 4.00 | 188 | 0 | 0 | $0.00 | $0.00 |
| 350-6 | Cut and Remove Concrete Cutoff Wall | LF | $ 10.00 | 32 | 0 | 32 | $0.00 | $320.00 |
| 350-7 | Cut and Remove Shotcrete | SY | $ 3.50 | 490 | 0 | 490 | $0.00 | $1,715.00 |
| 350-8 | Cut and Remove Fence | LF | $ 2.50 | 255 | 0 | 255 | $0.00 | $637.50 |
| 350-9 | Remove and Salvage Riprap | CY | $ 13.00 | 96 | 0 | 96 | $0.00 | $1,248.00 |
| 420-1 | 6' Chain Link Fence | LF | $ 10.00 | 667 | 337 | 667 | $3,370.00 | $6,670.00 |
| 420-2 | 8' Chain Link Fence | LF | $ 24.00 | 76 | 76 | 76 | $1,824.00 | $1,824.00 |
| | | | | | | | **$15,612.30** | **$38,053.80** |

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**FLOOD CONTROL DISTRICT**

**PROGRESS REPORT**

| | | |
|---|---|---|
| Estimate #7 | FCD Contract #1999C071 | Final Payment |
| Contractor: | Hunter Contracting Co. | |
| Project: | Golden Eagle Park Dam Modifications | |
| Covering Period From: | 1/1/2001 to 1/31/2001 | |

| Bid Item No. | Description | Unit | Unit Price | Bid Quantity | Quantity This Period | Quantity Complete | Amt. Earned This Period | Total Earned To Date |
|---|---|---|---|---|---|---|---|---|
| 420-3 | 6' Chain Link X 4' Single Leaf Gate | EA | $ 525.00 | 1 | 0 | 1 | $0.00 | $525.00 |
| 420-4 | 6' Chain Link X 12' Double Leaf Gate | EA | $ 670.00 | 1 | 1 | 1 | $670.00 | $670.00 |
| 420-5 | Breakaway Fence at Principal Outlet Works | EA | $ 3,400.00 | 1 | 1 | 1 | $3,400.00 | $3,400.00 |
| 420-6 | Breakaway Fence at Auxilixiary Outlet Works | EA | $ 1,800.00 | 1 | 1 | 1 | $1,800.00 | $1,800.00 |
| 425-1 | Topsoil | LS | $ 7,370.00 | 1 | 50% | 1 | $3,685.00 | $7,370.00 |
| 430-1 | Type 1 Seeding | AC | $ 4,800.00 | 2 | 2 | 2 | $9,600.00 | $9,600.00 |
| 430-2 | Type 2 Seeding | AC | $ 4,800.00 | 1 | 1 | 1 | $4,800.00 | $4,800.00 |
| 430-3 | Remove and Replace Turf Lawn | SY | $ 6.00 | 1,900 | 1,111 | 1,111 | $6,666.00 | $6,666.00 |
| 430-4 | Blue Paloverde, 5 Gal. | EA | $ 30.00 | 5 | 5 | 5 | $150.00 | $150.00 |
| 430-5 | Freemont Cottonwood, 5 Gal. | EA | $ 30.00 | 30 | 8 | 8 | $240.00 | $240.00 |
| 430-6 | Goodding Willow, 5 Gal. | EA | $ 30.00 | 7 | 7 | 7 | $210.00 | $210.00 |
| 440-1 | Remove & Replace Turf Irrigation System | LS | $ 6,000.00 | 1 | 1 | 1 | $6,000.00 | $6,000.00 |
| 440-2 | Nursery Stock Drip Irrigation System | LS | $ 6,000.00 | 1 | 1 | 1 | $6,000.00 | $6,000.00 |
| 505-1 | Concrete, Class AA (F'c = 4,000 Psi) | CY | $ 430.00 | 388.10 | 0 | 388 | $0.00 | $166,840.00 |
| 505-2 | Concrete, Class C (F'c = 2,000 Psi) | CY | $ 74.00 | 35 | 0 | 30 | $0.00 | $2,220.00 |
| 505-3 | 10'x 4' Box Culvert (ADOT B-02.10) | LF | $ 450.00 | 117 | 0 | 117 | $0.00 | $52,650.00 |
| 505-4 | Concrete Steps | LS | $ 500.00 | 1 | 1 | 1 | $500.00 | $500.00 |
| 510-1 | 4 Course Block Wall | LF | $ 45.00 | 54 | 0 | 54 | $0.00 | $2,430.00 |
| | | | | | | | **$43,721.00** | **$272,071.00** |

4/5

**FLOOD CONTROL DISTRICT**

**PROGRESS REPORT**

| | | |
|---|---|---|
| Estimate #7 | FCD Contract #1999C071 | Final Payment |
| Contractor: | Hunter Contracting Co. | |
| Project: | Golden Eagle Park Dam Modifications | |
| Covering Period From: | 1/1/2001 to 1/31/2001 | |



| Bid Item No. | Description | Unit | Unit Price | Bid Quantity | Quantity This Period | Quantity Complete | Amt. Earned This Period | Total Earned To Date |
|---|---|---|---|---|---|---|---|---|
| 510-2 | 3 Course Block Wall | LF | $ 40.00 | 6 | 0 | 6 | $0.00 | $240.00 |
| 510-3 | 2 Course Block Wall | LF | $ 35.00 | 108 | 0 | 108 | $0.00 | $3,780.00 |
| 510-4 | 1 Course Block Wall | LF | $ 30.00 | 32 | 0 | 32 | $0.00 | $960.00 |
| 510-5 | Masonry Retaining Wall | LF | $ 150.00 | 93 | 0 | 93 | $0.00 | $13,950.00 |
| 515-1 | Trashrack at Principal Outlet Works | LS | $ 8,000.00 | 1 | 0 | 1 | $0.00 | $8,000.00 |
| 515-2 | Trashrack at Auxiliary Outlet Works | LS | $ 8,000.00 | 1 | 0 | 1 | $0.00 | $8,000.00 |
| 515-3 | Steel Handrail | LF | $ 35.00 | 40 | 41 | 41 | $1,435.00 | $1,435.00 |
| 540-1 | Desert Varnish | LS | $ 5,000.00 | 1 | 1 | 1 | $5,000.00 | $5,000.00 |
| 618-1 | 24" RCP | LF | $ 135.00 | 120 | 0 | 120 | $0.00 | $16,200.00 |
| 618-2 | 60" RCP | LF | $ 240.00 | 20 | 0 | 20 | $0.00 | $4,800.00 |
| 618-3 | 24" Pipe Plug, MAG 427 | EA | $ 500.00 | 2 | 0 | 2 | $0.00 | $1,000.00 |
| 618-4 | 60" Pipe Plug, MAG 427 | EA | $ 500.00 | 2 | 0 | 2 | $0.00 | $1,000.00 |
| | **C.O. #1** Relocate 12" storm drain | LS | $403.74 | 1 | 1 | 1 | $403.74 | $403.74 |
| | Relocate 4" sewer line | LS | $808.49 | 1 | 1 | 1 | $808.49 | $808.49 |
| | Relocate 12" water main | LS | $8,972.61 | 1 | 1 | 1 | $8,972.61 | $8,972.61 |
| | Relocate 2" and 4" irrigation w/mains | LS | $2,778.67 | 1 | 1 | 1 | $2,778.67 | $2,778.67 |
| | Relocate SRP power line | LS | $15,532.83 | 1 | 1 | 1 | $15,532.83 | $15,532.83 |
| | Substitute CIP box for precast box | LS | $0.00 | 1 | 1 | 1 | $0.00 | $0.00 |
| | Substitute paint finish in place of desert varnish specified as per T.O.F.H.'s request | LS | $0.00 | 1 | 1 | 1 | $0.00 | $0.00 |
| | Relocate 2" water line at North end | LS | $947.25 | 1 | 1 | 1 | $947.25 | $947.25 |
| | Relocate fire protection alarm line | LS | $6,632.52 | 1 | 1 | 1 | $6,632.52 | $6,632.52 |
| | Compensation for demolition and hauling away concrete debris from existing underground structure not shown on plans | LS | $1,000.00 | 1 | 1 | 1 | $1,000.00 | $1,000.00 |
| | | | | | | | **$43,511.11** | **$101,441.11** |

5/5

CHANGE ORDER 1/5

Original Kendal COPY

# CONSTRUCTION CHANGE ORDER - FCD APPROVAL
## Flood Control District of Maricopa County

1/22/01

Change Order Number: 2 (Final)
Amount: ($55,374.66)

File No: FCD 1999C071

Contract No: FCD 1999C071

PCN No: 670.03.31

Contractor Name: Hunter Contracting Co.

Contract Title: Golden Eagle Park Dam Modifications

Initial Amount: $1,021,346.50

Contract Award Date: 5/25/00

Total Previous Change Orders: $37,076.11

The Contractor, by mutual agreement of the parties, shall make the herein described changes from the plans and specifications or do the following described work not included in the plans and specifications on the above-mentioned project.
All other contract terms and conditions remain unchanged.

This change order reconciles actual quantities with plan quantities as indicated on attachments.

By reason of this proposed change 0 days extension of time will be allowed.
The contract completion date is: 12/22/00 .

The following financial information is submitted:

| | |
|---|---|
| Initial Contract Amount | $ 1,021,346.50 |
| Amended Contract Amount w/ previous change orders | $ 1,058,422.61 |
| Current Change Order Request | $ (55,374.66) |
| ***Amended Contract Amount w/ current change order*** | ***$ 1,003,047.95*** |
| **Change Order Authorization Limit** | $ 200,000.00 |
| Total Requested Change Orders | $ 37,076.11 |
| **Change Order Authorization Remaining** | $ 162,923.89 |

*We, the undersigned Contractor, having given careful consideration to the change(s) proposed, hereby agree that upon execution of this change order that we will provide all equipment, furnish all material (except as noted in the bid line item sheet), perform all work specified in the bid line item sheet; and we will accept as full payment therefore the prices shown in the bid line item sheet.*

Contractor Name: Hunter Contracting Co.

Contractor Address: 701 N. Cooper Rd.
Gilbert, Az. 85234

Principle (Signature)

Printed Name: ROBERT CARLSON

Title: PROJECT MANAGER

Date: 1/24/01

## DISTRICT APPROVAL

I certify that this change is required to accomplish the overall task for which this contract is initiated.
Project Manager — Date 1/24/01

Division Concurrence
Division Manager — Date 1-24-01

Funds are available to accomplish this Change Order
Controller — Date 1/25/01

I certify that this change is within the limits authorized by the County Procurement Code.
Contracting Branch Manager — Date 1-24-01

General Manager Approval
Chief Engineer & General Manager — Date 1/25/01

Chief Public Works Officer Approval
SIGNATURE NOT REQUIRED
Chief Public Works Officer — Date

Copy to: Contract File, Controller, Division Manager, Project Manager

2/5

Original

Flood Control District of Maricopa County
FCD 1999C071
Bid Line Items Sheet
CONSTRUCTION CHANGE ORDER NO. 2 (Final)



**Provide description of work to be done, estimate of quantities, and prices to be paid, segregate between additional work at contract price, agreed price and actual cost. Unless otherwise stated, rates for rental of equipment on actual cost work cover only such time as equipment is actually used and no allowance will be made for idle times.**

| Bid Item No. | Description | Unit | Estimated Quantity | As-Built Quantity | Difference (+/-) | Unit Price | Difference (+/-) |
|---|---|---|---|---|---|---|---|
| 105-1 | Partnering Allowance | LS | 1 | 58.3003% | -41.6997% | $10,000.00 | ($4,169.97) |
| 107-1 | NPDES / SWPPP | LS | 1 | 1 | 0 | $10,000.00 | $0.00 |
| 107-2 | Public Information And Notification Allowance | LS | 1 | 86.0601% | -13.9399% | $10,000.00 | ($1,393.99) |
| 107-3 | Project Signs Allowance | LS | 1 | 1 | 0 | $2,000.00 | $0.00 |
| 107-4 | Diversion and Care of Wat | LS | 1 | 1 | 0 | $15,000.00 | $0.00 |
| 107-5 | Dewatering | MG | 2 | 0.18 | (1.82) | $4,600.00 | ($8,372.00) |
| 112-1 | Mobilization | LS | 1 | 1 | 0 | $ 20,000.00 | $0.00 |
| 201-1 | Clear and Grub | LS | 1 | 1 | 0 | $ 25,000.00 | $0.00 |
| 203-1 | Excavation, Common | CY | 16,093 | 16,093 | 0 | $ 13.00 | $0.00 |
| 203-2 | Excavation, Rock | CY | 25 | 0 | (25) | $ 25.00 | ($625.00) |
| 204-1 | Preliminary Cleanup | SY | 20 | 0 | (20) | $ 35.00 | ($700.00) |
| 204-2 | Final Cleanup | SY | 20 | 0 | (20) | $ 35.00 | ($700.00) |
| 204-3 | Foundation Preparation | SY | 20 | 0 | (20) | $ 35.00 | ($700.00) |
| 204-4 | Dental Concrete | CY | 5 | 0 | (5) | $ 140.00 | ($700.00) |
| 204-5 | Dental Mortar | CY | 1 | 0 | (1) | $ 175.00 | ($175.00) |
| 205-1 | Compacted Fill, Impervious | CY | 7,682 | 7682 | 0 | $ 11.00 | $0.00 |
| 205-2 | Compacted Fill, Pervious | CY | 7,680 | 7680 | 0 | $ 6.00 | $0.00 |
| 205-3 | Compacted Fill, Random | CY | 1,196 | 1196 | 0 | $ 5.00 | $0.00 |
| 205-4 | Filter, Sand | CY | 452 | 452 | 0 | $ 35.00 | $0.00 |
| 205-5 | Riprap D50 = 12" | CY | 910 | 910 | 0 | $ 22.00 | $0.00 |
| 205-6 | Riprap D50 = 18" | CY | 906 | 906 | 0 | $ 22.00 | $0.00 |
| 205-7 | Fuseplug Fill | CY | 175 | 175 | 0 | $ 18.00 | $0.00 |
| | Total this sheet | | | | | | $ (17,535.96) |
| | Total all sheets | | | | | | $ (55,374.66) |

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Original

**Flood Control District of Maricopa County**

**FCD 1999C071** **Sheet 3 of 5**

**Bid Line Items Sheet (Continuation)**

**CONSTRUCTION CHANGE ORDER NO. 2 (Final)**

| Bid Item No. | Description | Unit | Estimated Quantity | As-Built Quantity | Difference (+/-) | Unit Price | Difference (+/-) |
|---|---|---|---|---|---|---|---|
| 205-8 | Repair Erosion Damage or | SY | 1,850 | 1850 | 0 | $ 2.50 | $0.00 |
| 221-1 | Gabions | CY | 730 | 730 | 0 | $ 130.00 | $0.00 |
| 222-1 | Filter Fabric | SY | 4,030 | 4,030 | 0 | $ 1.50 | $0.00 |
| 223-1 | Gravel Mulch | SY | 1,500 | 1671 | 171 | $ 2.50 | $427.50 |
| 310-1 | Untreated Base | TON | 840 | 0 | (840) | $ 15.00 | ($12,600.00) |
| 321-1 | Asphalt Concrete C-3/4 | TON | 170 | 0 | (170) | $ 35.00 | ($5,950.00) |
| 321-2 | Asphalt Concrete D-1/2 | TON | 170 | 62 | (108) | $ 35.00 | ($3,780.00) |
| 340-1 | Concrete Sidewalk, MAG 2 | SF | 1,950 | 1778 | (172) | $ 2.60 | ($447.20) |
| 340-2 | Concrete Curb, MAG 222 T | LF | 120 | 0 | (120) | $ 10.00 | ($1,200.00) |
| 350-1 | Remove Existing Retaining | LF | 394 | 371 | (23) | $ 16.00 | ($368.00) |
| 350-2 | Remove Existing Trash Ra | LS | 1 | 1 | 0 | $ 210.00 | $0.00 |
| 350-3 | Sawcut and Remove Asph | SY | 3,100 | 240 | (2,860) | $ 2.20 | ($6,292.00) |
| 350-4 | Cut and Remove Concrete | LF | 470 | 300 | (170) | $ 6.50 | ($1,105.00) |
| 350-5 | Cut and Remove Concrete | LF | 188 | 0 | (188) | $ 4.00 | ($752.00) |
| 350-6 | Cut and Remove Concrete | LF | 32 | 32 | 0 | $ 10.00 | $0.00 |
| 350-7 | Cut and Remove Shotcrete | SY | 490 | 490 | 0 | $ 3.50 | $0.00 |
| 350-8 | Cut and Remove Fence | LF | 255 | 255 | 0 | $ 2.50 | $0.00 |
| 350-9 | Remove and Salvage Ripr | CY | 96 | 96 | 0 | $ 13.00 | $0.00 |
| 420-1 | 6' Chain Link Fence | LF | 667 | 667 | 0 | $ 10.00 | $0.00 |
| 420-2 | 8' Chain Link Fence | LF | 76 | 76 | 0 | $ 24.00 | $0.00 |
| 420-3 | 6' Chain Link X 4' Single Le | EA | 1 | 1 | 0 | $ 525.00 | $0.00 |
| 420-4 | 6' Chain Link X 12' Double Leaf Gate | EA | 1 | 1 | 0 | $ 670.00 | $0.00 |
| 420-5 | Breakaway Fence at Principal Outlet Works | EA | 1 | 1 | 0 | $ 3,400.00 | $0.00 |
| 420-6 | Breakaway Fence at Auxilixiary Outlet Works | EA | 1 | 1 | 0 | $ 1,800.00 | $0.00 |
| | Total this Sheet | | | | | | $ (32,066.70) |

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Original

**Flood Control District of Maricopa County**
**FCD 1999C071**
**Bid Line Items Sheet (Continuation)**
**CONSTRUCTION CHANGE ORDER NO. 2 (Final)**



| Bid Item No. | Description | Unit | Estimated Quantity | As-Built Quantity | Difference (+/-) | Unit Price | Difference (+/-) |
|---|---|---|---|---|---|---|---|
| 425-1 | Topsoil | LS | 1 | 1 | 0 | $ 7,370.00 | $0.00 |
| 430-1 | Type 1 Seeding | AC | 2 | 2 | 0 | $ 4,800.00 | $0.00 |
| 430-2 | Type 2 Seeding | AC | 1 | 1 | 0 | $ 4,800.00 | $0.00 |
| 430-3 | Remove and Replace Turf | SY | 1,900 | 1111 | -789 | $ 6.00 | ($4,734.00) |
| 430-4 | Blue Paloverde, 5 Gal. | EA | 5 | 5 | 0 | $ 30.00 | $0.00 |
| 430-5 | Freemont Cottonwood, 5 G | EA | 30 | 8 | -22 | $ 30.00 | ($660.00) |
| 430-6 | Goodding Willow, 5 Gal. | EA | 7 | 7 | 0 | $ 30.00 | $0.00 |
| 440-1 | Remove & Replace Turf Irr | LS | 1 | 1 | 0 | $ 6,000.00 | $0.00 |
| 440-2 | Nursery Stock Drip Irrigatio | LS | 1 | 1 | 0 | $ 6,000.00 | $0.00 |
| 505-1 | Concrete, Class AA (F'c = | CY | 388.10 | 388.00 | -0.10 | $ 430.00 | ($43.00) |
| 505-2 | Concrete, Class C (F'c = 2 | CY | 35 | 30 | -5 | $ 74.00 | ($370.00) |
| 505-3 | 10'x 4' Box Culvert (ADOT | LF | 117 | 117 | 0 | $ 450.00 | $0.00 |
| 505-4 | Concrete Steps | LS | 1 | 1 | 0 | $ 500.00 | $0.00 |
| 510-1 | 4 Course Block Wall | LF | 54 | 54 | 0 | $ 45.00 | $0.00 |
| 510-2 | 3 Course Block Wall | LF | 6 | 6 | 0 | $ 40.00 | $0.00 |
| 510-3 | 2 Course Block Wall | LF | 108 | 108 | 0 | $ 35.00 | $0.00 |
| 510-4 | 1 Course Block Wall | LF | 32 | 32 | 0 | $ 30.00 | $0.00 |
| 510-5 | Masonry Retaining Wall | LF | 93 | 93 | 0 | $ 150.00 | $0.00 |
| 515-1 | Trashrack at Principal Outl | LS | 1 | 1 | 0 | $ 8,000.00 | $0.00 |
| 515-2 | Trashrack at Auxiliary Outl | LS | 1 | 1 | 0 | $ 8,000.00 | $0.00 |
| 515-3 | Steel Handrail | LF | 40 | 41 | 1 | $ 35.00 | $35.00 |
| 540-1 | Desert Varnish | LS | 1 | 1 | 0 | $ 5,000.00 | $0.00 |
| 618-1 | 24" RCP | LF | 120 | 120 | 0 | $ 135.00 | $0.00 |
| 618-2 | 60" RCP | LF | 20 | 20 | 0 | $ 240.00 | $0.00 |
| | Total this Sheet | | | | | | $ (5,772.00) |

**Flood Control District of Maricopa County**
**FCD 1999C071**
**Bid Line Items Sheet (Continuation)**
**CONSTRUCTION CHANGE ORDER NO. 2 (Final)**



| Bid Item No. | Description | Unit | Estimated Quantity | As-Built Quantity | Difference (+/-) | Unit Price | Difference (+/-) |
|---|---|---|---|---|---|---|---|
| 618-3 | 24" Pipe Plug, MAG 427 | EA | 2 | 2 | 0 | $ 500.00 | $0.00 |
| 618-4 | 60" Pipe Plug, MAG 427 | EA | 2 | 2 | 0 | $ 500.00 | $0.00 |
| | C.O. #1 | | | | | | |
| | Relocate 12" storm drain | LS | 1 | 1 | 0 | $403.74 | $0.00 |
| | Relocate 4" sewer line | LS | 1 | 1 | 0 | $808.49 | $0.00 |
| | Relocate 12" water main | LS | 1 | 1 | 0 | $8,972.61 | $0.00 |
| | Relocate 2" and 4" irrigation w/mains | LS | 1 | 1 | 0 | $2,778.67 | $0.00 |
| | Relocate SRP power line | LS | 1 | 1 | 0 | $15,532.83 | $0.00 |
| | Substitute CIP box for precast box | LS | 1 | 1 | 0 | $0.00 | $0.00 |
| | Substitute paint finish in place of desert varnish specified as per T.O.F.H.'s request | LS | 1 | 1 | 0 | $0.00 | $0.00 |
| | Relocate 2" water line at North end | LS | 1 | 1 | 0 | $947.25 | $0.00 |
| | Relocate fire protection alarm line | LS | 1 | 1 | 0 | $6,632.52 | $0.00 |
| | Compensation for demolition and hauling away concrete debris from existing underground structure not shown on plans | LS | 1 | 1 | 0 | $1,000.00 | $0.00 |

# CONSTRUCTION COST

## PROJECT: GOLDEN EAGLE PARK DAM MODIFICATIONS
## PCN 6700331

| Item No. | Item Description | Unit | Engineer's Estimate | | | As-Built | | |
|---|---|---|---|---|---|---|---|---|
| | | | Quantity | Unit Price | Amount | Quantity | Unit Price | Amount |
| 105-1 | Partnering Allowance | LS | 1 | $ 10,000 | $ 10,000.00 | 1 | $ 5,830.03 | $ 5,830.03 |
| 107-1 | NPDES / SWPPP | LS | 1 | $ 6,000 | $ 6,000.00 | 1 | $ 10,000 | $ 10,000.00 |
| 107-2 | Public Information And Notification Allowance | LS | 1 | $ 10,000 | $ 10,000.00 | 1 | $ 8,606 | $ 8,606.01 |
| 107-3 | Project Signs Allowance | LS | 1 | $ 2,000 | $ 2,000.00 | 1 | $ 2,000 | $ 2,000.00 |
| 107-4 | Diversion and Care of Water | LS | 1 | $ 10,000 | $ 10,000.00 | 1 | $ 15,000 | $ 15,000.00 |
| 107-5 | Dewatering | MG | 2 | $ 700 | $ 1,400.00 | 0 | $ 4,600 | $ 828.00 |
| 112-1 | Mobilization | LS | 1 | $ 28,565 | $ 28,565.00 | 1 | $ 20,000 | $ 20,000.00 |
| 201-1 | Clear and Grub | LS | 1 | $ 4,500 | $ 4,500.00 | 1 | $ 25,000 | $ 25,000.00 |
| 203-1 | Excavation, Common | CY | 16093 | $ 5.40 | $ 86,902.20 | 16093 | $ 13.00 | $ 209,209.00 |
| 203-2 | Excavation, Rock | CY | 25 | $ 50 | $ 1,250.00 | 0 | $ 25 | $ - |
| 204-1 | Preliminary Cleanup | SY | 20 | $ 20 | $ 400.00 | 0 | $ 35 | $ - |
| 204-2 | Final Cleanup | SY | 20 | $ 20 | $ 400.00 | 0 | $ 35 | $ - |
| 204-3 | Foundation Preparation | SY | 20 | $ 20 | $ 400.00 | 0 | $ 35 | $ - |
| 204-4 | Dental Concrete | CY | 5 | $ 500 | $ 2,500.00 | 0 | $ 140 | $ - |
| 204-5 | Dental Mortar | CY | 1 | $ 500 | $ 500.00 | 0 | $ 175 | $ - |
| 205-1 | Compacted Fill, Impervious | CY | 7682 | $ 17.50 | $134,435.00 | 7682 | $ 11.00 | $ 84,502.00 |
| 205-2 | Compacted Fill, Pervious | CY | 7680 | $ 17.80 | $136,704.00 | 7680 | $ 6.00 | $ 46,080.00 |
| 205-3 | Compacted Fill, Random | CY | 1196 | $ 5.00 | $ 5,980.00 | 1196 | $ 5.00 | $ 5,980.00 |
| 205-4 | Filter, Sand | CY | 452 | $ 40 | $ 18,080.00 | 452 | $ 35 | $ 15,820.00 |
| 205-5 | Riprap D50 = 12" | CY | 910 | $ 50 | $ 45,500.00 | 910 | $ 22 | $ 20,020.00 |
| 205-6 | Riprap D50 = 6" | CY | 906 | $ 50 | $ 45,300.00 | 906 | $ 22 | $ 19,932.00 |
| 205-7 | Fuseplug Fill | CY | 175 | $ 50 | $ 8,750.00 | 175 | $ 18 | $ 3,150.00 |
| 205-8 | Repair Erosion Damage on Dam | SY | 1850 | $ 5.00 | $ 9,250.00 | 1850 | $ 2.50 | $ 4,625.00 |
| 221-1 | Gabions | CY | 730 | $ 113 | $ 82,490.00 | 730 | $ 130 | $ 94,900.00 |
| 222-1 | Filter Fabric | SY | 4030 | $ 1.25 | $ 5,037.50 | 4030 | $ 1.50 | $ 6,045.00 |
| 223-1 | Gravel Mulch | SY | 1500 | $ 2.25 | $ 3,375.00 | 1671 | $ 2.50 | $ 4,177.50 |
| 310-1 | Untreated Base | TON | 840 | $ 15 | $ 12,600.00 | 0 | $ 15 | $ - |
| 321-1 | Asphalt Concrete C-3/4 | TON | 170 | $ 45 | $ 7,650.00 | 0 | $ 35 | $ - |
| 321-2 | Asphalt Concrete D-1/2 | TON | 170 | $ 45 | $ 7,650.00 | 62 | $ 35 | $ 2,170.00 |
| 340-1 | Concrete Sidewalk, MAG 230 modified | SF | 1950 | $ 1.90 | $ 3,705.00 | 1778 | $ 2.60 | $ 4,622.80 |
| 340-2 | Concrete Curb, MAG 222 Type B | LF | 120 | $ 10 | $ 1,200.00 | 0 | $ 10 | $ - |

FINAL COST

1/4

# CONSTRUCTION COST

## PROJECT: GOLDEN EAGLE PARK DAM MODIFICATIONS
## PCN 6700331

| | | | Engineer's Estimate | | | As-Built | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Item Description | Unit | Quantity | Unit Price | Amount | Quantity | Unit Price | Amount |
| 350-1 | Remove Existing Retaining Walls | LF | 394 | $ 2.00 | $ 788.00 | 371 | $ 16.00 | $ 5,936.00 |
| 350-2 | Remove Existing Trash Rack | LS | 1 | $ 300 | $ 300.00 | 1 | $ 210 | $ 210.00 |
| 350-3 | Sawcut and Remove Asphalt Concrete Pavement | SY | 3100 | $ 1.00 | $ 3,100.00 | 240 | $ 2.20 | $ 528.00 |
| 350-4 | Cut and Remove Concrete Sidewalk | LF | 470 | $ 1.30 | $ 611.00 | 300 | $ 6.50 | $ 1,950.00 |
| 350-5 | Cut and Remove Concrete Curb | LF | 188 | $ 1.00 | $ 188.00 | 0 | $ 4.00 | $ - |
| 350-6 | Cut and Remove Concrete Cutoff Wall | LF | 32 | $ 12.50 | $ 400.00 | 32 | $ 10.00 | $ 320.00 |
| 350-7 | Cut and Remove Shotcrete | SY | 490 | $ 3.00 | $ 1,470.00 | 490 | $ 3.50 | $ 1,715.00 |
| 350-8 | Cut and Remove Fence | LF | 255 | $ 2.00 | $ 510.00 | 255 | $ 2.50 | $ 637.50 |
| 350-9 | Remove and Salvage Riprap | CY | 96 | $ 5.00 | $ 480.00 | 96 | $ 13.00 | $ 1,248.00 |
| 420-1 | 6' Chain Link Fence | LF | 667 | $ 27.30 | $ 18,209.10 | 667 | $ 10.00 | $ 6,670.00 |
| 420-2 | 8' Chain Link Fence | LF | 76 | $ 20.00 | $ 1,520.00 | 76 | $ 24.00 | $ 1,824.00 |
| 420-3 | 6' Chain Link X 4' Single Leaf Gate | EA | 1 | $ 120 | $ 120.00 | 1 | $ 525 | $ 525.00 |
| 420-4 | 6' Chain Link X 12' Double Leaf Gate | EA | 1 | $ 360 | $ 360.00 | 1 | $ 670 | $ 670.00 |
| 420-5 | Breakaway Fence at Principal Outlet Works | EA | 1 | $ 3,100 | $ 3,100.00 | 1 | $ 3,400 | $ 3,400.00 |
| 420-6 | Breakaway Fence at Auxilixiary Outlet Works | EA | 1 | $ 2,300 | $ 2,300.00 | 1 | $ 1,800 | $ 1,800.00 |
| 425-1 | Topsoil | LS | 1 | $ 2,000 | $ 2,000.00 | 1 | $ 7,370 | $ 7,370.00 |
| 430-1 | Type 1 Seeding | AC | 2.00 | $ 2,000 | $ 4,000.00 | 2 | $ 4,800 | $ 9,600.00 |
| 430-2 | Type 2 Seeding | AC | 1.00 | $ 2,000 | $ 2,000.00 | 1 | $ 4,800 | $ 4,800.00 |
| 430-3 | Remove and Replace Turf Lawn | SY | 1900 | $ 0.50 | $ 950.00 | 1111 | $ 6.00 | $ 6,666.00 |
| 430-4 | Blue Paloverde, 5 Gal. | EA | 5 | $ 100 | $ 500.00 | 5 | $ 30 | $ 150.00 |
| 430-5 | Freemont Cottonwood, 5 Gal. | EA | 30 | $ 100 | $ 3,000.00 | 8 | $ 30 | $ 240.00 |
| 430-6 | Goodding Willow, 5 Gal. | EA | 7 | $ 100 | $ 700.00 | 7 | $ 30 | $ 210.00 |
| 440-1 | Remove & Replace Turf Irrigation System | LS | 1 | $ 500 | $ 500.00 | 1 | $ 6,000 | $ 6,000.00 |
| 440-2 | Nursery Stock Drip Irrigation System | LS | 1 | $ 1,000 | $ 1,000.00 | 1 | $ 6,000 | $ 6,000.00 |
| 505-1 | Concrete, Class AA (F'c = 4,000 Psi) | CY | 388.1 | $ 340 | $131,954.00 | 388.0 | $ 430 | $ 166,840.00 |
| 505-2 | Concrete, Class C (F'c = 2,000 Psi) | CY | 35 | $ 100 | $ 3,500.00 | 30 | $ 74 | $ 2,220.00 |
| 505-3 | 10'x 4' Box Culvert (ADOT B-02.10) | LF | 117 | $ 600 | $ 70,200.00 | 117 | $ 450 | $ 52,650.00 |
| 505-4 | Concrete Steps | LS | 1 | $ 500 | $ 500.00 | 1 | $ 500 | $ 500.00 |
| 510-1 | 4 Course Block Wall | LF | 54 | $ 12.30 | $ 664.20 | 54 | $ 45.00 | $ 2,430.00 |
| 510-2 | 3 Course Block Wall | LF | 6 | $ 8.50 | $ 51.00 | 6 | $ 40.00 | $ 240.00 |
| 510-3 | 2 Course Block Wall | LF | 108 | $ 5.80 | $ 626.40 | 108 | $ 35.00 | $ 3,780.00 |

2/4

# CONSTRUCTION COST

## PROJECT: GOLDEN EAGLE PARK DAM MODIFICATIONS
## PCN 6700331

| Item No. | Item Description | Unit | Engineer's Estimate Quantity | Engineer's Estimate Unit Price | Engineer's Estimate Amount | As-Built Quantity | As-Built Unit Price | As-Built Amount |
|---|---|---|---|---|---|---|---|---|
| 510-4 | 1 Course Block Wall | LF | 32 | $ 3.20 | $ 102.40 | 32 | $ 30.00 | $ 960.00 |
| 510-5 | Masonry Retaining Wall | LF | 93 | $ 60 | $ 5,580.00 | 93 | $ 150 | $ 13,950.00 |
| 515-1 | Trashrack at Principal Outlet Works | LS | 1 | $ 6,400 | $ 6,400.00 | 1 | $ 8,000 | $ 8,000.00 |
| 515-2 | Trashrack at Auxiliary Outlet Works | LS | 1 | $ 6,500 | $ 6,500.00 | 1 | $ 8,000 | $ 8,000.00 |
| 515-3 | Steel Handrail | LF | 40 | $ 30 | $ 1,200.00 | 41 | $ 35 | $ 1,435.00 |
| 540-1 | Desert Varnish | LS | 1 | $ 1,000 | $ 1,000.00 | 1 | $ 5,000 | $ 5,000.00 |
| 618-1 | 24" RCP | LF | 120 | $ 66 | $ 7,920.00 | 120 | $ 135 | $ 16,200.00 |
| 618-2 | 60" RCP | LF | 20 | $ 455 | $ 9,100.00 | 20 | $ 240 | $ 4,800.00 |
| 618-3 | 24" Pipe Plug, MAG 427 | EA | 2 | $ 100 | $ 200.00 | 2 | $ 500 | $ 1,000.00 |
| 618-4 | 60" Pipe Plug, MAG 427 | EA | 2 | $ 300 | $ 600.00 | 2 | $ 500 | $ 1,000.00 |
| | | | Base Bid Total Price | | $986,727.80 | Base Bid Total Price | | $ 965,971.84 |
| | Additional Items Per Change Order No. 1 | | | | | | | |
| | Relocate 12" Storm Drain | LS | | | | 1 | $ 403.74 | $ 403.74 |
| | Relocate 4" Sewerline | LS | | | | 1 | $ 808.49 | $ 808.49 |
| | Relocate 12" Waterline | LS | | | | 1 | $ 8,972.61 | $ 8,972.61 |
| | Relocate 2" & 4" Irrigation Lines | LS | | | | 1 | $ 2,778.67 | $ 2,778.67 |
| | Relocate SRP Powerline | LS | | | | 1 | $ 15,532.83 | $ 15,532.83 |
| | Substitute CIP Box Culvert For Precast Box | LS | | | | 1 | $ - | $ - |
| | Substitute Paint Finish For Desert Varnish | LS | | | | 1 | $ - | $ - |
| | Relocate 2" Waterline at North End | LS | | | | 1 | $ 947.25 | $ 947.25 |
| | Relocate Fire Protection Alarm Line | LS | | | | 1 | $ 6,632.52 | $ 6,632.52 |
| | Demolition and Hauling of Concrete Debris From Underground Structure Not Shown on Plans | LS | | | | 1 | $ 1,000.00 | $ 1,000.00 |
| | | | | | | | Total Price | $1,003,047.95 |

*Note: As-built quantities are reconciled by Change Order No. 2*

3/4

Golden Eagle Park Dam Modifications
Calculation of ADWR Dam Construction Permit Fee

2-21-01 cvg

| | | | |
|---|---|---|---|
| | Design | | |
| | Final Design | $ | 241,339.00 |
| | Pre-Design | $ | 266,115.00 |
| | Geotechnical Investigation | $ | 27,119.00 |
| | Construction | | |
| | Estimated Construction Cost | $ | 1,003,047.95 |
| | Construction Testing and Inspection | $ | 69,111.28 |
| | Total | $ | 1,606,732.23 |
| | Fees Calculation | | |
| 2.0% | of 1st $100,000 | $ | 2,000.00 |
| 1.5% | of next $400,000 | $ | 6,000.00 |
| 1.0% | of next $500,000 | $ | 5,000.00 |
| 0.5% | remainder over $1,000,000 | $ | 3,033.66 |
| | Total Permit Fee | $ | 16,033.66 |
| | Previous Payment | $ | 15,073.88 |
| | Balance Due | $ | 959.78 |

Q/A inspection & testing

**AMEC**
**FCD 99-20**
**FY 01**

FORMERLY: AGRA

INCEPTION DATE: 06/16/99
EXPIRATION DATE: 06/15/01

FUND-AGCY-LORG -ACTY - OBJ/SUB - RCAT
**991-690-6965-6908-805/22-0016**
**ZDF3**
*FRH BCH LRH*

**V# 911641772 8**

**ENC# C69991035**

TOTAL ENCUMBRANCE AMOUNT: 74,999.00
FY ENCUMBRANCE AMOUNT: 74,999.00

ENCUMBRANCE BALANCE: 5,887.72

| DATE ROUTED | | CONTRACT BALANCE | OWED | RETAINED | DISBURSED | WT DATE | WARRANT # |
|---|---|---|---|---|---|---|---|
| 07/01/00 | BALANCE FORWARD | 74,999.00 | | | | | |
| 07/19/00 | PMT#1 ASSIGN#1 | -8,738.68 | 8,738.68 | | 8,738.68 | 07/31/00 | 310505680 |
| | BALANCE | 66,260.32 | 8,738.68 | | 8,738.68 | | |
| 08/07/00 | PMT#2 ASSIGN#1 | -8,224.79 | 8,224.79 | | 8,224.79 | 08/18/00 | 310509148 |
| | BALANCE | 58,035.53 | 16,963.47 | | 16,963.47 | | |
| 08/22/00 | PMT#3 ASSIGN#1 | -2,531.50 | 2,531.50 | | 2,531.50 | 08/28/00 | 310510582 |
| | BALANCE | 55,504.03 | 19,494.97 | | 19,494.97 | | |
| 09/19/00 | PMT#4 ASSIGN#1 | -11,367.03 | 11,367.03 | | 11,367.03 | 09/21/00 | 310514864 |
| | BALANCE | 44,137.00 | 30,862.00 | | 30,862.00 | | |
| 10/23/00 | PMT#5 ASSIGN#1 | -12,412.41 | 12,412.41 | | 12,412.41 | 10/27/00 | 310522625 |
| | BALANCE | 31,724.59 | 43,274.41 | | 43,274.41 | | |
| 11/20/00 | PMT#6 ASSIGN#1 | -8,911.17 | 8,911.17 | | 8,911.17 | 11/27/00 | 310527822 |
| | BALANCE | 22,813.42 | 52,185.58 | | 52,185.58 | | |
| 12/18/00 | PMT#7 ASSIGN#1 | -8,281.95 | 8,281.95 | | 8,281.95 | 12/20/00 | 310532969 |
| | BALANCE | 14,531.47 | 60,467.53 | | 60,467.53 | | |
| 01/23/01 | PMT#8 ASSIGN#1 | -8,643.75 | 8,643.75 | | 8,643.75 | | |
| | BALANCE | 5,887.72 | 69,111.28 | | 69,111.28 | | |

# BOX CULVERT DESIGN CHANGES

# FLOOD CONTROL DISTRICT
## OF MARICOPA COUNTY

MAY 3 2000

**FAXOGRAM**

**COVER SHEET**

**To:** Chuck Gopperton

**Agency/Firm:** Stantec Consulting
**Fax Number:** 431-9562

**From:** Tom Renckly
Phone: 506-8610
Fax 506-8561

**SUBJECT**: Golden Eagle Park Dam – Construction Contract FCD 1999C071 – Request from Hunter Contracting

Chuck,

Please review this request from Hunter Contracting on a cast in place ADOT box culvert for the auxiliary spillway. Please E-mail your comments to Shewa Shivaswamy (Email: hns@mail.maricopa.gov, Phone 602-506-4726.)
Also please cc me with comments. I have sent this to ADWR for their review as well.

Thanks
Tom R.

Total number of pages including cover sheet: 4

Hunter Contracting Co. A CORPORATION

CONTRACTOR'S LICENSE NO.
A-070961
B-067542
B-4-023057

May 22, 2000

FLOOD CONTROL DISTRICT
RECEIVED
MAY 24 '00

| | | | |
|---|---|---|---|
| CP & GM | | FINANCE | |
| PIO | | LANDS | |
| ADMIN | | O & M | |
| REG | | P & PM | ✓ |
| ENG | | FILE | |
| CONTRACTS | | | |
| ROUTING | | | |

HN 5

Flood Control District
2801 W. Durango Street
Phoenix AZ 85009

ATTN: H. N. "Shewa" Shivaswamy, P.E.

RE: Golden Eagle Park Dam Modifications
FCD Contract No. 1999CO71

Item No. 505-3 10' X 4' Box Culvert (ADOT B-02.10)

Dear Mr. Shivaswamy:

Hunter Contracting Co. submits for your approval the attached design for the concrete box culvert. The proposed design is for a cast in place box culvert per ADOT B-02.10 Table No. V 25'-30' Fill.

The utilization of a cast in place box is being proposed as an alternate to the Precast Box shown on the plans. By utilizing a Cast in Place Box, we will eliminate the construct ability issues associated with placing a precast box on the wet concrete slab, reduce the lead time required to procure the box (approximately 5-6 weeks from design approval), and utilize a proven ADOT design.

The proposed box size specified is the same size as the cast in place end shown in the plans. The headwall rebar will be incorporated into the constructed as indicated on the plans and will remain unchanged.

The attached project schedules will help evaluate the time impact of this change. We look forward to discussing this issue at the meeting on Tuesday.

701 North Cooper Road • Gilbert, Arizona 85233 • (480) 892-0521 • Fax (480) 892-4932
6930 North Camino Martin • Tucson, Arizona 85741 • (520) 744-0722 • Fax (520) 744-0847

Should you have any questions please call me at (480) 892-0521.

Sincerely,

HUNTER CONTRACTING CO.

Bob Carlson
Project Manager

**TABLE NO. I — 0'-10' FILL**

| Span "S" | Height "H" | Slab "T" | Walls "W" | aa Spacing | aa Length | cc Number+ | ee Bar Size | ee Spacing | ee Length | gg Number+ | hh Bar Size | hh Spacing | hh Length | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6' | 3' | 9½" | 9" | 12" | 4'-2 | 20 | 5 | 6" | 7'-2 | 14 | 4 | 9" | 5'-7 | 2'-6 |
| | 4' | 9½" | 9" | 12" | 5'-2 | 24 | 5 | 6" | 7'-2 | 16 | 4 | 8" | 5'-11 | 2'-9 |
| | 5' | 9½" | 9" | 12" | 6'-2 | 24 | 5 | 6" | 7'-2 | 14 | 4 | 6" | 6'-5 | 2'-9 |
| | 6' | 9½" | 9" | 12" | 7'-2 | 28 | 6 | 8" | 7'-2 | 18 | 4 | 6" | 7'-9 | 3'-0 |
| | 7' | 9½" | 9" | 12" | 8'-2 | 32 | 6 | 8" | 7'-2 | 18 | 4 | 6" | 7'-8 | 3'-0 |
| 8' | 3' | 10" | 11" | 12" | 4'-3 | 20 | 6 | 9" | 9'-6 | 18 | 4 | 6" | 6'-2 | 3'-5 |
| | 4' | 10" | 11" | 12" | 5'-3 | 24 | 6 | 8" | 9'-6 | 20 | 4 | 6" | 6'-8 | 3'-5 |
| | 5' | 10" | 11" | 12" | 6'-3 | 24 | 6 | 8" | 9'-6 | 20 | 4 | 6" | 7'-1 | 3'-4 |
| | 6' | 10" | 11" | 12" | 7'-3 | 28 | 6 | 8" | 9'-6 | 20 | 4 | 6" | 7'-7 | 3'-4 |
| | 7' | 10" | 11" | 12" | 8'-3 | 32 | 6 | 6" | 9'-6 | 22 | 4 | 6" | 8'-0 | 3'-3 |
| | 8' | 10" | 11" | 12" | 9'-3 | 32 | 6 | 6" | 9'-6 | 22 | 4 | 6" | 8'-5 | 3'-2 |
| 10' | 3' | 10" | 13" | 12" | 4'-3 | 20 | 6 | 8" | 11'-10 | 22 | 5 | 6" | 7'-4 | 4'-5 |
| | 4' | 10" | 13" | 12" | 5'-3 | 24 | 6 | 8" | 11'-10 | 22 | 5 | 6" | 7'-10 | 4'-5 |
| | 5' | 10" | 13" | 12" | 6'-3 | 24 | 6 | 7" | 11'-10 | 24 | 5 | 7" | 8'-3 | 4'-4 |
| | 6' | 10" | 13" | 12" | 7'-3 | 28 | 6 | 7" | 11'-10 | 24 | 5 | 7" | 8'-9 | 4'-4 |
| | 7' | 10" | 13" | 12" | 8'-3 | 32 | 6 | 7" | 11'-10 | 26 | 5 | 7" | 9'-2 | 4'-3 |
| | 8' | 10" | 13" | 12" | 9'-3 | 32 | 6 | 7" | 11'-10 | 26 | 5 | 7" | 9'-8 | 4'-3 |
| | 9' | 10" | 13" | 12" | 10'-3 | 36 | 6 | 6" | 11'-10 | 28 | 5 | 6" | 10'-1 | 4'-2 |
| | 10' | 10½" | 13" | 12" | 11'-4 | 40 | 6 | 6" | 11'-10 | 28 | 5 | 6" | 10'-7 | 4'-2 |
| 12' | 8' | 11½" | 15" | 9" | 9'-6 | 32 | 7 | 6" | 14'-2 | 38 | 6 | 6" | 10'-4 | 4'-8 |
| | 9' | 11½" | 15" | 8" | 10'-6 | 36 | 8 | 8" | 14'-2 | 38 | 6 | 6" | 10'-10 | 4'-8 |
| | 10' | 11½" | 15" | 6" | 11'-6 | 40 | 7 | 6" | 14'-2 | 40 | 6 | 6" | 11'-4 | 4'-6 |
| | 11' | 12" | 15" | 8" | 12'-7 | 40 | 8 | 8" | 14'-2 | 42 | 6 | 6" | 11'-6 | 4'-4 |
| | 12' | 12" | 15" | 6" | 13'-7 | 44 | 8 | 6" | 14'-2 | 46 | 6 | 6" | 12'-2 | 4'-6 |

**TABLE NO. II — 10'-15' FILL**

| Span "S" | Height "H" | Slab "T" | Walls "W" | aa Spacing | aa Length | cc Number+ | ee Bar Size | ee Spacing | ee Length | gg Number+ | hh Bar Size | hh Spacing | hh Length | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6' | 3' | 8" | 9" | 12" | 3'-11 | 20 | 5 | 8" | 7'-2 | 14 | 4 | 6" | 5'-1 | 2'-6 |
| | 4' | 8" | 9" | 12" | 4'-11 | 24 | 5 | 8" | 7'-2 | 14 | 4 | 6" | 5'-7 | 2'-6 |
| | 5' | 8" | 9" | 12" | 5'-11 | 24 | 5 | 6" | 7'-2 | 14 | 4 | 9" | 6'-1 | 2'-6 |
| | 6' | 8" | 9" | 12" | 6'-11 | 28 | 6 | 9" | 7'-2 | 14 | 4 | 6" | 6'-7 | 2'-6 |
| | 7' | 8" | 9" | 12" | 7'-11 | 32 | 6 | 9" | 7'-2 | 14 | 4 | 6" | 7'-1 | 2'-6 |
| 8' | 3' | 9" | 11" | 9" | 4'-1 | 20 | 5 | 6" | 9'-6 | 18 | 5 | 6" | 5'-8 | 2'-10 |
| | 4' | 9" | 11" | 9" | 5'-1 | 24 | 5 | 6" | 9'-6 | 18 | 5 | 6" | 6'-2 | 2'-10 |
| | 5' | 9½" | 11" | 9" | 6'-2 | 24 | 6 | 6" | 9'-6 | 18 | 5 | 6" | 6'-8 | 2'-10 |
| | 6' | 9½" | 11" | 8" | 7'-2 | 28 | 6 | 6" | 9'-6 | 18 | 5 | 6" | 7'-1 | 2'-9 |
| | 7' | 9½" | 11" | 12" | 8'-2 | 32 | 6 | 6" | 9'-6 | 18 | 5 | 6" | 7'-7 | 2'-9 |
| | 8' | 9½" | 11" | 12" | 9'-2 | 32 | 6 | 6" | 9'-6 | 18 | 5 | 6" | 8'-1 | 2'-9 |
| 10' | 3' | 10½" | 13" | 8" | 4'-4 | 20 | 6 | 6" | 11'-10 | 22 | 6 | 6" | 6'-9 | 3'-8 |
| | 4' | 10½" | 13" | 8" | 5'-4 | 24 | 6 | 6" | 11'-10 | 22 | 6 | 6" | 7'-2 | 3'-7 |
| | 5' | 10½" | 13" | 9" | 6'-4 | 24 | 6 | 6" | 11'-10 | 22 | 6 | 6" | 7'-7 | 3'-6 |
| | 6' | 11" | 13" | 8" | 7'-5 | 28 | 7 | 8" | 11'-10 | 22 | 6 | 8" | 8'-1 | 3'-6 |
| | 7' | 11" | 13" | 9" | 8'-5 | 32 | 7 | 6" | 11'-10 | 22 | 6 | 8" | 8'-6 | 3'-5 |
| | 8' | 11" | 13" | 10" | 9'-5 | 32 | 7 | 7" | 11'-10 | 22 | 6 | 7" | 9'-0 | 3'-5 |
| | 9' | 11½" | 13" | 11" | 10'-6 | 36 | 7 | 7" | 11'-10 | 22 | 6 | 7" | 9'-6 | 3'-4 |
| | 10' | 11½" | 13" | 11" | 11'-6 | 40 | 7 | 6" | 11'-10 | 22 | 6 | 9" | 10'-0 | 3'-4 |
| 12' | 8' | 13" | 15" | 10" | 9'-9 | 32 | 8 | 7" | 14'-2 | 26 | 6 | 7" | 9'-5 | 3'-8 |
| | 9' | 13" | 15" | 10" | 10'-9 | 36 | 8 | 7" | 14'-2 | 26 | 6 | 7" | 9'-11 | 3'-8 |
| | 10' | 13" | 15" | 10" | 11'-9 | 40 | 8 | 7" | 14'-2 | 26 | 6 | 7" | 10'-5 | 3'-8 |
| | 11' | 13" | 15" | 10" | 12'-9 | 40 | 9 | 7" | 14'-2 | 26 | 6 | 7" | 11'-0 | 3'-9 |
| | 12' | 13½" | 15" | 7" | 13'-10 | 44 | 8 | 7" | 14'-2 | 26 | 6 | 7" | 11'-7 | 3'-9 |

**TABLE NO. III — 15'-20' FILL**

| Span "S" | Height "H" | Slab "T" | Walls "W" | aa Spacing | aa Length | cc Number+ | ee Bar Size | ee Spacing | ee Length | gg Number+ | hh Bar Size | hh Spacing | hh Length | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6' | 3' | 9" | 9" | 12" | 4'-1 | 20 | 5 | 6" | 7'-2 | 14 | 4 | [illegible] | 5'-2 | 2'-6 |
| | 4' | 9" | 9" | 12" | 5'-1 | 24 | 5 | 6" | 7'-2 | 14 | 4 | 6" | 5'-8 | 2'-6 |
| | 5' | 9" | 9" | 12" | 6'-1 | 24 | 6 | 8" | 7'-2 | 14 | 4 | 6" | 6'-2 | 2'-6 |
| | 6' | 9" | 9" | 12" | 7'-1 | 28 | 6 | 6" | 7'-2 | 14 | 4 | 6" | 6'-8 | 2'-6 |
| | 7' | 9" | 9" | 12" | 8'-1 | 32 | 6 | 6" | 7'-2 | 14 | 4 | 6" | 7'-2 | 2'-6 |
| 8' | 3' | 10½" | 11" | 7" | 4'-4 | 20 | 6 | 7" | 9'-6 | 18 | 5 | 7" | 5'-7 | 2'-8 |
| | 4' | 10½" | 11" | 10" | 5'-4 | 24 | 6 | 6" | 9'-6 | 18 | 5 | 6" | 6'-1 | 2'-8 |
| | 5' | 10½" | 11" | 9" | 6'-4 | 24 | 6 | 6" | 9'-6 | 18 | 5 | 6" | 6'-7 | 2'-8 |
| | 6' | 11" | 11" | 11" | 7'-5 | 28 | 7 | [illegible] | 9'-6 | 18 | 5 | 7" | 7'-2 | 2'-8 |
| | 7' | 11" | 11" | 11" | 8'-5 | 32 | 7 | 8" | 9'-6 | 18 | 5 | 6" | 7'-8 | 2'-8 |
| | 8' | 11" | 11" | 12" | 9'-5 | 32 | 7 | 6" | 9'-6 | 18 | 5 | 8" | 8'-2 | 2'-8 |
| 10' | 3' | 12½" | 13" | 6" | 4'-8 | 20 | 6 | 6" | 11'-10 | 22 | 6 | 6" | 6'-7 | 3'-4 |
| | 4' | 12½" | 13" | 7" | 5'-8 | 24 | 7 | 7" | 11'-10 | 22 | 6 | 7" | 7'-1 | 3'-4 |
| | 5' | 12½" | 13" | 7" | 6'-8 | 24 | 7 | 7" | 11'-10 | 22 | 6 | 7" | 7'-7 | 3'-4 |
| | 6' | 12½" | 13" | 7" | 7'-8 | 28 | 7 | 7" | 11'-10 | 22 | 6 | 7" | 8'-1 | 3'-4 |
| | 7' | 12½" | 13" | [illegible] | 8'-8 | 32 | 7 | 6" | 11'-10 | 22 | 5 | 6" | 8'-3 | 3'-2 |
| | 8' | 13" | 13" | 9" | 9'-9 | 32 | 7 | 6" | 11'-10 | 22 | 5 | 6" | 8'-10 | 3'-2 |
| | 9' | 13" | 13" | 10" | 10'-9 | 36 | 8 | 6" | 11'-10 | 22 | 5 | 6" | 9'-4 | 3'-2 |
| | 10' | 13" | 13" | 11" | 11'-9 | 40 | 8 | 6" | 11'-10 | 22 | 5 | 6" | 9'-10 | 3'-2 |
| 12' | 8' | [illegible] | 15" | 10" | 10'-1 | 32 | 8 | 7" | 14'-2 | 26 | 6 | 7" | 9'-6 | 3'-7 |
| | 9' | 15" | 15" | 10" | 11'-1 | 36 | 9 | 7" | 14'-2 | 26 | 6 | 7" | 10'-0 | 3'-7 |
| | 10' | 15½" | 15" | 10" | 12'-2 | 40 | 8 | 6" | 14'-2 | 26 | 6 | 8" | 10'-7 | 3'-7 |
| | 11' | 15½" | 15" | 10" | 13'-2 | 40 | 8 | 6" | 14'-2 | 26 | 6 | 6" | 11'-2 | 3'-6 |
| | 12' | 15½" | 15" | 6" | 14'-2 | 44 | 8 | 6" | 14'-2 | 26 | 6 | 6" | 11'-9 | 3'-9 |

**TABLE NO. IV — 20'-25' FILL**

| Span "S" | Height "H" | Slab "T" | Walls "W" | aa Spacing | aa Length | cc Number+ | ee Bar Size | ee Spacing | ee Length | gg Number+ | hh Bar Size | hh Spacing | hh Length | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6' | 3' | 10" | 9" | 12" | 4'-3 | 20 | 6 | 8" | 7'-2 | 14 | 4 | [illegible] | 5'-3 | 2'-6 |
| | 4' | 10" | 9" | 12" | 5'-3 | 24 | 6 | 6" | 7'-2 | 14 | [illegible] | 6" | 5'-9 | 2'-6 |
| | 5' | 10" | 9" | 12" | 6'-3 | 24 | 6 | 6" | 7'-2 | 14 | 4 | 6" | 6'-3 | 2'-6 |
| | 6' | 10" | 9" | 12" | 7'-3 | 28 | 7 | 9" | 7'-2 | [illegible] | 4 | 6" | 6'-9 | 2'-6 |
| | 7' | 10" | 9" | 12" | 8'-3 | 32 | 7 | 9" | 7'-2 | 14 | 4 | 6" | 7'-3 | 2'-6 |
| 8' | 3' | 12" | 11" | 11" | 4'-7 | 20 | 7 | 7" | [illegible] | 18 | 5 | 7" | 5'-9 | 2'-8 |
| | 4' | 12" | 11" | 12" | 5'-7 | 24 | 7 | 8" | 9'-6 | 18 | 5 | 6" | 6'-4 | 2'-8 |
| | 5' | 12" | 11" | 12" | 6'-7 | 24 | 7 | [illegible] | 9'-6 | 18 | 5 | 8" | 6'-7 | 2'-8 |
| | 6' | 12" | 11" | 12" | 7'-7 | 28 | 7 | 7" | 9'-6 | 18 | 5 | 7" | 6'-4 | 2'-8 |
| | 7' | 12" | 11" | 12" | 8'-7 | 32 | [illegible] | 6" | 9'-6 | 18 | 5 | 9" | 6'-7 | 2'-8 |
| | 8' | 12½" | 11" | 12" | 9'-8 | 32 | 7 | 6" | 9'-6 | 18 | 4 | 8" | 6'-1 | 2'-8 |
| 10' | 3' | 14" | 13" | 6" | 4'-11 | [illegible] | 8 | 9" | 11'-10 | 22 | 6 | 6" | 6'-6 | 3'-2 |
| | 4' | 14" | 13" | 6" | 5'-11 | 24 | 8 | 6" | 11'-10 | 22 | 6 | 8" | 7'-0 | 3'-2 |
| | 5' | 14" | 13" | 7" | [illegible] | 24 | 8 | 7" | 11'-10 | 22 | 6 | 7" | 7'-6 | 3'-2 |
| | 6' | 14½" | 13" | 7" | 8'-0 | 28 | 8 | 7" | 11'-10 | 22 | 6 | 7" | 8'-1 | 3'-2 |
| | 7' | 14½" | 13" | [illegible] | 9'-0 | 32 | 9 | 8" | 11'-10 | 22 | 5 | 6" | 8'-5 | 3'-3 |
| | 8' | 14½" | 13" | 8" | 10'-0 | 32 | 9 | 8" | 11'-10 | 22 | 5 | 6" | 8'-11 | 3'-2 |
| | 9' | 14½" | 13" | 9" | 11'-0 | 36 | 9 | 8" | 11'-10 | 22 | 5 | 6" | 9'-5 | 3'-2 |
| | 10' | 15" | 13" | 8" | 12'-0 | 40 | 9 | 8" | 11'-10 | 22 | 5 | 6" | 9'-11 | 3'-2 |
| 12' | 8' | [illegible] | 15" | 10" | 10'-5 | 32 | 8 | 6" | 14'-2 | 26 | 5 | 6" | 9'-6 | 3'-6 |
| | 9' | 17½" | 15" | 9" | 11'-6 | 36 | 9 | 6" | 14'-2 | 26 | 6 | 9" | 10'-1 | 3'-7 |
| | 10' | 17½" | 15" | 10" | 12'-6 | 40 | 10 | 9" | 14'-2 | 26 | 5 | 6" | 10'-7 | 3'-7 |
| | 11' | 17½" | 15" | 7" | 13'-6 | 40 | 9 | 7" | 14'-2 | 26 | 6 | 7" | 11'-5 | 3'-8 |
| | 12' | 17½" | 15" | 7" | 14'-6 | 44 | 10 | 7" | 14'-2 | 26 | 6 | 7" | 12'-0 | 3'-9 |

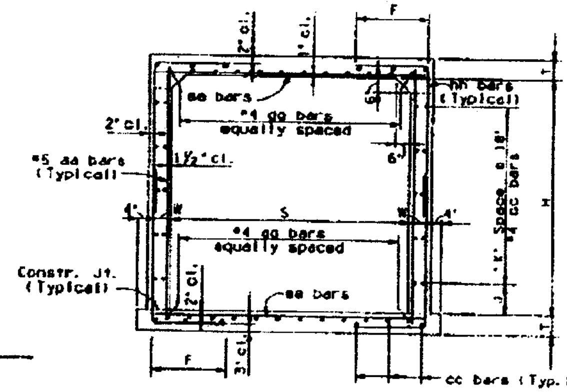
+Total number of bars in the cross-section.

**TABLE NO. V — 25'-30' FILL**

| Span "S" | Height "H" | Slab "T" | Walls "W" | aa Spacing | aa Length | cc Number+ | ee Bar Size | ee Spacing | ee Length | gg Number+ | hh Bar Size | hh Spacing | hh Length | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6' | 3' | 10½" | 9" | 12" | 4'-4 | 20 | 6 | 6" | 7'-2 | 14 | 4 | 6" | 5'-3 | 2'-6 |
| | 4' | 11" | 9" | 12" | 5'-5 | 24 | 6 | 6" | 7'-2 | 14 | 4 | 6" | 5'-10 | 2'-6 |
| | 5' | 11" | 9" | 12" | 6'-5 | 24 | 6 | 6" | 7'-2 | 14 | 4 | 6" | 6'-4 | 2'-6 |
| | 6' | 11" | 9" | 12" | 7'-5 | 28 | 7 | 8" | 7'-2 | 14 | 4 | 6" | 6'-10 | 2'-6 |
| | 7' | 11" | 9" | 12" | 8'-5 | 32 | 7 | 8" | 7'-2 | 14 | 4 | 6" | 7'-4 | 2'-6 |
| 8' | 3' | 13" | 11" | 7" | 4'-9 | 20 | 7 | 7" | 9'-6 | 18 | 5 | 7" | 5'-10 | 2'-6 |
| | 4' | 13" | 11" | 10" | 5'-9 | 24 | 7 | 6" | 9'-6 | 18 | 5 | 6" | 6'-4 | 2'-8 |
| | 5' | 13½" | 11" | 10" | 6'-10 | 24 | 8 | 8" | 9'-6 | 18 | 5 | 8" | 6'-10 | 2'-8 |
| | 6' | 13½" | 11" | 11" | 7'-10 | 28 | 8 | 8" | 9'-6 | 18 | 5 | 8" | 7'-4 | 2'-8 |
| | 7' | 13½" | 11" | 11" | 8'-10 | 32 | 8 | 6" | 9'-6 | 18 | 4 | 6" | 7'-10 | 2'-8 |
| | 8' | 13½" | 11" | 12" | 9'-10 | 32 | 8 | 8" | 9'-6 | 18 | 4 | 6" | 8'-4 | 2'-8 |
| 10' | 3' | 16" | 13" | 6" | 5'-3 | 20 | 7 | 6" | 11'-10 | 22 | 6 | 8" | 7'-0 | 3'-5 |
| | 4' | 16" | 13" | 7" | 6'-3 | 24 | 8 | 7" | 11'-10 | 22 | 6 | 7" | 7'-6 | 3'-5 |
| | 5' | 16" | 13" | 8" | 7'-3 | 24 | 8 | 8" | 11'-10 | 22 | 6 | 8" | 8'-0 | 3'-4 |
| | 6' | 16" | 13" | 8" | 8'-3 | 28 | 8 | 8" | 11'-10 | 22 | 6 | 8" | 8'-4 | 3'-4 |
| | 7' | 16" | 13" | 8" | 9'-3 | 32 | 8 | 8" | 11'-10 | 22 | 5 | 6" | 8'-8 | 3'-3 |
| | 8' | 16" | 13" | 9" | 10'-3 | 32 | 8 | 6" | 11'-10 | 22 | 5 | 6" | 9'-2 | 3'-3 |
| | 9' | 16" | 13" | 9" | 11'-3 | 36 | 8 | 6" | 11'-10 | 22 | 5 | 6" | 9'-7 | 3'-2 |
| | 10' | 16½" | 13" | 12" | 12'-4 | 40 | 8 | 6" | 11'-10 | 22 | 5 | 6" | 10'-1 | 3'-2 |
| 12' | 8' | 19½" | 15" | 8" | 10'-10 | 32 | 10 | 8" | 14'-2 | 26 | 5 | 6" | 9'-8 | 3'-6 |
| | 9' | 19½" | 15" | 10" | 11'-10 | 36 | 10 | 7" | 14'-2 | 26 | 5 | 7" | 10'-2 | 3'-6 |
| | 10' | 19½" | 15" | 10" | 12'-10 | 40 | 9 | 6" | 14'-2 | 26 | 5 | 6" | 10'-8 | 3'-7 |
| | 11' | 19½" | 15" | 8" | 13'-10 | 40 | 10 | 8" | 14'-2 | 26 | 6 | 8" | 11'-6 | 3'-8 |
| | 12' | 20" | 15" | 10" | 14'-11 | 44 | 9 | 6" | 14'-2 | 26 | 6 | 6" | 12'-0 | 3'-9 |

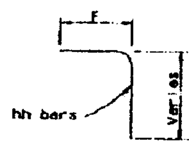
**QUANTITIES PER LINEAR FOOT OF BARREL**

| Span "S" | Height "H" | Table I Concrete C.Y. | Table I Reinf. Steel Lbs. | Table II Concrete C.Y. | Table II Reinf. Steel Lbs. | Table III Concrete C.Y. | Table III Reinf. Steel Lbs. | Table IV Concrete C.Y. | Table IV Reinf. Steel Lbs. | Table V Concrete C.Y. | Table V Reinf. Steel Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6' | 3' | 0.615 | 90.0 | 0.563 | 95.7 | 0.611 | 104.2 | 0.659 | 107.7 | 0.684 | 118.6 |
| | 4' | 0.691 | 104.4 | 0.618 | 104.7 | 0.667 | 113.2 | 0.715 | 127.4 | 0.763 | 128.4 |
| | 5' | 0.746 | 123.0 | 0.674 | 118.4 | 0.722 | 121.8 | 0.771 | 133.6 | 0.819 | 134.7 |
| | 6' | 0.802 | 137.8 | 0.729 | 126.1 | 0.778 | 141.5 | 0.826 | 138.6 | 0.874 | 144.5 |
| | 7' | 0.858 | 146.7 | 0.785 | 135.1 | 0.835 | 150.4 | 0.882 | 147.5 | 0.930 | 153.4 |
| 8' | 3' | 0.841 | 123.8 | 0.778 | 123.7 | 0.837 | 129.7 | 0.966 | 143.5 | 1.029 | 150.7 |
| | 4' | 0.908 | 138.8 | 0.846 | 135.3 | 0.940 | 149.2 | 1.034 | 150.1 | 1.097 | 173.0 |
| | 5' | 0.976 | 144.3 | 0.945 | 151.8 | 1.008 | 157.7 | 1.102 | 160.7 | 1.196 | 164.0 |
| | 6' | 1.044 | 153.3 | 1.013 | 166.6 | 1.101 | 165.4 | 1.170 | 163.8 | 1.264 | 170.5 |
| | 7' | 1.112 | 177.1 | 1.080 | 170.8 | 1.175 | 156.8 | 1.238 | 171.2 | 1.332 | 220.3 |
| | 8' | 1.180 | 182.7 | 1.149 | 177.0 | 1.243 | 181.8 | 1.337 | 198.7 | 1.408 | 195.5 |
| 10' | 3' | 1.022 | 151.4 | 1.060 | 193.6 | 1.215 | 197.7 | 1.356 | 210.9 | 1.465 | 209.8 |
| | 4' | 1.102 | 160.4 | 1.140 | 204.6 | 1.295 | 206.9 | 1.410 | 213.3 | 1.565 | 238.6 |
| | 5' | 1.182 | 165.0 | 1.221 | 210.6 | 1.375 | 215.6 | 1.491 | 241.0 | 1.645 | 220.3 |
| | 6' | 1.262 | 173.4 | 1.340 | 202.0 | 1.456 | 227.0 | 1.610 | 253.6 | 1.725 | 229.1 |
| | 7' | 1.343 | 182.5 | 1.429 | 211.6 | 1.535 | 225.8 | 1.690 | 255.2 | 1.806 | 232.1 |
| | 8' | 1.423 | 188.1 | 1.500 | 235.3 | 1.654 | 233.6 | 1.770 | 262.5 | 1.886 | 267.4 |
| | 9' | 1.503 | 198.3 | 1.619 | 243.4 | 1.735 | 269.9 | 1.850 | 255.2 | 1.966 | 276.4 |
| | 10' | 1.622 | 206.4 | 1.699 | 246.4 | 1.815 | 276.6 | 1.969 | 282.4 | 2.085 | 277.7 |
| 12' | 8' | 1.803 | 313.2 | 1.940 | 288.8 | 2.123 | 298.5 | 2.307 | 295.4 | 2.535 | 336.2 |
| | 9' | 1.896 | 325.9 | 2.033 | 300.2 | 2.216 | 337.3 | 2.445 | 340.2 | 2.628 | 352.8 |
| | 10' | 1.988 | 353.4 | 2.176 | 310.5 | 2.164 | 321.2 | 2.534 | 326.2 | 2.721 | 357.3 |
| | 11' | 2.137 | 345.8 | 2.710 | 354.4 | 2.447 | 362.6 | 2.630 | 375.1 | 2.813 | 373.9 |
| | 12' | 2.219 | 414.3 | 2.356 | 345.7 | 2.540 | 398.4 | 2.723 | 431.2 | 2.952 | 421.0 |




TYPICAL SECTION

| Height "H" | "J" Dim. | "K" Spaces |
|---|---|---|
| 3' | 9" | 1 |
| 4' | 3" | 2 |
| 5' | 12" | 2 |
| 6' | 9" | 3 |
| 7' | 3" | 4 |
| 8' | 12" | 4 |
| 9' | 9" | 5 |
| 10' | 3" | 6 |
| 11' | 12" | 6 |
| 12' | 9" | 7 |




BENDS

NOTE: See B-01.10 for General Notes and Miscellaneous Details

| DESIGN APPROVED / APPROVED FOR DISTRIBUTION | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS | REVISION 7 48 |
|---|---|---|
| | SINGLE BARREL BOX CULVERT | STANDARD NO. B-02.10 |

**Gopperton, Chuck**
**To:** Shewa Shivaswamy (E-mail)
**Cc:** Tom Renckly (E-mail)
**Subject:** gep dam const - cast in place box

Date: 31 May, 2000
Project No.: 82000157
Project: Golden Eagle Park Dam
Subject: cast in place box proposal

To: Shewa Shivaswamy, PE

The cast in place box proposal is acceptable.

The box was originally designed to be cast in place, and I believe if properly constructed, it will give a better end product. The ADOT standard details are acceptable. Also, the concrete slab underneath the box may be deleted. This will slightly reduce both the excavation and embankment quantities as well as the concrete quantity. However, the sand diaphragm quantities must remain the same.

Concrete mix design proposed for the box needs to be reviewed. They may want to use an accelerating admixture. This will need approval from ADWR.

I believe that by constructing the box in place, the contractor's cost for the box culvert is decreased. He doesn't have to pay profit to the vendor, set up charges for designing and making the forms, taxes, shipping, difficult installation requiring a crane, more difficult connection to the headwalls, gasket joints, etc. You may want to ask for a VECP, so the County can share in this cost savings.

Chuck Gopperton, PE - Associate, Water Resources Division

Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355
Tel: (602) 438-2200 Fax: (602 431-9562
e-mail: cgopperton@stantec.com
website: http://www.stantec.com

the following submittals are needed —
mix design

To: Chuck Gopperton 602 431 9562 (Fax)

From: Chris Bridges

6/4/00 1 sheet

JUN 05 2000

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2445
Fax (602) 417-2423

JANE DEE HULL

May 31, 2000

| Post-it® Fax Note 7671 | Date 6/2 | # of pages ▸ 2 |
|---|---|---|
| Co./Dept. TY CIN | From Chuck Gopperton | |
| Phone # | Co. [illegible] | |
| Fax # 480 421 0902 | Phone # | |
| | Fax # | |

Mr. H. N. "Shewa" Shivaswamy, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-6399

**Subject: Golden Eagle Park Dam (07.33)**
**Dam Modifications Construction Contract FCD 1999C071**
**Proposed Design Change to Auxiliary Outlet**

Chris – please look at items marked with *

Dear Mr. Shivaswamy:

We have reviewed the letter and attachment from Hunter Contracting Co., dated May ~~22, 2~~000, regarding their proposed design change for the box culvert, which we received by FAX from Tom Renckly this morning. Hunter proposes a cast-in-place box culvert (ADOT Standard B-02.10) instead of the precast box culvert shown on the approved drawings. We have the following comments on the proposed design:

* 1. In Table No. V, from what point is the 25 – 30 feet height of fill measured? To top of culvert

* 2. What design unit weight was assumed for the backfill on top of the culvert? 120 pcf

* 3. What friction angle was assumed for the fill? 34°

* 4. What was the "live load" assumption? HS20 only

* 5. Was active, passive or "at rest" pressure assumed for the fill? At rest

6. What will be the maximum length of pour between construction joints? 38'-6"

7. What will be the minimum time allowed between adjacent concrete pours?

8. What design strength was assumed for the concrete? 4000 psi

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

Post-it® Fax Note 7671 | Date | # of pages ▶ 3
To Shewa Shivaswamy | From
Co./Dept. FCDMC | Co. STANTEC
Phone # | Phone #
Fax # 5064601 | Fax #

| | | | |
|---|---|---|---|
| To: | Larry Lambert | | |
| Attention: | ADWR | Tel. No: | 438-2200 |
| Fax No: | (602) 417-2423 | Fax No: | 431-9562 |
| Date: | 1 June, 2000 | **3** page(s) total includes cover sheet | |
| File: | 82000157 | Original will **NOT** follow by mail. | |

THE CONTENT OF THIS FAX IS CONFIDENTIAL. IF THE READER IS NOT THE INTENDED RECIPIENT OR ITS AGENT, BE ADVISED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THE CONTENT OR OF THIS FAX IS PROHIBITED. IF YOU HAVE RECEIVED THIS FAX IN ERROR, PLEASE NOTIFY US IMMEDIATELY AND RETURN THE ORIGINAL FAX TO US BY MAIL AT OUR EXPENSE. THANK YOU.

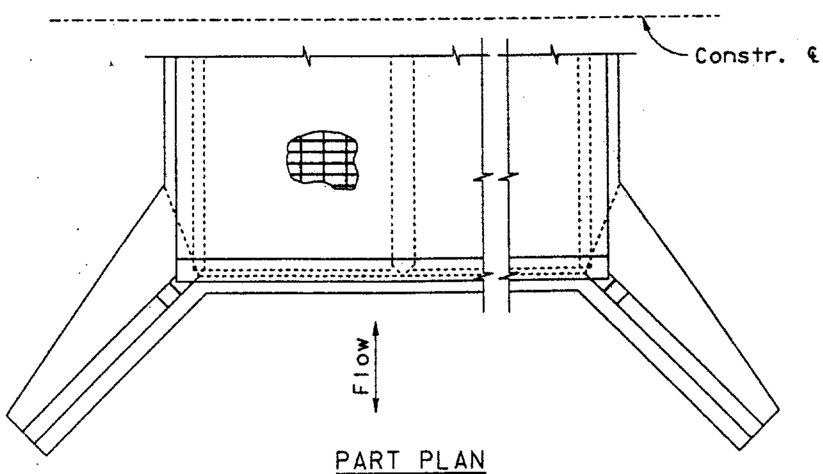
**Reference: GOLDEN EAGLE PARK DAM**

Larry - I am sending you additional details for the ADOT standard box culvert, with my comments marked on it.

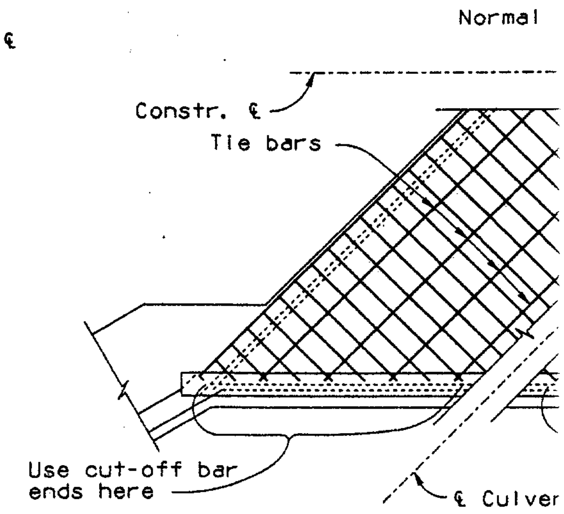
CC: Shewa Shivaswamy - FCDMC; Tom Renckly - FCDMC

p:\82000157\const\correspondence\faxes\cvg06010llrfax.doc

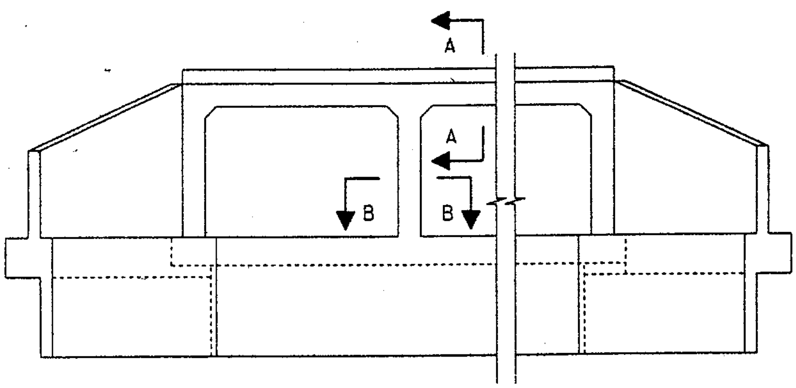
PVC waterstops shall be used at all const. joints



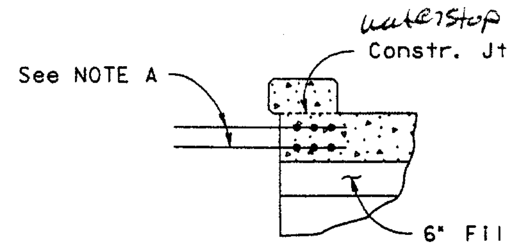

PART PLAN
Showing Inlet & Outlet Details




PART PLAN-SKEWED
Showing Reinf. Stee

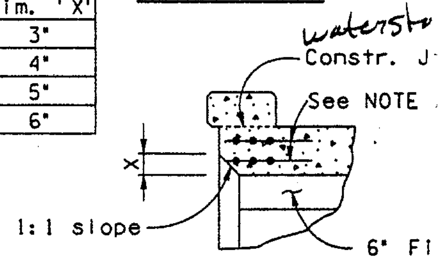



TYPICAL ELEVATION-OUTLET END

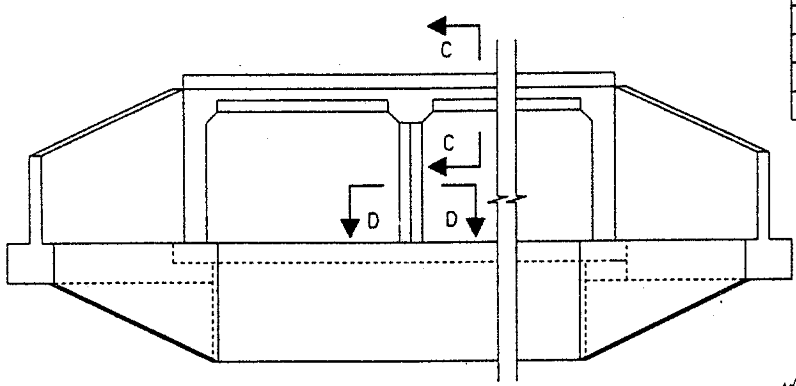



SECTION A-A

| Span 'S' | Dim. 'X' |
|---|---|
| 6' | 3" |
| 8' | 4" |
| 10' | 5" |
| 12' | 6" |




SECTION C-C




TYPICAL ELEVATION-INLET END

PVC waterstop to be used

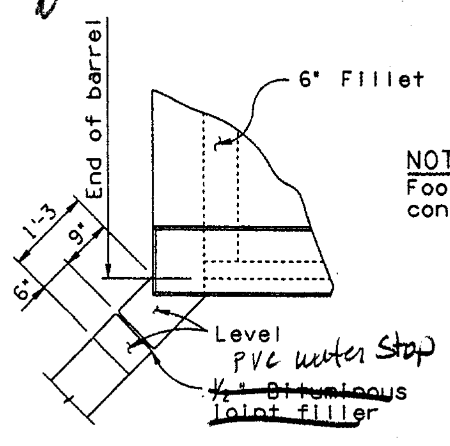
JOINT NOTE:

All structures shall have formed Constr. joints in top slab and walls ~~(optional in floor slab)~~ spaced not more than 38'-6" apart or as shown. Reinforcing steel shall project 1'-6" thru the joint. ~~The joint shall be made with 1/4" plywood bulkhead which shall be left in place. Joints shall be perpendicular to the centerline of the box.~~

+ AND FLOOR

NOTE A:

For culverts skewed over 5° to 30° use 3#7 bars* top and bottom of slab. For culverts skewed over 30° to 45°, use 3#8 bars* top and bottom of slab. For culverts skewed over 45°, a special edge beam design is required.
*Reinforcing bar quantities have to be calculated.

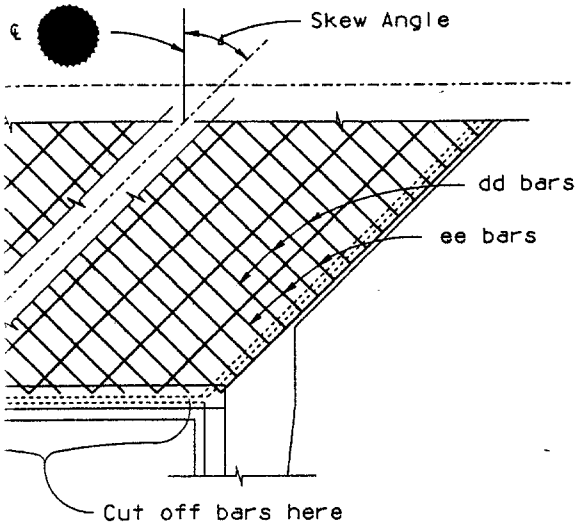


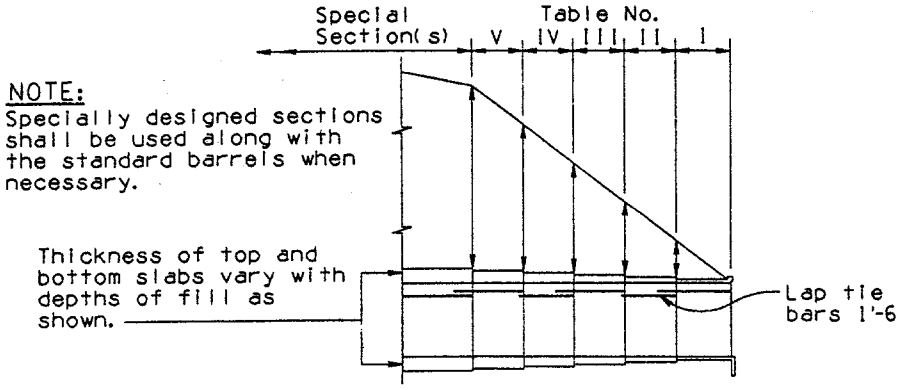

WINGWALL JOINT DETAIL
For all barrels under 8ft (H<8')

NOTE
Footing s
contiuous

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
|  | Revised & Modified Standard. | J. W. | 4-92 |
|  | K. W. | | 4-92 |

ONLY Table V used



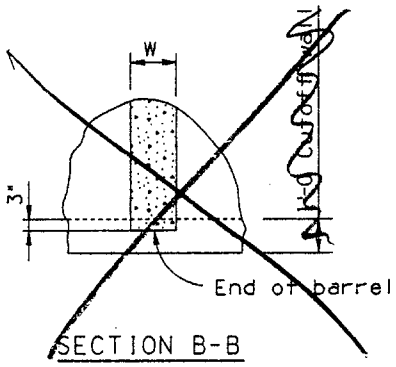




NOTE:
Specially designed sections shall be used along with the standard barrels when necessary.

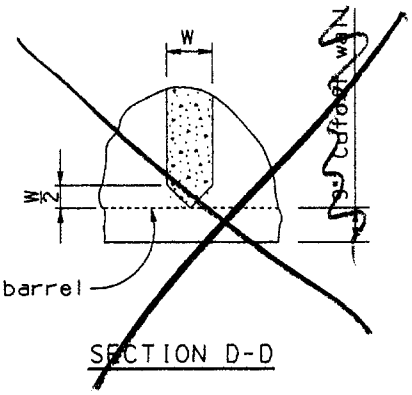
DIAGRAM SHOWING TABLES TO BE USED FOR VARIOUS FILL HEIGHTS

NOTE: Culvert barrels always begin and end with Table No. I.

ULVERT
lacement

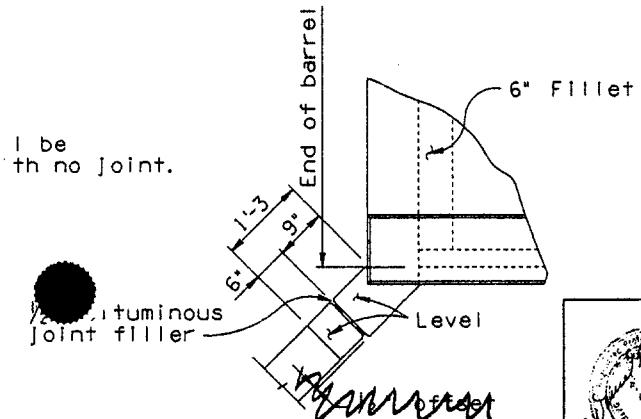



SECTION B-B




SECTION D-D

:t




l be
th no joint.

ituminous
joint filler

WINGWALL JOINT DETAIL
For all barrels 8ft. and over (H ≥ 8')

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO Standard Specifications for Highway Bridges, Edition of 1989 and 1990 Interim Specifications.

Loading Class - HS20-44 and/or Interstate Alternate Loading.

All concrete shall be Class "S" unless noted otherwise.

Reinforcing steel shall conform to ASTM Specification A615. Bar sizes #6 and smaller shall be designed as Grade ~~40~~ 60 but may be furnished as ~~Grade 40 or~~ Grade 60. Bar sizes #7 and larger shall be designed and furnished as Grade 60.

All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2 inch clear cover unless noted otherwise.

Stresses:
Concrete ..... f'c = ~~3000 psi~~ 4,000
~~Grade 40 reinforcing steel ..... fs = 20000 psi~~
Grade 60 reinforcing steel ..... fs = 24000 psi

Chamfer all exposed corners ¾" as per Standard B-19.10 unless noted otherwise.

Dimensions shall not be scaled from drawings.

QUANTITY NOTE:

Total Box Culvert Quantities include Barrel Quantities and Headwall Quantities. Add Apron Quantity when apron is used.
Standard headwall quantities include wings, curb and cut-off wall.
Barrel Quantities are obtained by mutiplying length of box by quantities per linear foot of box.

| | | | |
|---|---|---|---|
| | DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS | REVISION 4-92 |
| | APPROVED FOR DISTRIBUTION | MISCELLANEOUS DETAILS FOR STANDARD BOX CULVERTS | STANDARD NO. B-01.10 |

**Gopperton, Chuck**

**From:** Gopperton, Chuck
**Sent:** Thursday, June 01, 2000 4:11 PM
**To:** 'info@greenstreak.com'
**Subject:** gep dam waterstops

Date: 1 June, 2000
Project No.: 82000157
Project: Golden Eagle Park Dam
Subject: waterstops

To:

I am working on a specification for waterstops for several structures on the above referenced project. I see references in the COE guide specs and also in your master specification to the corps of engineers publication CRD-C 572-74 for PVC waterstops. I am unable to find this specification and wonder what it covers. It appears to me that it is only a testing spec for strength and effect of alkali, and most of the testing for waterstops is based on ASTM specs. I plan to approve the submitted waterstop material based on certification from the factory and don't plan on doing any QA testing. Does CRD-C 572-74 contain anything other than test methods for manufacturing of the product?

Also, I need to specify the size and type of waterstop and approve the contractors submittal. The dam will impound up to approximately 30' of water for a short period of time. The waterstops are to be installed in joints at the floor-wall, deck-wall, wingwall and construction joints in a cast in place concrete box culvert. I am not sure what type of movement to anticipate, but hopefully not much. Since it will be within the dam embankment, I want to specify something fairly durable. I also want a product that is easy to install, and consolidation of concrete around it is a concern. I am thinking of using a type 732. Do you have a split rib configuration?

Chuck Gopperton, PE - Associate, Water Resources Division

Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355
Tel: (602) 438-2200 Fax: (602 431-9562
e-mail: cgopperton@stantec.com
website: http://www.stantec.com

**Gopperton, Chuck**
**From:** Gopperton, Chuck
**Sent:** Thursday, June 01, 2000 4:43 PM
**To:** 'tammstech@tamms.com'
**Subject:** gep dam waterstops 2Tamms

Date: 1 June, 2000
Project No.: 82000157
Project: Golden Eagle Park Dam
Subject: waterstops

To:

I need to specify the size and type of waterstop and approve the contractors submittal for this project. The dam will impound up to approximately 30' of water for a short period of time. The waterstops are to be installed in joints at the floor-wall, deck-wall, wingwall and construction joints in a cast in place concrete box culvert. I am not sure what type of movement to anticipate, but hopefully not much. Since it will be within the dam embankment, I want to specify something fairly durable. I also want a product that is easy to install, and consolidation of concrete around it is a concern. I am thinking of using a type 9, 500 . Could you send me the specs for these?
Chuck Gopperton, PE - Associate, Water Resources Division

Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355
Tel: (602) 438-2200 Fax: (602 431-9562
e-mail: cgopperton@stantec.com
website: http://www.stantec.com

# Transmittal

COPY

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | FCDMC | Sender: | Chuck Gopperton |
| Attention: | Tom Johnson<br>% Shewa Shivaswami | ☑ | For Your Information |
| | | ☐ | For Your Approval |
| Date: | 5 June 2000 | ☐ | For Your Review |
| File: | 82000157 | ☐ | As Requested |

**Reference: Proposed Cast in Place Box Culvert**

Enclosed you will find the 5 page document described above, as well as the 2 page letter from ADWR. Please feel free to call me if you any questions.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton, PE
Associate, Water Resource Division
cgopperton@stantec.com

Attachment: Pages 1-5 of Construction Joint Details for Cast in Place Culvert
Dated 6-5-00
Copy of original letter from ADWR

c. Tom Renckly, FCDMC

cjm p:\82000157\correspondence\transmittals\sshivaswamy fcdmc, 060500.doc

**Memo**

Stantec

To: File

File: 82000157

From: Chuck Gopperton

Date: 5 June, 2000

**Re: PROPOSED CAST IN PLACE BOX CULVERT**

---

**Message:**

This memo is being written in response to a letter written by ADWR on May 31, requesting more information on the proposed change at the auxiliary outlet from pre-cast box, to a cast in place box culvert. The item numbers correspond to the numbers in the letter which is attached for reference.

1. Fill height in the ADOT standard box culvert fill tables is measured from the top surface of the deck. The detail on ADOT Std. No. B-01.10 at the upper right hand corner shows this. The typical section for cast in place shown on the plans is derived from the ADOt standard detail.

2. The structural analysis design unit weight assumed for the backfill is 120 pounds per cubic foot.

3. The friction angle assumed for the structural backfill is 34 degrees.

4. The design live load assumption is HS-20.

5. The earth pressure assumed for the structural backfill is "At Rest".

6. Two control joints are required and the maximum length of pour is 39 feet. Details of the locations for the control and construction joints are shown on Detail 4 which is attached.

7. The minimum time before forms are stripped shall be 24 hours. The minimum time between adjacent concrete pours shall be 48 hours.

Increase this time for deck slab

8. The box was designed for concrete with a f'c of 3,000 psi and all bars #6 and smaller designed for fs of 20,000 psi (Grade 40). For this project, the concrete f'c shall be 4,000 psi and all bars will have a fs of 24,000 psi (Grade 60). This is specified in Section 505 and 515 of the specifications.

---

9. The ADOT construction joint details are not used. Detail 1 -4 are attached. The joints will use pvc waterstops. Construction shall conform to Section 730 of the specifications and to the attached details and supplemental specifications.

Note: Items 1 - 5 were verified by TY Lin.

STANTEC CONSULTING INC.

Chuck Gopperton, PE
Associate, Water Resources Division
cgopperton@stantec.com

Attachments - Pages 1 - 5 of Construction Joint Details for Cast in Place Culvert, Dated 6-5-00

Copy of original letter from ADWR

*Fax and mail original*

c. Tom Johnson c/o Shewa Shivaswami - FCDMC

Tom Renckly - FCDMC

p:\82000157\const\correspondence\memos\cvg060200m2f.doc

Stantec

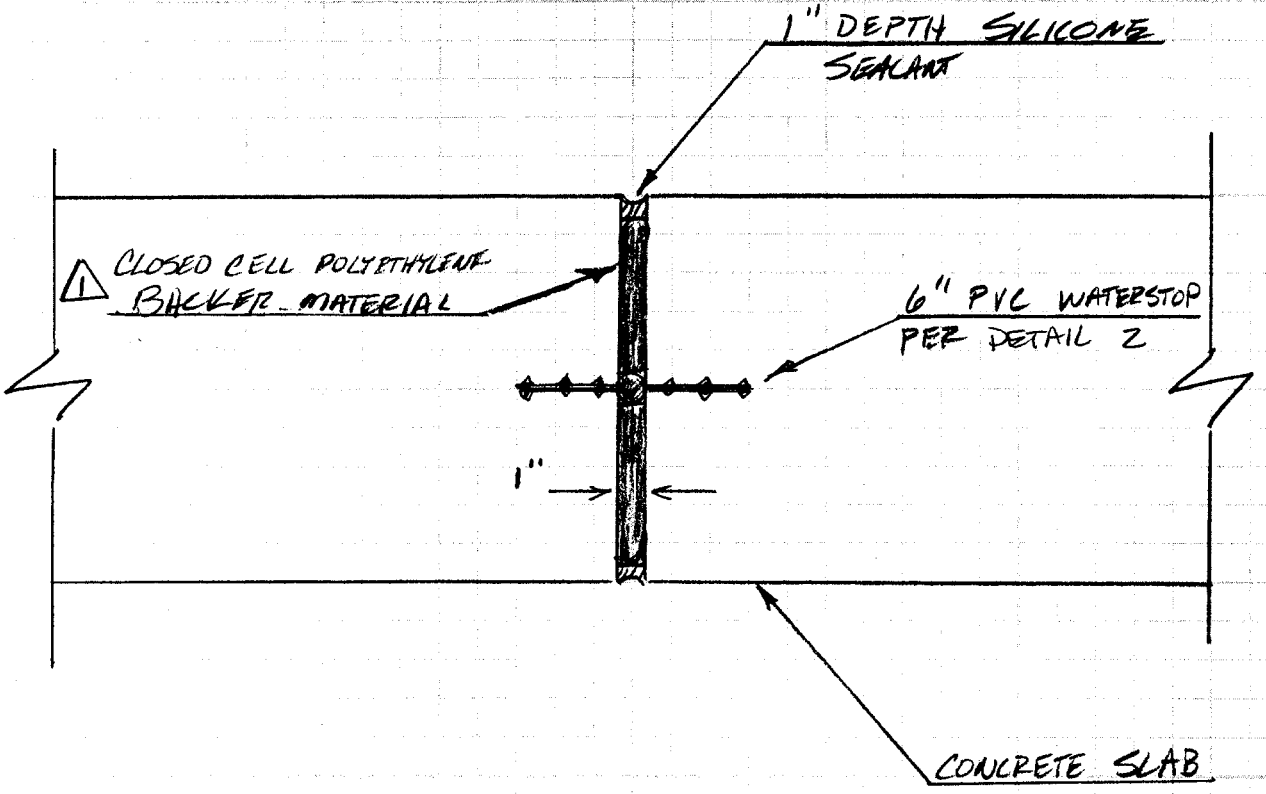
Project: Golden Eagle Park Dam  Project Number: 82000157

Notes: CONST. JOINT DTLS FOR CAST IN PLACE CULVERT  Scale: NTS

Page 1 of Page(s)

Computed By: CH  Date: 6/2/00  Checked By:  Date:

1 Revised 6/8/00




NOTES:

1. REINFORCING STEEL SHALL PROJECT 1'-6" MINIMUM THROUGH THE JOINT

2. SEAL BOTH SIDES WITH SILICONE WHEN EXPOSED, PRIOR TO BACKFILLING. SEAL ONLY THE TOP SIDE OF FLOOR SLAB WHICH IS POURED AGAINST AN EARTH FOUNDATION

3. THIS DETAIL SHALL BE USED AT LONGITUDINAL CONTROL JOINTS, MAXIMUM SPACING OF 39'

DETAIL 1

CONTROL JOINT

1 4. BACKER MATERIAL SHALL MEET ASTM D5249-95, TYPE 2

Stantec

Project: Golden Eage Park Dam Project Number: 82000457

Notes: CONST JOINT details for cast in place culvert Scale: 1" = 1"

Page 2 of ____ Page(s)

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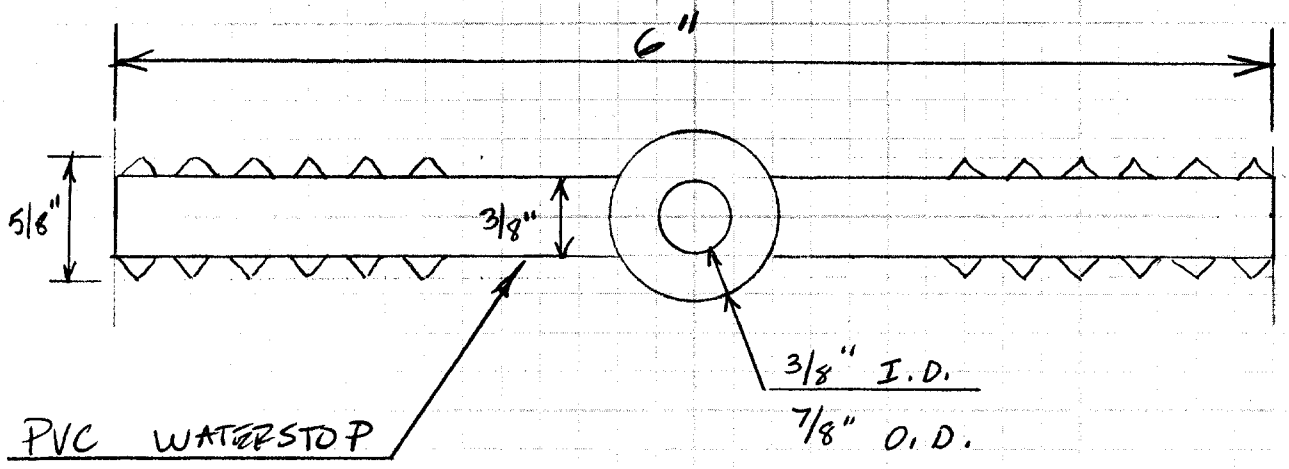


DETAIL 2

WATER STOP DETAIL

Stantec

Project: Golden Eagle Park Dam Project Number 82000157

Notes: CONST JOINT DETAILS FOR CAST IN PLACE CULVERT Scale: NTS

Page 3 of Page(s)

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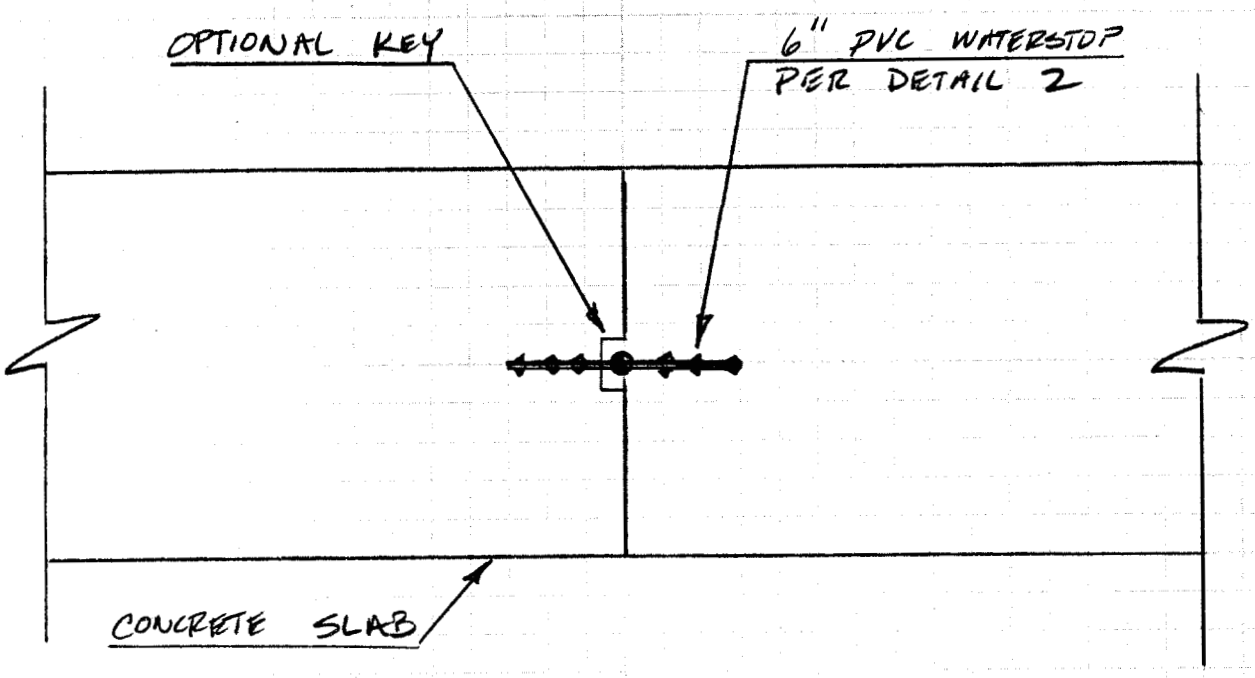


NOTES:

1. REINFORCING STEEL SHALL PROJECT 1'-6" MINIMUM THROUGH THE JOINT

2. THIS DETAIL SHALL BE USED AT THE FLOOR TO WALL JOINT AND AT THE WALL TO DECK JOINT.

DETAIL 3

CONSTRUCTION JOINT

NOT TO SCALE

Stantec

Project: Golden Eagle Park Dam | Project Number: 82000157

Notes: Const Joint Dtls for cast in place culvert | Scale: NTS

Page 4 of ___ Page(s)

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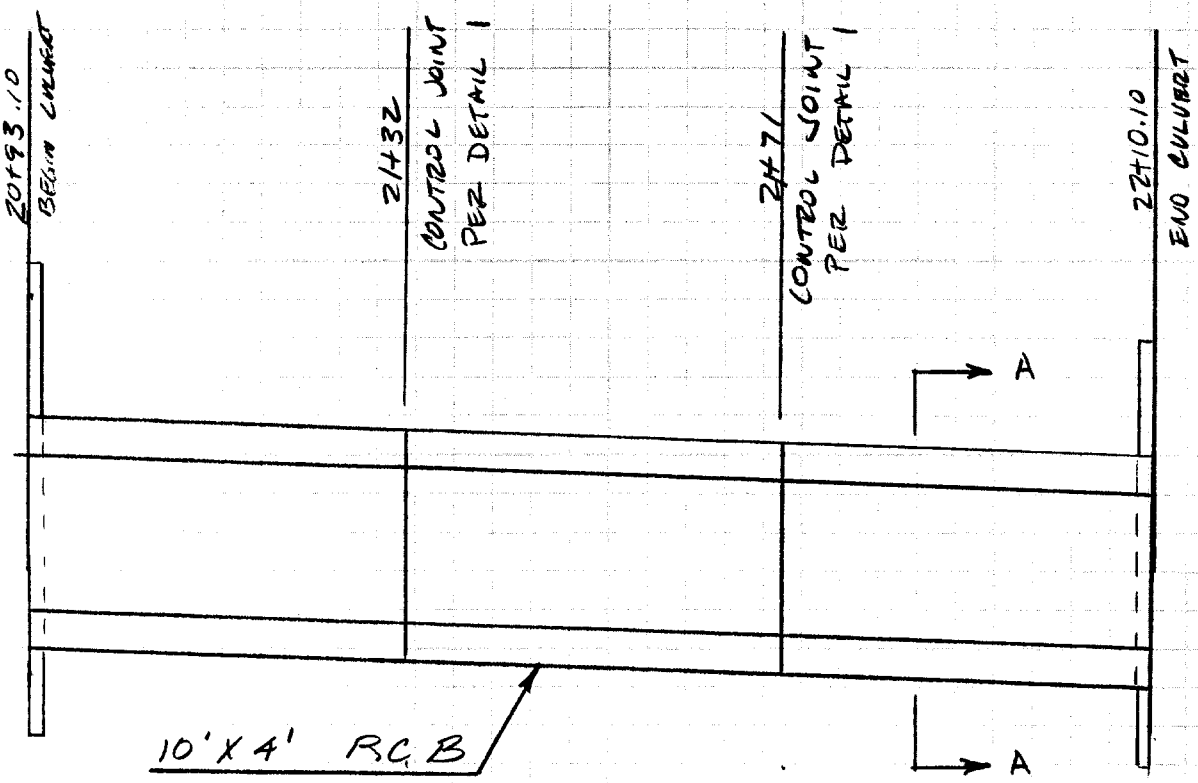


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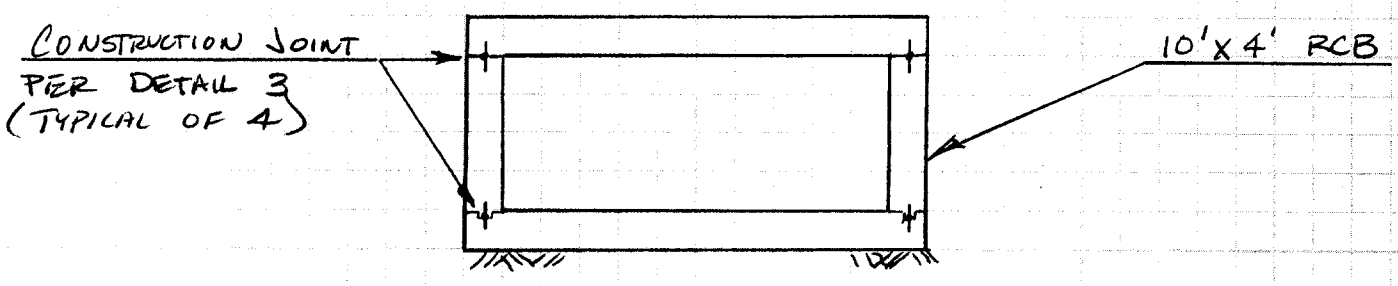


SECTION A-A

DETAIL 4

LOCATION OF JOINTS

Stantec

Project: Golden Eagle Park Dam Project Number: 82000157

Notes: CONST. JOINTS FOR CAST IN PLACE CULVERT Scale:

Page 5 of Page(s)

Computed By: Date: 6/5/00 Checked By: Date:

## GENERAL NOTES

1. WATERSTOP SHALL BE CONTINUOS THROUGH CONTROL JOINTS.

2. INTERSECTION OF WATERSTOP BETWEEN CONSTRUCTION AND CONTROL JOINTS REQUIRES WELDING OF INTERSECTION FITTINGS INTO TEE, ELL OR CROSS CONFIGURATION. THESE FITTINGS SHALL BE FACTORY PRE-FABRICATED.

3. HEADWALL TO WINGWALL JOINTS MAY BE CONSTRUCTED AS EITHER A CONTROL OR A CONSTRUCTION JOINT.

4. WATERSTOPS SHALL MEET THE REQUIREMENTS OF SECTION 730 OF THE SPECIFICATIONS.

5. WATERSTOPS SHALL BE PVC AND SHALL BE ACCEPTED ON THE BASIS OF CERTIFIED MANUFACTURERS TEST REPORTS. SAMPLES OF WATERSTOP AND PRE-FABRICATED SPLICES AND FITTINGS SHALL BE SUBMITTED FOR INSPECTION.

6. ADDITIONAL REQUIREMENTS FOR WATERSTOPS ARE AS FOLLOWS:

| PROPERTY | TEST METHOD | REQUIRED LIMITS |
|---|---|---|
| TEAR RESISTANCE | ASTM D624 | 285 lb/in MIN. |
| OZONE RESISTANCE | ASTM D1149 | PASSED |
| ULTIMATE ELONGATION | ASTM D638 | 360% MIN. |
| TENSILE STRENGTH | ASTM D638 | 2000 PSI MIN. |
| LOW TEMPERATURE BRITTLENESS (-35F) | ASTM D746 | NO FAILURE |
| STIFFNESS IN FLEXURE | ASTM D747 | 600 PSI MIN. |
| TENSILE STRENGTH AFTER ACCELERATED EXTRACTION | CRD 572 | 1600 PSI MIN |
| ELONGATION AFTER ACCELERATED EXTRACTION | CRD 572 | 300% MIN |
| EFFECT OF ALKALIES AFTER 7 DAYS | CRD 572 | 0.10% LOSS MAX<br>0.25% GAIN MAX |

NOTE: WATERSTOP SHALL BE FABRICATED FROM VIRGIN POLYVINYL CHLORIDE RESIN.

7. WATER STOP MAY BE CENTERED AND SECURED DURING PLACEMENT BY TIE WIRES CONNECTED TO GROMMETS OR BY HOG RINGS.

# ARIZONA DEPARTMENT OF WATER RESOURCES

**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2445
Fax (602) 417-2423


May 31, 2000


**JANE DEE HULL**
**Governor**

**RITA P. PEARSON**
**Director**


Mr. H. N. "Shewa" Shivaswamy, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-6399

**Subject: Golden Eagle Park Dam (07.33)**
**Dam Modifications Construction Contract FCD 1999C071**
**Proposed Design Change to Auxiliary Outlet**

Dear Mr. Shivaswamy:

We have reviewed the letter and attachment from Hunter Contracting Co., dated May 22, 2000, regarding their proposed design change for the box culvert, which we received by FAX from Tom Renckly this morning. Hunter proposes a cast-in-place box culvert (ADOT Standard B-02.10) instead of the precast box culvert shown on the approved drawings. We have the following comments on the proposed design:

1. In Table No. V, from what point is the 25 – 30 feet height of fill measured?

2. What design unit weight was assumed for the backfill on top of the culvert?

3. What friction angle was assumed for the fill?

4. What was the "live load" assumption?

5. Was active, passive or "at rest" pressure assumed for the fill?

6. What will be the maximum length of pour between construction joints?

7. What will be the minimum time allowed between adjacent concrete pours?

8. What design strength was assumed for the concrete?

9. What are the construction joint details for :

   a) Slab to wall?

   b) Wall to top of culvert?

   c) Vertical joints between adjacent pours?

A complete proposed design for the cast-in-place box culvert sealed by the engineer of record should be submitted to ADWR for review and approval.

If you have any questions regarding our comments please contact Larry Lambert at (602) 417-2400, extension 7190.

Sincerely,

Jon M. Benoist, P.E.
Supervisor
Dam Safety Section

cc: Tom Renckly, FCDMC
Chuck Gopperton, Stantec

FAXED
JUN 1 3 2000
#Pages_____

**MEETING NOTES**

Stantec

# Golden Eagle Park Dam

Stantec Project No. 82000157

Date: 7 June, 2000

Place/Time: Flood Control District of Maricopa County/ 1:00 PM

Attendees:

| Name | Organization | Phone |
|---|---|---|
| Chuck Gopperton | Stantec Cons. | 602-707-4637 |
| Tom Renckly | FCDMC | 602-506-8610 |
| Shewa Shivaswamy | FCDMC | 602-506-4726 |
| Jerry Cox | ADWR | 602-417-2400 |
| Larry Lambert | FCDMC | 602-506-1501 |
| Steve Ostwinkle | Hunter Cont. | 480-892-0521 |
| Andy Dileo | Dileo Engineering | 602-395-0756 |

Distribution: All Attendees

---

**Meeting to discuss cast in place box culvert construction**

| Item: | Action/Comments: |
|---|---|
| 1. Hunter previously submitted a copy of the ADOT standard drawing B 02.10 to replace the pre-cast box as shown on the plans. Upon review, ADWR had several issues with the submittal. | Larry Lambert is reviewing the submittals for ADWR. The submittal was not approved by ADWR as submitted. Larry wrote a letter asking for more information with the submittal. |
| 2. Chuck prepared a memorandum which addresses ADWR concerns and provides additional specifications and details for the box culvert. | Larry is comfortable with the submittal, but has not finished his review yet. |

| | Item: | Action/Comments: |
|---|---|---|
| 3. | Two control joints are proposed at 39' maximum spacing (approximately as specified by ADOT). The joints will have waterstops and closed cell polyethylene joint filler. | Cork and bituminous material are not allowed for joint filler. Recommended spacing may be reduced to 30' which will require one additional control joint. |
| 4. | Concrete must be wet cured for 7 days. | Adjacent pours at control joints (not construction joints) must wait until 7 day cure is finished. This may require pouring in a checkerboard pattern. |
| 5. | The 6" concrete slab under the box is not required for cast in place construction. | A change order will be required. |
| 6. | The revised design must re-submitted to ADWR and new drawing approved. | Once all the comments have been received, Chuck will revise the design and prepare a new plan sheet. |

The meeting adjourned at 2:00 PM.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Inc.
Chuck Gopperton, PE
Associate, Water Resources Division
cgopperton@stantec.com

## Gopperton, Chuck

**From:** Gopperton, Chuck
**Sent:** Thursday, June 08, 2000 10:16 AM
**To:** Shewa Shivaswamy (E-mail)
**Cc:** Tom Renckly (E-mail)
**Subject:** gep dam box culvert

Date: 8 June, 2000
Project No.: 82000157
Project: Golden Eagle Park Dam
Subject: Backer material for caulking in box culvert

To: Shewa Shivaswamy, Tom Renckly

here is the ASTM spec for the backer material. It should be type 2.
Please forward this also to Larry Lambert (I don't have his email address)

D5249-95.pdf

Chuck Gopperton, PE - Associate, Water Resources Division

Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355
Tel: (602) 438-2200 Fax: (602 431-9562
e-mail: cgopperton@stantec.com
website: http://www.stantec.com

Designation: D 5249 – 95

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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# Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints[1]

This standard is issued under the fixed designation D 5249; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers backer material for cold- and hot-applied joint sealant for use in portland-cement concrete or asphalt-pavement joints.

1.2 This specification establishes basic requirements for sealant-backer material either in rod or strip form, that can withstand the temperature of hot- or cold-applied sealants without excessive deformation.

1.3 Sealant backer material serves one or more of the following purposes:

1.3.1 Limits the amount and depth of sealant applied to a joint,

1.3.2 Acts as a barrier interface to prevent backside adhesion (bondbreaker), and

1.3.3 Provides a form to assist the sealant in developing a shape factor.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information purposes only.

1.5 The following safety hazards caveat pertains only to the test methods described in this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*

C 670 Practice for Preparing Precision and Bias Statements for Test Methods of Construction Materials[2]

C 1016 Test Method for Determination of Water Absorption of Sealant Backing (Joint Filler) Material[3]

C 1253 Test Method for Determining the Outgassing Potential of Sealant Backing[3]

D 545 Test Methods for Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types)[4]

D 1622 Test Method for Apparent Density of Rigid Cellular Plastics[5]

D 1623 Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics[5]

D 5535 Terminology Relating to Formed-in-Place Sealants for Joints and Cracks in Pavement[4]

E 1 Specification for ASTM Thermometers[6]

## 3. Terminology

3.1 For definitions, refer to Terminology D 5535.

## 4. Classification

4.1 Sealant backer material is available in three types:

4.1.1 *Type 1*, shall be round rods of various diameters intended for use with cold- and hot-applied sealants.

4.1.2 *Type 2*, shall be sheets or strips of various thicknesses, laminated or skived by the manufacturer but capable of being field laminated and used with cold- and hot-applied sealants.

4.1.3 *Type 3*, shall be round rods of various diameters limited for use with cold-applied sealants.

4.2 Type 1 and Type 3 rod materials are intended for use primarily where there is a reservoir, either already existing or formed, such as a contraction joint, where the rod will limit the sealant depth and prevent the sealant from bonding to the bottom of the joint reservoir (bond-breaker) thus eliminating bottom-side adhesion.

4.3 Type 2 strip material is intended primarily for use where there is an opening the full depth of the pavement, such as an expansion joint for which it is desirable to have a filler material completely fill the opening and prevent or minimize the accumulation of water or incompressible materials below the sealant.

## 5. Ordering Information

5.1 Types 1, 2, and 3 backer material are available in a range of sizes, lengths, and diameters; they are available on reels, in coils, or in straight lengths. Consult the manufacturer for information on how to order.

[1] This specification is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.33 on Formed-In-Place Sealants for Joints and Cracks in Pavements.

Current edition approved Nov. 10, 1995. Published January 1996. Originally published as D 5249 – 92. Last previous edition D 5249 – 92.

[2] *Annual Book of ASTM Standards*, Vol 04.02.

[3] *Annual Book of ASTM Standards*, Vol 04.07.

[4] *Annual Book of ASTM Standards*, Vol 04.03.

[5] *Annual Book of ASTM Standards*, Vol 08.01.

[6] *Annual Book of ASTM Standards*, Vol 14.03.

5.2 Backer material must be ordered by diameter or size in relation to the joint opening, usually 25 to 35 % larger than the joint width.

## 6. Materials

6.1 Sealant backer material shall be easily compressed and installed in the joint reservoir. This material shall be heat resistant when used with hot-applied sealants.

## 7. Physical Properties

7.1 Physical properties of the sealant backer material shall conform to the requirements of Table 1 .

## 8. Workmanship, Finish, and Appearance

8.1 The product shall be clean, free of scale or foreign matter, oil, or water which could wipe off on a joint sidewall and interfere with the proper cure or adhesion of the sealant.

## 9. Test Methods

9.1 *Water Absorption*—Tests for water absorption of the Types 1 and 3 backing material shall be made in accordance with Test Method C 1016, Procedure B. Type 2 material shall be tested in accordance with Test Method D 545.

9.1.1 For Type 2 material:

$$WA = \frac{W \times 100}{262t} \tag{1}$$

where:

$WA$ = water absorption by volume, %,
$W$ = weight of water absorbed, from tests made according to Test Methods D 545, g, and
$t$ = thickness of 4 in. by 4 in. specimen, inches.

9.1.2 For the purposes of this calculation, 1 g of water occupies 0.061 in.$^3$ at test conditions.

9.2 *Density*—Tests for density of Types 1 and 3 materials shall be made in accordance with Test Method D 1622. Tests for density of Type 2 material shall be made in accordance with Test Methods D 545.

9.3 *Tensile Strength*—Tests for tensile strength of Types 1 and 3 materials shall be made in accordance with Test Method D 1623.

9.4 *Compression Deflection and Recovery*—Type 2 material shall be tested in accordance with Test Methods D 545. Type 1 and 3 materials shall be tested in accordance with the following procedure.

9.4.1 *Significance and Use*—This test method covers a procedure for measuring the force necessary to compress the backer material, and the percentage recovery of original dimensions after removal of the compression load.

**TABLE 1 Physical Property Requirements**

| Property | Type 1 | Type 2 | Type 3 |
|---|---|---|---|
| Density, lb/ft$^3$(kg/m$^3$), max | 6 (96.1) | 4 (64.1) | 6 (96.1) |
| Tensile strength, psi (kgf/cm$^2$), min | 20 (1.41) | N/A | 20 (1.41) |
| Water absorption, by volume, %, max | 0.5 | 0.5 | 0.5 |
| 25 % Compression deflection force, psi (kgf/cm$^2$), max | 15 (1.06) | 15 (1.06) | 15 (1.06) |
| Compression recovery, %, min | 90 | 90 | 90 |
| Heat resistance, °F | 392 ± 5 | 392± 5 | N/A |
| °C | 200 ± 2.8 | 200 ± 2.8 | N/A |
| Maximum shrinkage, % | 10 % | 10 % | N/A |

9.4.2 *Apparatus*:

9.4.2.1 An apparatus shall be provided having a flat compression plate larger than the specimen to be tested, connected to a force measuring device, and mounted in such a manner that the specimen can be deflected (compressed) at a speed of 0.5 to 2 in./min. The apparatus shall be arranged to support the specimen on a level horizontal plate. The apparatus shall be capable of measuring the distance between the movable plate and the stationary plate.

9.4.2.2 *Calipers*, capable of measuring 0.001 in.[7]

9.4.3 *Test Specimens*:

9.4.3.1 Test specimens shall be 6 ± 0.125 in. lengths of the backer material.

9.4.3.2 Each test requires a minimum effective area of 3.0 in.$^2$ When the effective area of a single length is less than 3 in.$^2$, multiple lengths shall be used in a single test. When rod-shaped backer material is less than ¾in. in diameter, multiple lengths are required for each test (see Table 2).

**TABLE 2 Multiple Specimen Requirements for Rod-Shaped Backer Materials for Compression Recovery Testing**

| Rod Diameter | Specimens Required for Each Test |
|---|---|
| ¾ in. or larger | 1 |
| ⅜ to ⅝ in. | 2 |
| < ⅜ in. | 3 |

9.4.4 *Number of Test Specimens*—Test three specimens for each sample. The values reported shall be the mean of those observed.

9.4.5 *Procedure*:

9.4.5.1 Place the test specimen in the center of the supporting plate of the apparatus. Materials that are supplied in coils often have a tendency to curl. Place these samples between the plates in such a manner that the arc formed by the sample is in the vertical plane.

9.4.5.2 Bring the compression plate into contact with the specimen so that the entire length of the test specimen is in contact with both plates. No light should be visible anywhere between the rod and the plate, except within ½ in. of the end of the sample.

9.4.5.3 Measure the original diameter of the rod by measuring the separation of the plates of the apparatus with the calipers. Compress the rod 25 ± 0.5 % of this thickness at 0.5 in./min. Record the reading of the load immediately.

9.4.5.4 Hold the specimen at the specified deflection for 30 s.

9.4.5.5 Remove the load at a rate of 0.5 in./min. Carefully observe the specimen during the last 10 % of plate travel. Stop plate when contact is not maintained with the specimens. This may be observed when, except within ½ in. of the ends, light is visible along the length of the rod. Immediately measure and record the loss in diameter.

9.4.6 *Calculation*:

[7] Brown and Sharp Model 579-1 or equivalent has been found suitable.

9.4.6.1 Calculate the 25 % compression deflection force, *CD*, per unit area of specimen, expressed in pounds force per square inch (kilograms of force per centimeter square) as follows:

$$CD = F/A \tag{2}$$

where:

$F$ = force required to compress the specimen 25 % as measured in 9.4.5.3, lbf (kgf), and

$A$ = effective area of specimen compression contact surface, in.$^2$, (cm$^2$).

For rods:

$$A = 0.66\, dl \tag{3}$$

where:

$d$ = diameter of rod, in. (cm), and

$l$ = length of the sample, in. (cm).

9.4.6.2 Calculate the compression recovery, *CR*, as a percentage of the original diameter of thickness as follows:

$$CR = (d_o = \Delta_d)/d_o \times 100 \tag{4}$$

where:

$d_o$ = original diameter, in. (cm), and,

$\Delta_d$ = loss in diameter, in. (cm).

9.4.7 *Report*:

9.4.7.1 Report the average compression deflection for the three specimens tested in pounds force per square inch (kilograms of force per square centimeter).

9.4.7.2 Report the average compression recovery for the three specimens tested in percent.

9.4.8 *Precision and Bias*—Precision and bias statements are being prepared. They will be added to this specification when completed (see Practice C 670).

9.5 *Heat Resistance for Types 1 and 2 Backer Material*:

9.5.1 *Significance and Use*—This test method is used to determine the heat resistance of backer material.

9.5.2 *Apparatus*:

9.5.2.1 *Insulated Oil Bath*, capable of maintaining a uniform and homogeneous temperature of 392± 9°F. Any commercial deep-fryer is sufficient.

9.5.2.2 *Thermometer*, having a range from 170 to 500°F (77 to 260°C) and conforming to the requirements of Specification E 1. (For example, ASTM 11C Thermometer or ASTM 11F Thermometer.)

9.5.2.3 *Drainage Pan or Absorbent Towel.*

9.5.2.4 *Stop Watch or Timer*, that reads out in seconds.

9.5.2.5 *Silicone Fluid*, [8] 100 cSt viscosity, or equivalent.

9.5.2.6 *Calipers*, capable of measuring 0.001 in.

9.5.2.7 *Rule*, capable of measuring 0.01 in. (1 mm).

9.5.3 *Test Specimens*:

9.5.3.1 Test specimens of the rod material shall be cut 10 to 12 in. long. (Types 1 and 3.)

9.5.3.2 Test specimens of the slab or sheet material shall be cut 4 by 4 in. ± 1/16 (102 by 102 mm) (Type 2).

9.5.4 *Procedure*:

9.5.4.1 Measure the original diameter of the rod with the calipers. Measure the thickness of the slab or sheet with the ruler.

9.5.4.2 Fill insulated oil bath to a minimum depth of 3 in. with silicone fluid.[8] Heat fluid to 392 ± 5°F.

9.5.4.3 Holding the specimen vertically over the oil bath, immerse approximately 2 in. of the specimen in the hot oil.

9.5.4.4 Begin the dwell-time count upon immersion and leave the specimen immersed for the period of time designated in Table 3 .

9.5.4.5 Remove the specimen at the end of the dwell-time period and allow it to cool in the drain pan or on absorbent towels for 1 min.

9.5.4.6 Measure the diameter of the rod or thickness of the slab after immersion. Record the change in dimensions.

9.5.4.7 Calculate the percent shrinkage as follows:

$$S = \frac{t - t_1}{t} \times 100 \tag{5}$$

where:

$t$ = original diameter or thickness of specimen, and

$t_1$ = diameter or thickness after immersion.

9.5.4.8 The specimen is sufficiently heat resistant if the shrinkage is less than 10 % of the original diameter or original thickness.

9.5.5 *Precision and Bias*—Precision and bias statements are being prepared. They will be added to this specification when they are completed.

## 10. Rejection

10.1 Material that fails to conform to the requirements of this specification shall be rejected. Rejection shall be reported to the manufacturer or supplier promptly and in writing. In the case of dissatisfaction with the test results, the manufacturer or supplier may request retesting.

## 11. Package Marking

11.1 Packages shall be marked with the following information:

11.1.1 Name, brand, or trademark of the manufacturer,

11.1.2 Quantity and size,

11.1.3 ASTM designation, and

11.1.4 Any other information that the manufacturer requires.

**TABLE 3 Specimen Dwell Time**

| Specimen Diameter or Thickness | Dwell Time, s |
|---|---|
| Less than 3/16 in. | 2 |
| Equal to or greater than 3/16 to less than 7/16 in. | 3 |
| Equal to or greater than 7/16 to less than 15/16 in. | 5 |
| Equal to or greater than 15/16 to less than 1 1/8 in. | 8 |
| Equal to or greater than 1 1/8 to less than 1 3/8 in. | 10 |
| Equal to or greater than 1 3/8 to less than 1 3/4 in. | 15 |
| Equal to or greater than 1 3/4 in. | 20 |

[8] Dow Corning 200 has been found suitable.

## APPENDIX

**(Nonmandatory Information)**

### X1. PRECAUTIONS ON USE AND APPLICATION

X1.1 Some of the conditions that have been identified to influence bubble formation in the sealant include a combination of high moisture content in the concrete and high pavement surface temperatures, damaged or melted backer material, or air entrapment due to application equipment malfunctions.

X1.2 The use of a back-up material or bond breaker in the bottom of the joint covered by this specification is recommended to control the depth of sealant and achieve the desired shape factor, and to support the sealant against identation and sag. Back-up materials and bond breakers should be compatible with the material. Due to the elevated temperatures of application of material, care should be exercised in the selection of suitable back-up materials.

X1.3 Pavement joints should be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The sidewalls of the joint space to be sealed should then be thoroughly sandblasted, blown clean of loose sand by high-pressure air, and sealed. If joints are cleaned by jet waterblasting, the jet waterblast machine shall be capable of discharging water up to 10 000 psi (69 MPa) pressure and 22 gal of water/min. Joints shall be thoroughly dry before installation of bond breaker or joint sealant material is applied.

X1.4 The backer material is used as a base to gun and/or tool the sealant against, thus ensuring proper wetting of the joint side walls. Joint widths may vary because of spalls, ravels, and locked joints. Therefore, backer material sizing is important and project specific. Backing material should easily conform to joint irregularities to ensure contact with the joint side wall, thereby preventing the sealant from flowing to the base of the pavement.

X1.5 Tests for outgassing of cold applied sealants shall be made in accordance with Test Method C 1253.

*The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, West Conshohocken, PA 19428.*

Stantec Consulting Inc.
8211 South 48th Street
Phoenix AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

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Stantec

14 June, 2000

File: 82000157

Arizona Department of Water Resources
Dam Safety Section
500 North 3rd St
Phoenix, AZ 85004-3093

**Attention:** **Jon Benoist, PE**

**Reference:** **GOLDEN EAGLE PARK DAM (07.33)**

The contractor performing the work on the modifications to the dam has proposed to construct the auxiliary outlet works box culvert by using cast-in-place construction instead of pre-cast as specified in the approved plans. I have revised the following plan sheets to show the change to cast in place box culvert, remove the foundation slab and add additional details for waterstops:

| Sheet | Drawing | Title |
|---|---|---|
| 6 | G6 | Quantity Summary Sheet |
| 14 | D1 | Dam Embankment Typical Sections and Details |
| 17 | D4 | Auxiliary Outlet Works Inlet Structure - Structural Details |
| 18 | D5 | Auxiliary Outlet Works Outlet Structure |
| 19 | D6 | Auxiliary Outlet Works Outlet Structure - Structural Details |
| 20 | D7 | Misc. Details |

I have also revised the specifications Section 730 - Expansion, Contraction and Construction Joints in Concrete.

I am submitting six copies of the revised specification for your approval. Flood Control District will submit six copies of the revised plans for your approval.

Buildings
Environment
Industrial
Management Systems
Transportation
Urban Land

**Reference: Golden Eagle Park Dam**

Sincerely,

STANTEC CONSULTING INC.

Chuck Gopperton, PE
Project Engineer

c. Tom Renckly, Shewa Shivaswamy - FCDMC

Attachments

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COPY

## Section 730 - Expansion, Contraction and Construction Joints in Concrete

### General

*This specification is adopted from Department of the Army, U.S. Army Corps of Engineers CEGS-03151 and modified. All references within this specification to the "Government" shall mean to the Flood Control District of Maricopa County or the district's authorized representative.*

*This specification was revised on June 14, 2000. The following changes were made:*

- *Revised the specification for expansion joint filler and sealant*
- *Added additional specifications and requirements for PVC waterstops*
- *Deleted the specifications for rubber and metal waterstops*
- *Deleted the specifications for compression seals*

Registered Professional Engineer (Civil) CERTIFICATE NO. 28664 CHARLES V. GOPPERTON Date Signed 1-27-00 ARIZONA, U.S.A.

### References

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM D 624-98 | Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers |
| ASTM D 638-99 | Standard Test Method for Tensile Properties of Plastics |
| ASTM D 747-99 | Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam |
| ASTM C 920-98 | Standard Specification for Elastomeric Joint Sealants |
| ASTM D 1149-99 | Standard Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber |
| ASTM D 1752 | (1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction |
| ASTM D 2628 | (1991) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements |

CORPS OF ENGINEERS (COE)

| | |
|---|---|
| COE CRD-C 572 | (1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop |

### Submittals

District approval is required for all submittals with a "DA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with the submittal procedures in Section 110:

SD-08 Statements

Splicing Waterstops; DA.

Procedures for splicing waterstops shall be submitted.

SD-09 Reports

Premolded Expansion Joint Filler Strips; FIO.
Waterstops; FIO.

Certified manufacturer's test reports shall be provided for premolded expansion joint filler strips, compression seals and lubricant, and waterstops to verify compliance with applicable specification.

SD-14 Samples

Waterstops; FIO.

Waterstop materials and splice samples shall be submitted for inspection and shall be identified to indicate manufacturer, type of material, size and quantity of material and shipment represented. Each materials sample shall be a piece not less than 12 inches long cut from each 200 feet of finished waterstop furnished, but not less than a total of four linear feet of each type and size furnished. For spliced segments of waterstops to be installed in the work, one spliced sample of each size and type for every 50 splices made in the factory and every 10 splices made at the job site shall be furnished for inspection and testing. The spliced samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each spliced sample shall be not less than 12 inches long.

**Products**

**Materials**

Premolded Expansion Joint Filler Strips

Expansion joint material shall be SealTight, Ceramar flexible foam expansion joint or approved equal. The material shall conform to ASTM D1752, Type 1 and Corps of Engineers Specification CRD-C 509, Type 1.

Field Molded Sealants and Primer

A polymer-base joint sealant shall be used to seal the joint after the concrete has attained its design strength. The material shall conform to ASTM C920, Type M, Grade P or NS, Class 25, Use T or NT. The joint sealant may be Dualthane (for vertical or horizontal joints) or Pourthane (for horizontal joints) or approved equal.

Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials.

**Waterstops**

Waterstops shall be extruded from an elastomeric plastic material of which the basic resin is prime virgin polyvinyl chloride. The PVC compound shall not contain any scrapped or reclaimed material or pigment whatsoever.

Waterstops shall conform to the following:

**Table 1**
**Physical Requirements For PVC Waterstops**

| Property | Requirement | Test Method |
|---|---|---|
| Tear Resistance | 285 lbs./inch min. | ASTM D 624 |
| Ozone Resistance | no failure | ASTM D 1149 |
| Ultimate Elongation | 360% min. | ASTM D 638 |
| Tensile Strength | 2,000 psi min. | ASTM D 638 |
| Low Temperature Brittleness (-35F) | no failure | ASTM D 747 |
| Stiffness in Flexure | 600 psi min. | ASTM D 747 |
| Tensile Strength after Accelerated Extraction | 1,600 psi min. | CRD 572 |
| Elongation after Accelerated Extraction | 300% min | CRD 572 |
| Effect of Alkalies After 7 days | 0.10% loss max.<br>0.25% gain max. | CRD 572 |

**Tests, Inspections, And Verifications**

Materials Tests

Field-Molded Sealants

Samples of sealant and primer, when use of primer is recommended by the manufacturer, as required in paragraph FIELD MOLDED SEALANTS AND PRIMER, shall be tested by and at the expense of the

District for compliance with paragraph FIELD MOLDED SEALANTS AND PRIMER. If the sample fails to meet specification requirements, new samples shall be provided and the cost of retesting shall be born by the Contractor.

Waterstops

Samples of materials and splices as required in paragraph WATERSTOPS shall be visually inspected and tested by and at the expense of the District for compliance with the specifications. If a sample fails to meet the specification requirements, new samples shall be provided and the cost of retesting shall be born by the Contractor.

Waterstop splicing defects which are unacceptable include, but are not limited to the following:

1. Tensile strength not less than 80 percent of parent section.
2. Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch
3. Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness.
4. Misalignment which reduces waterstop cross section more than 15 percent.
5. Visible porosity in the weld.
6. Bubbles or inadequate bonding.
7. Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.
8. Charred or burnt material.

**Splicing Waterstops**

Procedure and Performance Qualifications

Procedure and performance qualifications for splicing waterstops shall be demonstrated in the presence of the Engineer.

Procedure and performance qualifications for splicing waterstops shall be demonstrated by the Contractor at the job site by each making spliced samples of each size and type of finished waterstop.

**Execution**

**Installation**

Joint locations and details, including materials and methods of installation of joint fillers and waterstops, shall be as specified, as shown, and as directed.

Expansion Joints

Premolded filler strips shall be accurately positioned and secured against displacement to clean, smooth concrete surfaces. Material used to secure premolded fillers to concrete shall not harm the concrete and shall be compatible with the joint sealant or seals. The groove shall be thoroughly cleaned of all laitance, curing compound, foreign materials, protrusions of hardened concrete and any dust which shall be blown out of the groove with oil-free compressed air. The expansion joint material shall be held in position using a compatible construction adhesive. Nails or other mechanical devices shall not be used to position the expansion joint material.

Joints With Field-Molded Sealant

Joints shall not be sealed when the sealant, air or concrete temperature is less than 40 degrees F. Immediately prior to installation of field molded sealants, the joint shall be cleaned of all debris and further cleaned using water, chemical solvents or other means as recommended by the sealant manufacturer. The joints shall be dry prior to filling with sealant. Bond breaker and back-up material shall be installed where required. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

Contraction Joints

Joints requiring a bond breaker shall be coated with curing compound. Waterstops shall be protected during application of bond breaking material to prevent them from being coated.

Waterstops

Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. All waterstops shall be installed so as to form a continuous watertight diaphragm in each joint. Adequate provision shall be made to support and protect the waterstops during the progress of work. Hog rings or grommets may be provided to secure the waterstop to the forms or the steel reinforcement. Any waterstop punctured or damaged shall be replaced or repaired at the Contractor's expense. The concrete shall be thoroughly consolidated in the vicinity of the waterstop. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued.

Splices

Joints in waterstops shall be spliced together by qualified splicers using the approved splicing procedures to form a continuous watertight diaphragm. Splices shall be as follows:

All splices shall be made on a bench in a temporary shop provided at the site of the installation or at the manufacturer's plant. A miter guide and portable power saw shall be used to cut the ends to be joined to insure good alignment and contact between joined surfaces. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis, protrusions and the like) shall be maintained across the splice.

Splices shall be made by heat sealing the adjacent surfaces in accordance with the approved procedure. A thermostatically controlled electrical heat source shall be used to make all splices. The correct temperature at which splices should be made will differ with the material concerned but the applied heat should be sufficient to melt but not char the plastic. Waterstops shall be reformed at splices with a remolding iron with ribs or corrugations to match the pattern of the waterstop. The spliced area, when cooled and bent by hand in as sharp an angle as possible, shall show no sign of separation.

**Measurement And Payment**

No separate measurement will be made for expansion and contraction joints which are included in the costs for the items to which work for expansion and contraction joints are incidental.

Furnishing and installing waterstops shall be considered incidental to the construction of the concrete structures. No separate payment will be made for expansion and contraction joints which are included in the costs for the items to which work for expansion and contraction joints are incidental.

# Transmittal

COPY

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Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | Flood Control District | Sender: | Chuck Gopperton |
| Attention: | Shewa Shivaswamy | ☑ | For Your Information |
| Date: | 13 June 2000 | ☐ | For Your Approval |
| | | ☐ | For Your Review |
| File: | 82000157 | ☐ | As Requested |

**Reference: Golden Eagle Park Dam**

- Corps specs for water stop.
- Photos and information from vendor on installation.

If you have any questions or concerns about these documents please do not hesitate to contact me.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton

Chuck Gopperton, PE
Water Resources,
Project Engineer

c. Tom Renckly, Larry Lambert

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GREENSTREAK®

June 5, 2000

Mr. Chuck Gopperton
Stantec Consulting, Inc.
8211 South 48th St.
Phoenix, AZ 85044-5355

Dear Mr. Gopperton:

I would like to thank you for your interest in Greenstreak waterstops. Please find enclosed a complete Greenstreak product binder, a copy of the Corps of Engineers document CRD-C 572-74, and some actual jobsite photos showing good examples of split form work. In the Greenstreak product binder, you can find a section devoted to waterstops. Within this section, you will find a waterstop catalog, suggested master specifications, and information about factory-made fabrications, as well as other miscellaneous information.

As I mentioned in our telephone conversation, when choosing a waterstop profile, it might be desirable to use a waterstop with a centerbulb throughout the whole job, instead of using some waterstop with a centerbulb and some without. This makes fabrications much easier to do.

We also discussed the advantages and disadvantages of using a split-flanged waterstop. With a split-flanged waterstop, you avoid the need to use split form work. On the other hand, you have to go back and adhere the waterstop its full length with a PVC compatible adhesive to get the split flange to stick together after you make your first pour and strip the formwork. Fabrications are also more difficult to do with a split-flanged profile.

I hope that this information helps you to decide what type of formwork is best for your application. Please take a moment to look all of the information over, and if you should have any further questions, please feel free to give me a call.

Sincerely,

Kyle S. Loyd
Technical Sales Engineer

**Main Office**
3400 Tree Court Industrial Boulevard
St. Louis, MO 63122 USA

Phone: 800.325.9504
636.225.9400
Fax: 800.551.5145
636.225.2049

**Western Region**
2663 Lindsay Privado
Ontario, CA 91761 USA

Phone: 888.225.2193
909.605.1517
Fax: 888.225.2194
909.605.1518

**Electronic**
www.greenstreak.com
info@greenstreak.com

VERIFIED CURRENT 10 '92

(Revised 1 June 1974) C 572

CRD-C 572-74

# CORPS OF ENGINEERS SPECIFICATIONS FOR POLYVINYLCHLORIDE WATERSTOP

## 1. Scope

1.1 These specifications cover polyvinylchloride waterstop.

## 2. General Requirements

2.1 Waterstop.- The waterstop shall be of the shape and dimensions shown on the drawings accompanying the project specifications. It shall be produced by an extrusion process such that, as supplied for use, it will be dense, homogeneous, and free from holes and other imperfections. The cross section of the waterstop shall be uniform along its length and shall by symmetrical transversely so that the thickness at any given distance from either edge of the waterstop will be uniform.

2.2 Material.- The waterstop shall be extruded from an elastomeric plastic compound, the basic resin of which shall be polyvinylchloride (PVC). The compound shall contain any additional resins, plasticizers, stabilizers, or other materials needed to insure that, when the material is compounded, it will meet the performance requirements given in this specification.

## 3. Inspection and Testing

3.1 All material and all waterstop will be subject to rigid inspection and testing in order to insure that the supplied waterstop meets the requirements of these specifications. Every facility shall be provided for representatives of the Government to perform careful sampling and inspection of the finished waterstop. The sampling of finished waterstop and all testing of finished waterstop, and job-made splices will be done by the Government.

## 4. Samples

4.1 A sample not less than 12 in. long (30.48 cm) will be cut from each 200 ft (61 m) of finished waterstop. The sample or samples representing a lot of waterstop will include not less than 4 lineal ft (1.2 m) of finished waterstop. The sample or samples will be cut into pieces of convenient size and reduced in thickness to between 1/16 and 1/8 in. (1.6 and 3.2 mm), according to the method specified in CRD-C 515. A total of not less than five dumbbell-shaped specimens will be cut from each sample using die C of CRD-C 573, with the long axis of the dumbbell parallel with the direction of extrusion. Additional specimens will be prepared for the other tests in accordance with the provisions of the applicable test methods. When more than 200 ft (61 m) of waterstop is represented, the tests for tensile strength and elongation will be made on samples representing each 200 ft (61 m), other tests will be made on specimens taken at random from all the samples representing the lot of waterstop.

## 5. Test Conditions

5.1 Tests will be conducted in a standard laboratory atmosphere of 23 ± 1.6 C (73.4 ± 3 F) and a relative humidity preferably not less than 50 percent, unless otherwise specified in the testing methods.

## 6. Detailed Requirements

6.1 Finished Waterstop.- Samples taken from the finished waterstop shall meet the requirements listed below when tested by the test method and in the number of specimens shown.

## 2 SPECIFICATIONS FOR POLYVINYLCHLORIDE WATERSTOP (C 572-74)

| Method of Test | Number of Specimens Tested | Requirement[a] |
|---|---|---|
| CRD-C 573 | 5 per 200 ft (61 m) | Tensile strength, using die C, not less than: 1750 psi (12.17 MPa) |
| CRD-C 573 | 5 per 200 ft (61 m) | Ultimate elongation, using die C, not less than: 300% |
| CRD-C 570 | 3 per lot | Low temperature brittleness, no sign of failure, such as cracking or chipping at -35 F (-37.2 C) |
| CRD-C 571 | 3 per lot | Stiffness in flexure, not less than: 600 psi (4.13 MPa) |
| | | Accelerated Extraction |
| Par. 7.1 below | 5 per lot | Ultimate elongation, using die C, not less than: 280%<br>Tensile strength, using die C, not less than: 1500 psi (10.3 MPa) |
| | | Effect of Alkalies |
| Par. 7.2 below | 3 per lot | Change in weight after 7 days, between: -0.10 and +0.25%<br>Change in Shore durometer readings after 7 days, not more than: ±5 |

[a] The average or the median of the results of tests of the group of 3 or 5 specimens tested will be used to determine compliance with the stated requirements, depending on which value is called for by the method of test referenced.

6.2 Job-Made and Factory-Made Splices in Waterstop.- Samples taken across splices should meet the following requirements when tested by the test method shown.

| Method of Test | Number of Specimens Tested | Requirement |
|---|---|---|
| CRD-C 573 | As directed | Tensile strength, using die C, not less than: 1000 psi (6.89 MPa) |

## 7. Methods of Testing

7.1 Accelerated Extraction Test.- The five tensile test specimens cut to the shape and dimensions given in CRD-C 573, using die C, will each be weighed to the nearest 0.001 g. The specimens will be placed in a one liter tall-form beaker with spout. The beaker will be filled within 2 in. (5 cm) of the top with a solution made by dissolving 5.0 g of chemically pure sodium hydroxide and 5.0 g of chemically pure potassium hydroxide in one liter of distilled water. The specimens will be completely immersed and the top of the beaker covered with a watch glass. The beaker will then be placed in a constant temperature bath and the temperature of the solution maintained between 60-65.5 C (140-150 F). A 1/4-in. (6.35 mm)-diameter glass tube will be inserted into the spout of the beaker to within 1/2 in. (12.7 mm) of the bottom of the beaker. Air will then be gently bubbled through the solution at the rate of about one bubble per second. The solution will be changed every 24 hr, the new solution being warmed to 65.5 C (150 F) before replacing the old. Once daily, each of the five specimens will be removed from the beaker (preferably at the time of renewing the solution) and rinsed lightly with distilled water. Each specimen will then be superficially dried with a clean cloth. Ten min after the specimens have been thus dried the group of five specimens will be weighed and the weight recorded. The sequence of testing will be carried out continuously for a period of not less than 14 days; after which period, provided the specimens have reached constant weight (Note), they will be tested for tensile strength and elongation. Tensile strength will be calculated from the total load at failure, the nominal width, and the thickness as determined prior to exposure to the extraction test. If the tests for tensile strength and elongation cannot be made within 1 hr after completion of the weighings that demonstrated that constant weight has been achieved, the specimens will be stored immersed in fresh alkali solution at room temperature. Prior to being tested for tensile strength and elongation, the specimens will be removed, rinsed, dried, stored for 10 min, and weighed. The tensile strength and elongation will be determined not more than 72 hr after the weighings which demonstrated that constant weight had been achieved.

Note.- Constant weight is assumed to have been achieved when the weights of the group of specimens on three successive weighings do not differ from each other by more than 0.05 percent of the original weight. If constant weight has not been achieved after 30 days, the exposure will be terminated, the specimen tested for tensile strength and elongation, and a note added to the report indicating the weight losses between the last three successive weighings and the fact that constant weight, as here defined, was not achieved.

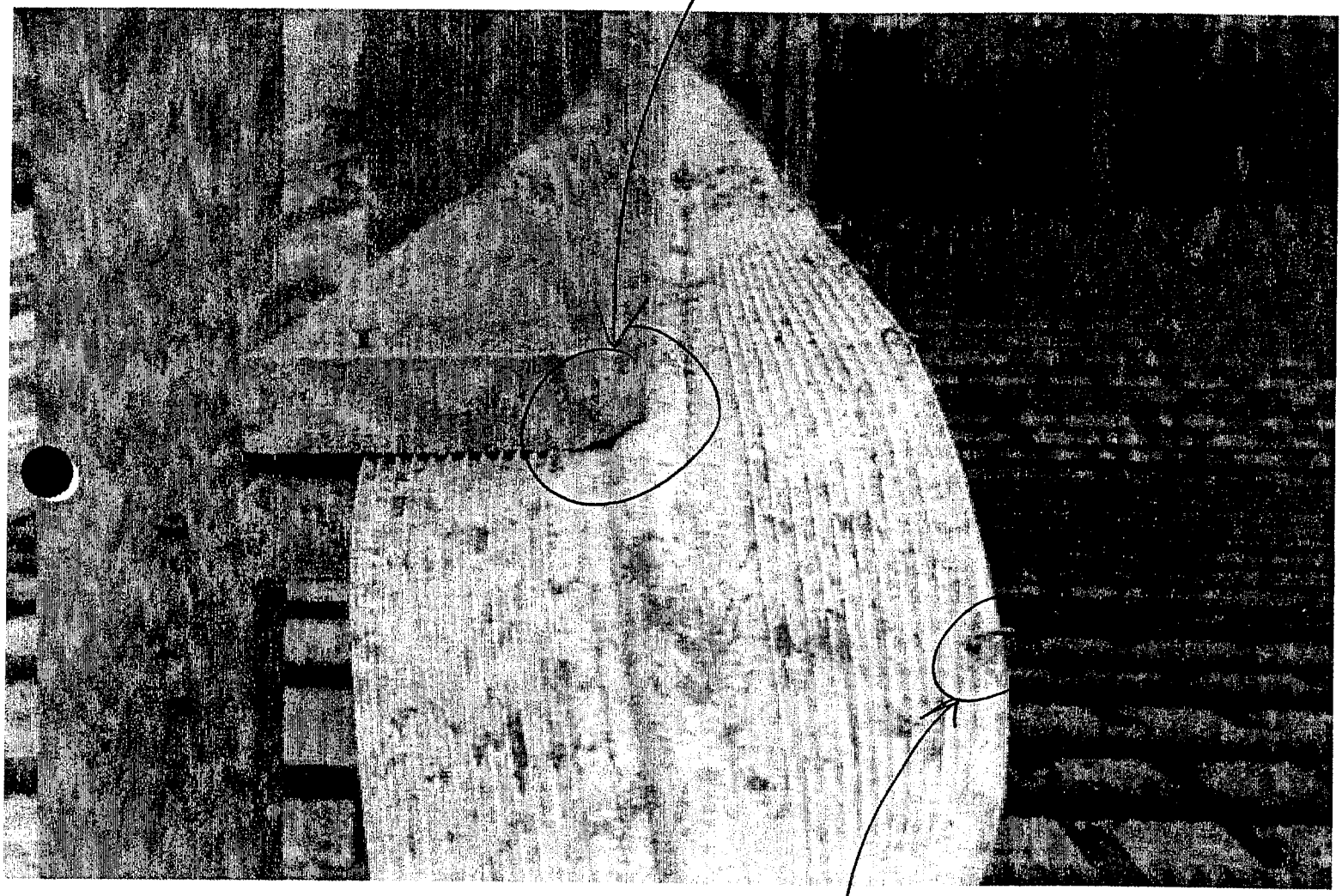
7.2 Effect-of-Alkalies Test.- Three specimens, each weighing about 75 g, will be pressed in accordance with CRD-C 515. The specimens will be washed in tap water, rinsed with distilled water, wiped with a clean cloth, and allowed to dry in laboratory air for approximately 1 hr. The weight of each specimen, to the nearest 0.001 g, will be recorded. Ten durometer readings, using the Shore durometer (type A), will be taken on each specimen in accordance with CRD-C 569. The specimens will be completely immersed in a freshly made solution containing 5.0 g of chemically pure sodium hydroxide and 5.0 g of chemically pure potassium hydroxide in one liter of distilled water, kept at 21-24 C (70-75 F). At the end of 7 days, the specimens will be removed, rinsed with distilled water, the surfaces wiped with a clean cloth, and allowed to dry in laboratory air for approximately 1 hr. The weight and durometer hardness will be measured and recorded. Changes in weight and durometer readings will be recorded as a percentage of the weight and durometer readings of the original samples; the averages of these changes for the three specimens tested shall be reported to determine compliance with applicable requirements in Par. 6.2.

8. Rejection

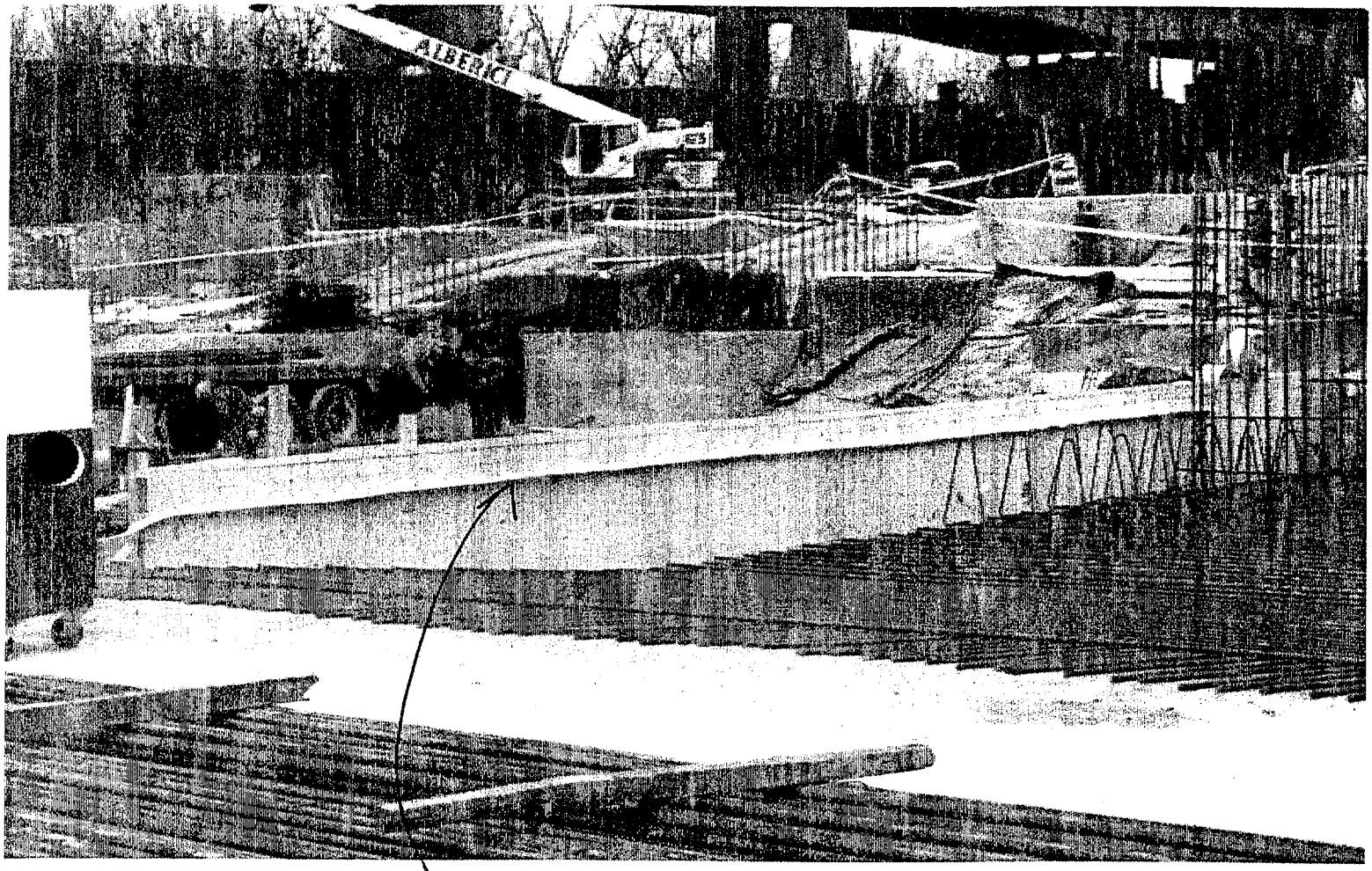
8.1 The waterstop may be rejected if it fails to meet any of the requirements of these specifications.

Good example of split formwork

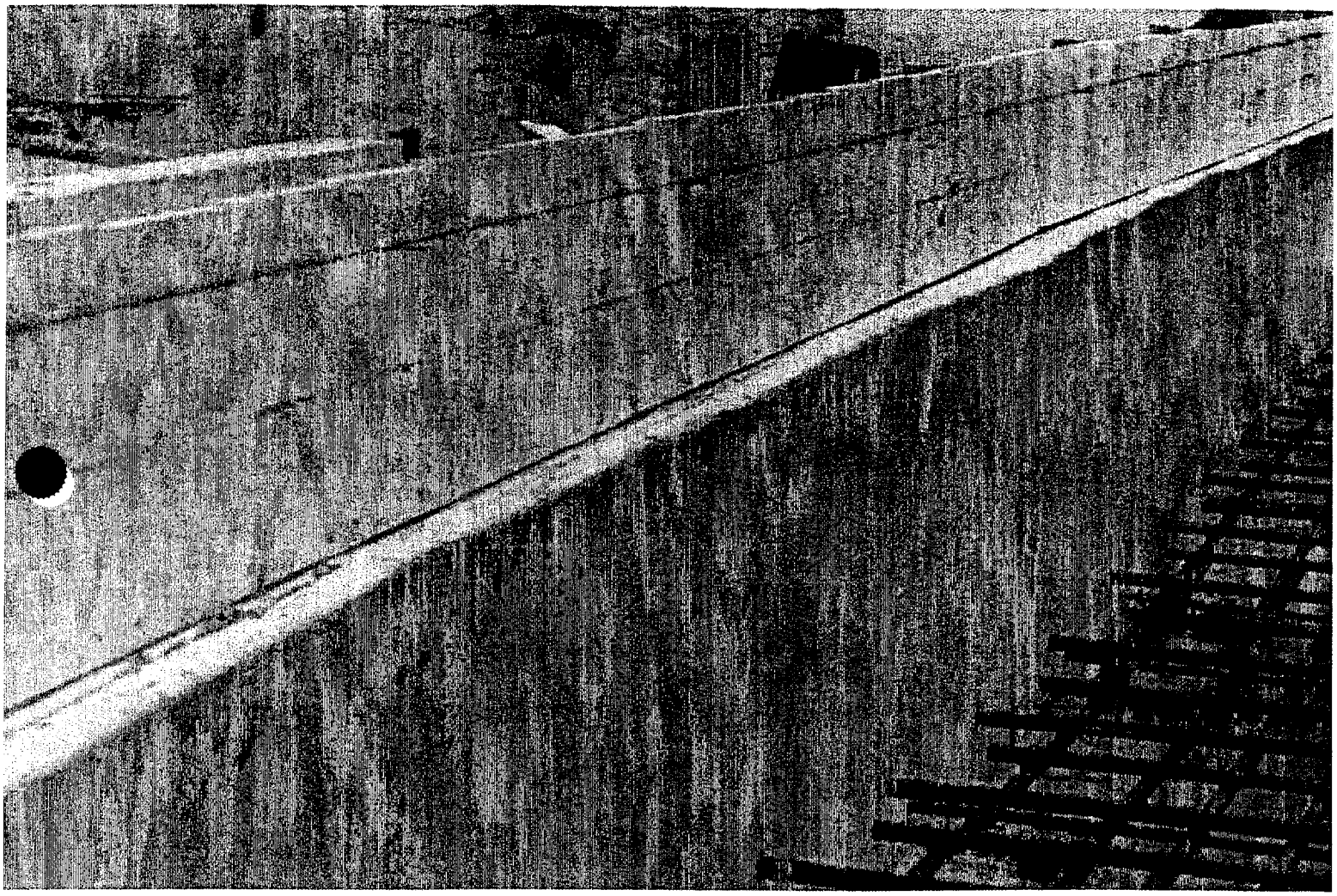
Bevel to fit centerbulb



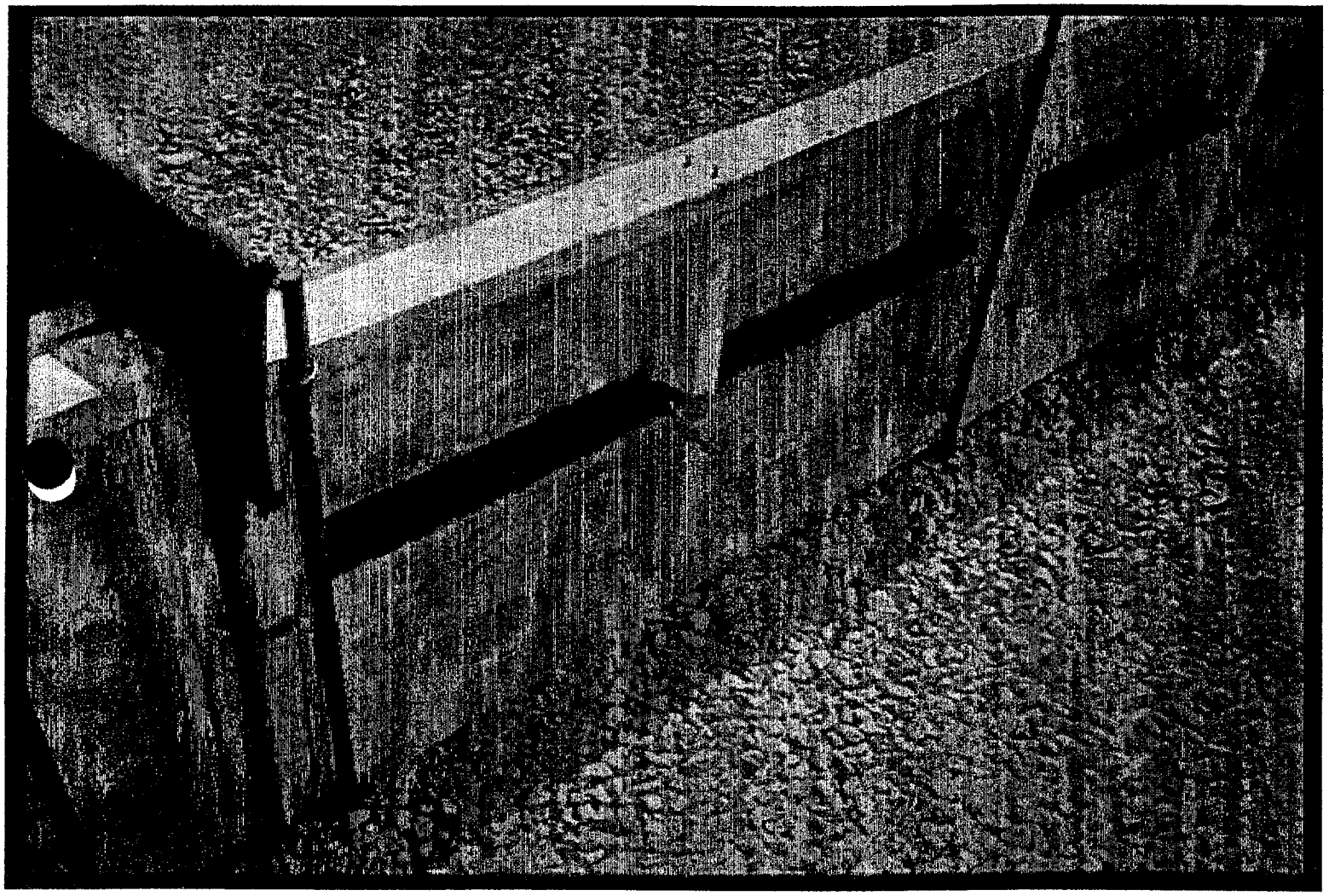
Hog ring to be tied off to adjacent rebar.




waterstop



Back of the forms.



**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone 602-417-2445
Fax 602-417-2423

**JANE DEE HULL**
**Governor**

**RITA PEARSON MAGUIRE**
**Director**

June 16, 2000

Mr. Tom Renckly, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-6399

**Subject: Golden Eagle Park Dam (07.33)**
**Dam Modifications Construction Contract FCD 1999C071**
**Proposed Design Change to Auxiliary Outlet**

Dear Mr. Renckly:

We have reviewed your letter dated June 16, 2000 and the enclosed revised Construction Drawings regarding the proposal to construct the auxiliary outlet box by cast-in-place method instead of the approved pre-cast construction. We have also reviewed the proposed changes to the Construction Specifications Section 730 which we received from Stantec Consulting Inc. on June 15, 2000. The specific documents reviewed were:

1. Construction Drawing G6: *Quantity Summery Sheet*; Revised 6/12/00 (six copies received by ADWR on 6/16/00).

2. Construction Drawing D1: *Dam Embankment Typical Sections and Details*; Revised 6/8/00 (six copies received by ADWR on 6/16/00).

3. Construction Drawing D4: *Auxiliary Outlet Works Inlet Structure – Structural Details*; Revised 6/8/00 (six copies received by ADWR on 6/16/00).

4. Construction Drawing D5: *Auxiliary Outlet Works Outlet Structure*; Revised 6/8/00 (six copies received by ADWR on 6/16/00).

5. Construction Drawing D6: *Auxiliary Outlet Works Outlet Structure – Structural Details*; Revised 6/8/00 (six copies received by ADWR on 6/16/00).

6. Construction Drawing D7: *Misc. Details*; Revised 6/8/00 (six copies received by ADWR on 6/16/00).

7. Construction Specifications Section 730: *Expansion, Contraction and Construction Joints in Concrete*; Revised 6/15/00 (one copy received by ADWR on 6/15/00).

The above documents are satisfactory. Six sets of the revised Construction Drawings have been stamped with ADWR's approval stamp. Six copies of the revised Construction Specifications Section 730 have also been approved and stamped. Two sets of the approved revised Construction Drawings and two copies of the approved revised Construction Specifications Section 730 have been retained for ADWR's use. Four sets of the approved revised Construction Drawings and four copies of the approved revised Construction Specifications Section 730 are enclosed for your use.

If you have any questions regarding this approval please contact Gerald Cox at (602) 417-3445.

Sincerely,

Jon M. Benoist, P.E.
Supervisor
Dam Safety Section

Enclosures

cc: Tom Ward, Town of Fountain Hills, w/o encl.
Shewa Shivaswamy, FCDMC, w/o encl.
Charles Gopperton, Stantec Consulting Inc., w/o encl.

# CONTRACTOR SUBMITTALS

# Transmittal

COPY

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Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | Flood Control District Maricopa County | Sender: | Chuck Gopperton, PE |
| | | ☑ | For Your Information |
| Attention: | Shewa Shivaswamy | ☐ | For Your Approval |
| Date: | 19 June 2000 | ☐ | For Your Review |
| File: | 82000157 | ☐ | As Requested |

**Reference: Golden Eagle Park Dam**

Attachments: Filter fabric and waterstop submittals.

If you have any questions about these document please do not hesitate to contact me.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton

Chuck Gopperton, PE
Water Resources,
Project Engineer

cc: Jerry Cox – ADWR, with attachments

mas p:\82000157\construction\correspondence\transmittals\sshivaswamy fcdmc, 061900.doc

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on 15 June, 2000 by Hunter Contracting:

- Mirafi 180N geotextile fabric - meets the specifications and is approved

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Charles V. Lopatka

Date: 6/16/00

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TC Mirafi _____ *TECHNICAL DATA SHEET*

# Mirafi 180N

Mirafi 180N is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. 180N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

| Mechanical Properties | Test Method | Unit | Minimum Average Roll Value | |
|---|---|---|---|---|
| | | | MD | CD |
| Grab Tensile Strength | ASTM D 4632 | kN (lbs) | 0.9 (205) | 0.9 (205) |
| Grab Tensile Elongation | ASTM D 4632 | % | 50 | 50 |
| Trapezoid Tear Strength | ASTM D 4533 | kN (lbs) | 0.36 (80) | 0.36 (80) |
| Mullen Burst Strength | ASTM D 3786 | kPa (psi) | 2756 (400) | |
| Puncture Strength | ASTM D 4833 | kN (lbs) | 0.58 (130) | |
| Apparent Opening Size (AOS) | ASTM D 4751 | mm (U.S. Sieve) | 0.180 (80) | |
| Permittivity | ASTM D 4491 | $sec^{-1}$ | 1.2 | |
| Permeability | ASTM D 4491 | cm/sec | 0.28 | |
| Flow Rate | ASTM D 4491 | $l/min/m^2$ ($gal/min/ft^2$) | 3866 (95) | |
| UV Resistance (at 500 hours) | ASTM D 4355 | % strength retained | 70 | |

| Physical Properties | Test Method | Unit | Typical Value |
|---|---|---|---|
| Weight | ASTM D 5261 | $g/m^2$ ($oz/yd^2$) | 278 (8.2) |
| Thickness | ASTM D 5199 | mm (mils) | 2.3 (90) |
| Roll Dimensions (width x length) | -- | m (ft) | 4.5 x 91 (15 x 300) |
| Roll Area | -- | $m^2$ ($yd^2$) | 418 (500) |
| Estimated Roll Weight | -- | kg (lb) | 124 (273) |

**DISCLAIMER:** TC Mirafi warrants our products to be free from defects in material and workmanship when delivered to TC Mirafi's customers and that our products meet our published specifications. Contact your local TC Mirafi Representative for detailed product specification and warranty information.

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on 15 June, 2000 by Hunter Contracting:

- Greenstreak PVC waterstop - meets the specifications and is approved, must use type 732 as shown on the plans

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Charles V. Leppento

Date: 6/16/00

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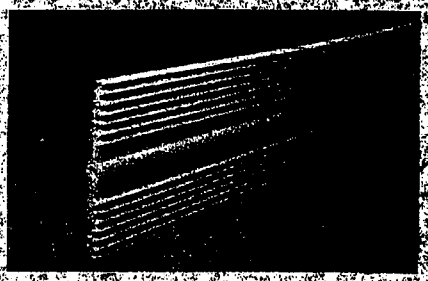
## WATERSTOP BASIC USE

Embedded in concrete, across and/or along the joint, waterstops form a watertight diaphragm that prevents the passage of fluid through the joint.

## SUGGESTED WATERSTOP DESIGN CHECKLIST

- Determine structure type.
- Verify chemical containment requirements (if any).
- Verify hydrostatic head pressure requirements.
- Determine joint type and joint movement requirements.
- Verify joinery details of dissimilar or non-symmetrical waterstop profiles (consider using one profile throughout to simplify intersections).
- Specify ribbed profile for best water sealing performance.
- Specify type and size, by product number, if possible.
- Specify factory fabrications of intersections and heat welded field butt joints.
- Specify method for securing waterstop in position (hog rings, grommets, etc.).



## PVC WATERSTOP

- The industry standard.
- Broadest design selection.
- Formulated and compounded by Greenstreak.
- Manufactured by Greenstreak from only prime resins and all virgin raw materials.
- Great inherent elasticity.
- Resistant to many waterborne chemicals.
- Heat weldable.
- Will not discolor concrete or produce electrolytic action.
- Suitable for above or below grade applications.

### Physical properties

All Greenstreak PVC waterstops are specially formulated and manufactured to meet or exceed the industry's standard specifications.

**Greenstreak PVC Waterstop Physical Properties**

| PROPERTY | TEST ASTM | NOMINAL VALUE |
|---|---|---|
| Water absorption | *D 570 | 0.15 |
| Tear resistance | *D 624 | 350/lb.in. |
| Ultimate Elongation | *D 638 | 390% |
| Tensile strength | *D 638 | 2250 psi min. |
| Low temperature brittleness | *D 746 | Passed @ -35°F / -37°C |
| Stiffness in flexure | *D 747 | 1190 psi |
| Specific gravity | *D 792 | 1.37 |
| Ozone resistance | *D1149 | No failure |
| Volatile Loss | *D1203 | 0.30% |
| Hardness Shore A15 | *D2240 | 76±3 |
| Accelerated extraction | CRD-C 572 | |
| • Tensile strength | | 2130 psi |
| • Elongation | | 370% |
| Effect of Alkali | | |
| • weight change | | +0.05% |
| • hardness change | | -1 point |

Independent laboratory tests are available for the following applicable standards:

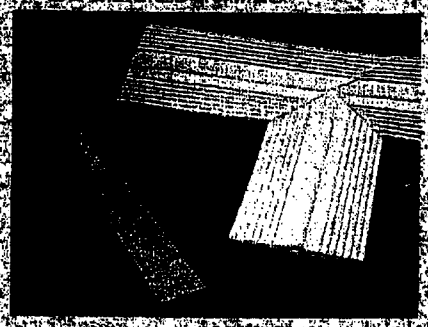
- Corps of Engineers CRD-C572-74
- Bureau of Reclamation 6902
- CRZMI
- Department of Agriculture Soil Conservation Service Manual Spec. 537
- Federal Standard 601
- Tennessee Valley Authority Spec. PP-1026
- Montgomery Watson, Inc.
- Various State Highway and or Public Works Department Standards

### Installation aids for PVC waterstops

Greenstreak offers various features to economically assist and promote proper installation of PVC waterstops. Waterstops must be securely positioned in the forms to prevent deflection or misalignment during concrete placement. This is achieved by tethering the outer flanges of the waterstop to the adjacent reinforcing steel.

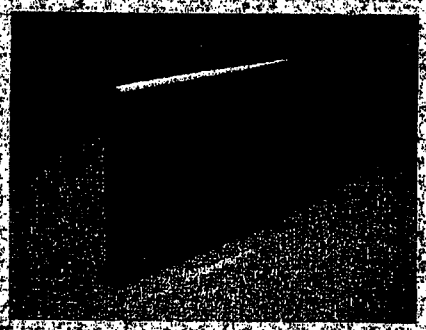
**The following features are offered to assist this method of installation:**

- Tie-Right - most PVC shapes are available with factory applied hog rings.
- Punched flanges - most ribbed shapes are available with punched flanges.
- Grommets - selected shapes are available with brass grommets.

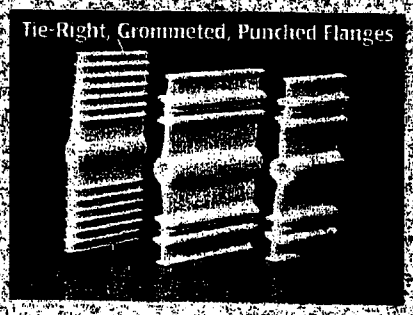


### PVC Waterstop fabrications

PVC waterstop splices, directional changes, and intersections are critical components of a quality installation. Specifications requiring factory made fabrications are strongly recommended. Greenstreak can provide homogenous directional changes and intersections, leaving only the less difficult straight splices to be welded in the field.



Tie-Right, Grommeted, Punched Flanges



## SBR AND NEOPRENE RUBBER WATERSTOPS

Greenstreak offers SBR and Neoprene waterstops for applications requiring the physical properties of rubber. These waterstops are manufactured to meet the Corps of Engineers and The Bureau of Reclamation's specifications for rubber waterstops.

# Transmittal

COPY

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | Flood Control District Maricopa County | Sender: | Chuck Gopperton |
| | | ☑ | For Your Information |
| Attention: | Tom Johnson c/o Shewa Shivaswamy | ☐ | For Your Approval |
| | | ☐ | For Your Review |
| Date: | 23 June 2000 | ☐ | As Requested |
| File: | 82000157 | | |

**Reference: Golden Eagle Park Dam Modifications**

Attached is the concrete mix design information from Maricopa Ready Mix.

Reviewed for conformance to specs.

If you have any questions or concerns about this information please do not hesitate to contact me.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton

Chuck Gopperton, PE
Water Resources, Project Engineer

c. Tom Renckly- FCDMC: Transmittal only.

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Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on 6-19-00 by Maricopa Ready Mix:

- Concrete mix design #340145
- Sieve analysis for concrete aggregates performed by Dan Peters & Assoc.
- Abrasion test of concrete aggregate by Law Engineering
- Manufacturer's certification for portland cement from Arizona Portland Cement Co.
- Product information sheets for air entraining and water reducing admixtures from W. R. Grace

The submittals were reviewed, however, the following additional information is needed prior to approval of the concrete mix design:

- Test results for the compression tests on the mix design trial mixture
- Test results for the the air content on the mix design trial mixture
- Aggregate quality tests

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: _____

Date: _____

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# MARICOPA READY MIX

**CUSTOMER:** Hunter Contracting **DATE:** 06/19/00

**PROJECT:** Golden Eagle Dam Modifications
Fountain Hills, Arizona

**MIX #:** 340145 **DESCRIPTION:** 4000psi Air Entrained

THE FOLLOWING IS OUR PROPOSED CONCRETE MIX DESIGN FOR THE ABOVE NOTED PROJECT. ALL QUANTITIES ARE LISTED FOR ONE CUBIC YARD NET AND AGGREGATE WEIGHTS ARE FOR AGGREGATES IN A SATURATED, SURFACE DRY CONDITION. CORRECTIONS MUST BE MADE FOR AGGREGATES THAT VARY FROM THESE MOISTURE CONDITIONS

| MIX PROPORTIONS | | | | | VOLUME |
|---|---|---|---|---|---|
| Water | | | 34gal | 284 lb. | 4.55 cu. ft. |
| Cement | | | ASTM C - 150 Type I/III | 630 lb. | 3.21 cu. ft. |
| Fly Ash | | | ASTM C - 618 | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | | 1 inch | ASTM C-33 | 951 lb. | 5.75 cu. ft. |
| Coarse Aggregate | | 1/2 inch | ASTM C-33 | 778 lb. | 4.70 cu. ft. |
| Coarse Aggregate | | 3/8 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
| Sand | | | ASTM C - 33 | 1252 lb. | 7.57 cu. ft. |
| WRA | WRDA 64 | | ASTM 394 TYPE A | 27.0 oz | |
| AEA | DARA 1000 | | ENTRAINED AIR @ 4.5% | 7.0 oz. | 1.22 cu. ft. |
| HRWR | | | ASTM 394 TYPE F | 0.0 oz. | |
| | | | | TOTAL | 27.0 cu. ft. |

## CONCRETE PROPERTIES

| | |
|---|---|
| Water/Cementicious Ratio (by weight) | 0.45 |
| Slump (max) | 4.0 inches |
| Air Content (+/- 1.5%) At Truck Discharge | 4.5 % |
| Unit Weight of Mixed Concrete: | 144.3 lb./cubic ft. |
| Mix Density | 3895 lb./cubic yd. |

| MATERIAL | SOURCE | SPEC. GRAVITY |
|---|---|---|
| Cement | Arizona Portland | 3.15 |
| Fly Ash (if used) | Material Resources Technologies | 2.16 |
| 1" Rock | Cemex | 2.65 |
| 1/2" Rock | Cemex | 2.65 |
| Sand | Arizona San Man | 2.65 |
| Water Reducer | W.R. Grace | N/A |
| Air Entrainer | W.R. Grace | N/A |

7400 E. McDonald, Suite 120 • Scottsdale, AZ 85250 • (602) 607-3999 • Fax (602) 607-3335

Dan Peters & Associates

Lab Number: 003567

# SIEVE ANALYSIS

Client: Maricopa Ready Mix
Attn: Mr. Don Bain
7400 E. McDonald Drive
Scottsdale, AZ 85250

DPA Project No.: 2218
Report Date: 6/8/00
Reviewed By: Dave B. McFadden

Project: Misc. Lab Testing
Location:

Material: 1/2" Aggregate
Material Source: Alma School Plant

| Seive US/mm | % Passing | SPECS |
|---|---|---|
| 3" / 75 | | |
| 2 1/2" / 62.5 | | |
| 2" / 50 | | |
| 1 1/2" / 37.5 | | |
| 1" / 25 | | |
| 3/4" / 19 | 100 | |
| 1/2" / 12.5 | 82 | |
| 3/8" / 9.5 | 56 | |
| 1/4" / 6.3 | 26 | |
| # 4 / 4.75 | | |
| - #4 | 12 | |
| #8 / 2.36 | 3 | |
| #10 / 2.00 | | |
| #16 / 1.18 | | |
| #30 / 0.600 | 2 | |
| #40 / 0.425 | | |
| #50 / 0.300 | | |
| #100 / 0.150 | | |
| #200 / 0.075 | | |
| -#200 / 0.075 | 0.9 | |

**Moisture Density Relationship**

Maximum Dry Density (pcf):
Optimum Moisture (%):

**Plasticity Index**

Liquid Limit:
Plastic Limit:
P.I.: Spec:

**pH & Resistivity**

ph Reading: Spec:
Resistivity: Spec:

**Sand Equivelant**

Average SE Value:

Test Methods: ASTM D 4318
ARIZ 201c
AASHTO T-27

Comments: Fineness Modules = 2.62

6751 W. Galveston St., Bldg A Chandler, AZ 85226 (480) 753-1996 Fax (480) 753-1970 Toll Free (888) 753-8553

**LAW**
LAWGIBB Group Member

# Soil/Agg. Sample Summary

| | | | |
|---|---|---|---|
| Client: | Dan Peters and Associates | LAW Job No.: | 70241-0-0208.04 |
| Project Name: | Miscellaneous Testing | LAW Lab No.: | 01587 |
| Project No.: | | Date Received: | 06/07/00 |
| Material: | Rock | Sample Date: | |
| Material Location: | | Report Date: | 06/08/00 |

**Gradation**

Test Method:

| Screen Size | % Passing | Spec |
|---|---|---|
| 3" | | |
| 2 1/2' | | |
| 2" | | |
| 1 1/2" | | |
| 1" | | |
| 3/4" | | |
| 1/2" | | |
| 3/8" | | |
| 1/4" | | |
| #4 | | |
| #8 | | |
| #10 | | |
| #16 | | |
| #30 | | |
| #40 | | |
| #50 | | |
| #100 | | |
| #200 | | |

**% Carbonates**

| Test Method: | | Spec |
|---|---|---|
| Carbonates (%): | | |

**Plasticity Index**

| Test Method: | | Spec |
|---|---|---|
| Plastic Limit: | | |
| Liquid Limit: | | |
| Plasticity Index | | |

**Specific Gravity / Absorbtion %**

Test Method:

| | Coarse | Fine | Spec |
|---|---|---|---|
| Bulk Sp. Gr.: | | | |
| SSD Sp. Gr.: | | | |
| App. Sp. Gr.: | | | |
| Absorbtion %.: | | | |

**Moisture / Density**

Test Method:

| | | |
|---|---|---|
| Max.Dry Density: | | (pcf) |
| Optimum Moisture: | | (%) |

**pH and Soluble Salts**

pH Test Method:

| | pH | Spec |
|---|---|---|
| pH: | | |

Soluble Salts test Method:

| | ohm-cm | Spec |
|---|---|---|
| Resistivity: | | |

**Aggregate Properties**

**Flakiness Index**

| Test Method: | | Spec |
|---|---|---|
| Flakiness Index: (%) | | |
| Median: (in) | | |
| Ave.Least Dim.: (in) | | |

**Crushed Faces**

| Test Method: | (%) | Spec |
|---|---|---|
| Crushed Faces (1Face): | | |
| Crushed Faces (2Faces): | | |

**L.A. Abrasion**

Test Method: AASHTO T-96

| Grading: B | % Loss | Spec |
|---|---|---|
| 100 Rev (%) | 4 | |
| 500 Rev (%) | 19 | |

Reviewed By:

4634 South 36th Place * Phoenix, Arizona 85040 * Telephone: (602) 437-0250

Dan Peters & Associates

Lab Number: 003566

# SIEVE ANALYSIS

Client: Maricopa Ready Mix
Attn: Mr. Don Bain
7400 E. McDonald Drive
Scottsdale, AZ 85250

DPA Project No.: 2218
Report Date: 6/8/00
Reviewed By:

Project: Misc. Lab Testing
Location:

Material: 1" Aggregate
Material Source: Alma School Plant

| Seive US/mm | % Passing | SPECS |
|---|---|---|
| 3" / 75 | | |
| 2 1/2" / 62.5 | | |
| 2" / 50 | | |
| 1 1/2" / 37.5 | 100 | |
| 1" / 25 | 96 | |
| 3/4" / 19 | 52 | |
| 1/2" / 12.5 | 6 | |
| 3/8" / 9.5 | 3 | |
| 1/4" / 6.3 | 1 | |
| # 4 / 4.75 | | |
| - #4 | 1 | |
| #8 / 2.36 | | |
| #10 / 2.00 | | |
| #16 / 1.18 | | |
| #30 / 0.600 | | |
| #40 / 0.425 | | |
| #50 / 0.300 | | |
| #100 / 0.150 | | |
| #200 / 0.075 | | |
| -#200 / 0.075 | 0.6 | |

**Moisture Density Relationship**

Maximum Dry Density (pcf):
Optimum Moisture (%):

**Plasticity Index**

Liquid Limit:
Plastic Limit:
P.I.: Spec:

**pH & Resistivity**

ph Reading: Spec:
Resistivity: Spec:

**Sand Equivelant**

Average SE Value:

Test Methods: ASTM D 4318
ARIZ 201c
AASHTO T-27

Comments: See attached for LA Abrasion Test Results

6751 W. Galveston St., Bldg A Chandler, AZ 85226 (480) 753-1996 Fax (480) 753-1970 Toll Free (888) 753-8553

Dan Peters & Associates

Lab Number: 003568

# SIEVE ANALYSIS

Client: Maricopa Ready Mix
Attn: Mr. Don Bain
7400 E. McDonald Drive
Scottsdale, AZ 85250

DPA Project No.: 2218
Report Date: 6/8/00
Reviewed By: Steve R. Madden

Project: Misc. Lab Testing
Location:

Material: Sand
Material Source: Alma School Plant

| Seive US/mm | % Passing | SPECS |
|---|---|---|
| 3" / 75 | | |
| 2½" / 62.5 | | |
| 2" / 50 | | |
| 1½" / 37.5 | | |
| 1" / 25 | | |
| ¾" / 19 | | |
| ½" / 12.5 | | |
| ⅜" / 9.5 | | |
| ¼" / 6.3 | | |
| # 4 / 4.75 | | |
| - #4 | 100 | 95-100 |
| #8 / 2.36 | 86 | 80-100 |
| #10 / 2.00 | 81 | |
| #16 / 1.18 | 65 | 50-85 |
| #30 / 0.600 | 44 | 25-60 |
| #40 / 0.425 | 32 | |
| #50 / 0.300 | 23 | 10-30 |
| #100 / 0.150 | 7 | 2-10 |
| #200 / 0.075 | | |
| -#200 / 0.075 | 2.7 | |

**Moisture Density Relationship**

Maximum Dry Density (pcf):
Optimum Moisture (%):

**Plasticity Index**

Liquid Limit:
Plastic Limit:
P.I.: Spec:

**pH & Resistivity**

ph Reading: Spec:
Resistivity: Spec:

**Sand Equivelant**

Average SE Value: 77

Test Methods: ASTM D 4318
ARIZ 201c
AASHTO T-27

Comments: Fineness Modules = 2.75

6751 W. Galveston St., Bldg A Chandler, AZ 85226 (480) 753-1996 Fax (480) 753-1970 Toll Free (888) 753-8553

# ARIZONA PORTLAND CEMENT COMPANY

*A Division of California Portland Cement Company*
Manufacturers of Arizona Cements
P. O. Box 338
Rillito, Arizona 85654-0338

Tel: (520) 682-2221 Fax: (520) 682-4345


## MANUFACTURER'S CERTIFICATION

Mr. Bob Carlson
*Hunter Construction Company*
Ref: Arizona Department of Water Resources

We hereby certify that the following Type I/III, Low Alkali, Portland Cement lots have been shipped from the Arizona Portland Cement Company, Rillito Cement Plant, Rillito Arizona. All Type I/III cement is shipped from Rillito, Arizona and meets or exceeds the current ASTM C-150 specifications for Low Alkali Cement.

Individual certifications can be obtained with each load upon request and delivered to your plant sites. These certifications will contain pertinent data including shipping lot number.

The Shipping Lot Numbers for the Month of **MAY 2000** are as follows:

| | | |
|---|---|---|
| 12202 | 13302 | 14402 |
| 12302 | 13502 | 14502 |
| 12502 | 13702 | 14602 |
| 12602 | 13802 | 14702 |
| 12702 | 13902 | 14802 |
| 12902 | 14002 | 15002 |
| 13102 | 14102 | 15302 |
| 13201S | 14105 | |

William J. Phillips

William J. Phillips
Quality Control Supervisor

Date Signed: 19-Jun-00

*File: Type II Data.doc*

# ARIZONA PORTLAND CEMENT COMPANY

*A Division of California Portland Cement Company*
Manufacturers of Arizona Cements
P. O. Box 338
Rillito, Arizona 85654-0338

Tel: (520) 682-2221 Fax: (520) 682-4345


## CERTIFICATE OF TEST

**Arizona Portland Cement Type I/III Low Alkali**
**A.S.T.M. Designation: C 150**

We certify that the Low Alkali Cement produced and shipped from the Rillito Plant meets or exceeds all current ASTM C-150 requirements and specifications. The following represents the monthly average chemical and physical data for the month of **MAY 2000.**

| CHEMICAL ANALYSIS ( Oxides in %) | | ASTM C-150 LIMITS | |
|---|---|---|---|
| Silicon Dioxide, $SiO_2$ | 20.98 | 20.0 min.% | |
| Alumina Oxide, $Al_2O_3$ | 4.18 | 6.0 max.% | |
| Ferric Oxide, $Fe_2O_3$ | 3.51 | 6.0 max.% | |
| Calcium Oxide, CaO | 62.23 | -- | |
| Magnesium Oxide, MgO | 4.52 | 6.0 max.% | |
| Sulphur Trioxide, $SO_3$ | 2.84 | 3.0 max.% | (C3A less than 8.0) |
| Loss on ignition | 0.90 | 3.0 max.% | |
| Insoluble residue | 0.44 | 0.75 max.% | |
| Alkali Equivalent (%$Na_2O$+0.658% $K_2O$) | 0.44 | 0.60 max.% | |
| **POTENTIAL COMPOSITION** | | | |
| Tricalcium Silicate, $3CaO.SiO_2$ (C3S) | 53 | -- | |
| Tricalcium Aluminate, $3CaO.Al_2O_3$ (C3A) | 5 | 8 max.% | |
| **PHYSICAL ANALYSIS** | | | |
| Fineness, Blaine, Specific Surface (m2/kg) | 404 | 280 min. (m2/kg) | |
| Percent passing 325 mesh screen (45u) | 96.9 | -- | |
| **Compressive Strength, C-109, p.s.i.** | | | |
| 3 day | 3820 | 1450 min. psi | |
| 7 day | 4840 | 2470 min. psi | |
| 28 day (April Data) * | 6320 | -- | |
| **Soundness** | | | |
| Autoclave expansion | 0.14 | 0.80 max.% | |
| False Set | 86 | 50 min.% (optional) | |
| Vicat time of setting: Initial (minutes) | 105 | 45 min. (minutes) | |
| Air Content of Mortar (volume %) | 5.5 | 12 max.% | |
| Water | 25.5 | -- | |

Remarks: Apparatus and methods in use in this laboratory have been checked by the National Institute of Standards and Technology. Major oxides are analyzed by X-ray Fluorescence Spectrometry.

William J. Phillips
Quality Control Supervisor

PRODUCT INFORMATION

# Daravair® 1000

Air-Entraining Admixture ASTM C 260, AASHTO M 154

Daravair® 1000 is a liquid air-entraining admixture that provides freeze-thaw resistance, yield control, and finishability performance across the full range of concrete mix designs. Daravair 1000 is a clean, light-orange product designed to generate specification-quality air systems. Based on a high-grade saponified rosin formulation, Daravair 1000 is chemically similar to vinsol-based products, but with increased purity and supply dependability.

Daravair 1000 air-entraining admixture may be used wherever the purposeful entrainment of air is required by concrete specifications. Formulated to perform across the entire spectrum of production mixes, Daravair 1000 generates quality, freeze-thaw resistant air systems in concrete conditions that include the following:

- Low Slump
- Paving
- Central Mix
- Extruded Slip Form
- Mixes Containing Hot Water and Accelerators
- Precast
- High Cement Factor
- Fly Ash and Slag
- Superplasticizers
- Manufactured Sands

Air is incorporated into the concrete by the mechanics of mixing and stabilized into millions of discrete semi-microscopic bubbles in the presence of a specifically designed air-entraining admixture such as Daravair 1000. These air bubbles act much like flexible ball bearings increasing the mobility, or plasticity and workability of the concrete. This can permit a reduction in mixing water with no loss of slump. Placeability is improved. Bleeding, plastic shrinkage and segregation are minimized.

Through the purposeful entrainment of air, Daravair 1000 markedly increases the durability of concrete to severe exposures particularly to freezing and thawing. It has also demonstrated a remarkable ability to impart resistance to the action of frost and deicing salts as well as sulfate, sea and alkaline waters.

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PRODUCT INFORMATION

# WRDA® 64

Water-Reducing Admixture ASTM C 494, Type A and Type D

WRDA® 64 is a polymer based aqueous solution of complex organic compounds. WRDA 64 is a ready-to-use low viscosity liquid which is factory pre-mixed in exact proportions to minimize handling, eliminate mistakes and guesswork.

WRDA 64 contains no calcium chloride and weighs approximately 1.21 kg/L (10.1 lb/gal).

WRDA 64 produces a concrete with lower water content (typically 8 to 10% reduction), greater plasticity and higher strength. It is used in ready-mix plants, block and concrete product plants, in lightweight and prestressed work ... wherever concrete is produced.

WRDA 64 offers significant advantages over single component water reducers. Water reduction and setting times are more consistent due to the polymer components. WRDA 64 also performs especially well in concrete containing fly ash and other pozzolans.

The use of WRDA 64 produces a plastic concrete that is more workable, easier to place and more finishable than plain or other admixtured concrete. In the hardened state, WRDA 64 concrete has higher compressive and flexural strengths at all ages than untreated or conventional admixtured concrete.

The greater degree of plasticity achieved, compared with conventional water-reducing admixtures, allows improved finishability.

Finishers have stated that the cement paste, or mortar, in WRDA 64 admixtured concrete has improved trowelability. The influence of WRDA 64 on the finishability of lean mixes has been particularly noticeable. Floating and troweling, by machine or hand, imparts a smooth, close tolerance surface.

GRACE
Construction Products

W.R. GRACE PRODUCTS

# Concrete Products
# Technical Guide Specification
# Admixtures For Concrete

## SECTION 03300


**PART I GENERAL**

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| 1.02 | Related Sections | |
| 1.03 | References | ACI and ASTM |
| 1.04 | Definitions | Water-to-Cementitious Ratio<br>Corrosion Inhibitor<br>Microsilica Concrete<br>Cementitious Materials |
| 1.05 | Submittals | |
| 1.06 | Delivery and Storage | |

**PART II PRODUCTS**

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| 2.02 | Materials | Admixtures<br>A. Air Entraining Agents<br>B. Water Reducers<br>C. Retarders<br>D. High Range Water Reducers<br>E. Accelerators<br>F. Corrosion Inhibitor<br>G. Microsilica<br>H. Dampproofer<br>I. Synthetic Fibers<br>J. Controlled Low Strength Material Additive |
| 2.03 | Concrete Mixes | A. Mix Design<br>B. Proportions<br>C. Chloride Limits<br>D. High Range Water Reducers<br>E. Corrosion Inhibitor<br>F. Microsilica Concrete<br>G. Fiber Reinforcement for Concrete<br>H. Dampproofing Concrete<br>I. Controlled Low Strength Material<br>J. Crack-Resistant Concrete Finishing System |

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| 3.02 | Admixture Addition on Job Site | |
| 3.03 | Environmental Conditions | Hot Weather Concreting<br>Cold Weather Concreting |
| 3.04 | Finishing and Curing | (Notably Corrosion Inhibitor, Microsilica and High Range Water Reduced Concretes) |

# Concrete Products
# Technical Guide Specification
# Admixtures For Concrete

# SECTION 03300

## PART I GENERAL

### 1.01 Concrete Admixtures

Definition - all materials other than cement, water, and aggregates used as an ingredient of concrete or mortar which are added during mixing cycle.

### 1.02 Related Sections

**NTS For projects requiring special admixture needs and for contractors who are first-time users of high range water reducers, non-chloride accelerators, microsilica concrete and corrosion inhibitors, preconstruction conference, Section 3.01B and concrete finishing and curing recommendations, Section 3.04 should be followed. W. R. Grace & Co.-Conn. admixture specialists are available to assist in the writing of additional sections to assure proper knowledge of product behavior prior to project start-up.**

A. Section 01200 - Preconstruction Meetings

B. Section 03345 - Concrete Finishing

### 1.03 References

A. ACI - 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

B. ASTM C 260 Standard Specification for Air-Entraining Admixtures for Concrete.

C. ACI - 302.1 Guide for Concrete Floor and Slab Construction.

D. ACI - 305R Hot Weather Concreting.

E. ACI - 306R Cold Weather Concreting.

F. ACI - 308 Standard Practice for Curing Concrete.

G. ACI - 318 Building Code Requirements for Reinforced Concrete.

H. ASTM C 494 Standard Specification for Chemical Admixtures for Concrete.

I. CSA 266

### 1.04 Definitions

A. Water-to-Cementitious ratio - An equational value representing quantity in pounds of free moisture available for cement hydration divided by quantity of cementitious materials in pounds per cubic yard concrete.

B. Corrosion Inhibitor Admixture - A liquid admixture that inhibits corrosion of concrete-embedded steel in the presence of chloride ions. DCI® corrosion inhibitor is calcium nitrite based and manufactured by W. R. Grace & Co.-Conn.

C. Microsilica (silica fume) Concrete - Generally concrete made for high strength or extended durability. Microsilica is a highly active pozzolan.

D. Cementitious Material - Cementitious materials include cement, microsilica, ground blast furnace slag and fly ash.

### 1.05 Submittals

A concrete admixture "Product Data Sheet" shall include brand name, manufacturer and dosage rate range.

### 1.06 Delivery, Storage, And Handling For Job-Site Admixture Additions

NTS **The desired location for dispensing admixtures is the concrete batch plant where all ingredients can be recorded simultaneously on delivery ticket. However, certain situations may arise where job-site addition of admixtures may be beneficial to concrete performance. Job conditions should be given thorough review and pre-testing of materials should indicate preferred location for addition.**

Admixture storage tanks and dispensing equipment shall be provided, installed and serviced by admixture manufacturer at no additional cost to the concrete producer.

## PART II PRODUCTS

### 2.01 Manufacturers

Admixture Manufacturer - Shall provide quality admixtures. All technical assistance and necessary dispensing equipment shall be provided at no additional cost. Manufacturer's certification of delivered admixtures shall be available upon request. A manufacturer's representative shall be available for consultation by telephone or on-site upon 72-hour notice by contractor. Representative shall be employed full time by manufacturer and posses technical admixture training and concrete mix design experience. All dispensing equipment shall assure accuracy and manufacturer representative shall instruct concrete batch man on its proper usage. Approval of admixture manufacturers shall be given by Architect/Engineer. Reputable manufacturers shall include:

1. W. R. Grace & Co.-Conn., Cambridge, MA

### 2.02 Materials

Concrete Admixtures - Shall provide highest concrete performance and allow for most efficient placement for project requirements. Admixtures shall improve concrete properties including desired setting characteristics, and shall be used in accordance with manufacturer's recommendations. All admixtures shall be added at separate intervals or locations of mix cycle. Admixtures may also meet applicants CSB stands. All concrete admixtures provided for the work of this project shall be supplied by one manufacturer.

The following admixtures (and approved equals) shall be allowed:

NTS **Geographical differences of material resources used in manufacture of concrete have been balanced with a variety of admixture formulations that optimize concrete performance. This is particularly true with air-entraining agents, water reducers, and retarders as products vary in local availability. For the most standard admixtures to quote for specification purposes, check with manufacturer representatives. A full listing of Grace admixtures is available following this sample specification.**

A. Air-Entraining Admixture: Air-Entraining admixture complying with ASTM C 260. Subject to compliance with requirements, provide Daravair® series or Darex® series admixtures by W. R. Grace & Co.-Conn.

B. Water Reducing Admixture: Water reducing admixture complying with ASTM C 494, Type A. Subject to compliance with requirements, provide one of the following admixtures by W. R. Grace & Co.-Conn:

   1. WRDA® series admixture.

   2. Daracem® 50, mid range water reducing admixture.

   3. Daracem 55, mid range water reducing admixture.

4. Daracem 65, mid range water reducing admixture.

5. MIRA®, mid range water reducing admixture.

C. Water Reducing and Retarding Admixture: Water reducing and retarding admixture complying with ASTM C 494, Type D. Subject to compliance with requirements, provide one of the following admixtures by W. R. Grace & Co.-Conn.:

1. Daratard® series admixture.

2. Recover® series admixture, hydration stabilizer for long-haul applications or extended placement beyond 4 hours.

D. Water Reducing, High Range Admixture: Water reducing, high range admixture (superplasticizer) complying with ASTM C 494, Type F or G, ASTM C 1017, Type 1 or 2. Subject to compliance with requirements, provide one of the following admixtures by W. R. Grace & Co.-Conn.:

1. Daracem 19
2. Daracem 100
3. Daracem ML330
4. Daracem ML500
5. ADVA® Series

E. Accelerating Admixture: Accelerating admixture complying with ASTM C 494, Type C. Subject to compliance with requirements, provide one of the following admixtures by W. R. Grace & Co.-Conn.:

1. PolarSet®, non-chloride cold-temperature admixture.

2. DCI®, non-chloride admixture.

3. Daraccel®, chloride-type admixture.

**NTS Calcium nitrite is a proven non-chloride accelerator as well as corrosion inhibitor. Quantities of calcium nitrite contained in PolarSet manufactured by W. R. Grace & Co.-Conn., Cambridge, MA provide assurance that it does not promote corrosion.**

F. Corrosion Inhibitor: Calcium nitrite based corrosion inhibitor. Subject to compliance with requirements, provide one of the following admixtures by W. R. Grace & Co.-Conn.:

1. DCI

2. DCI-S

G. Microsilica Admixture: Microsilica admixture complying with ASTM C 1240-93. Subject to compliance with requirements, provide Force 10,000® by W. R. Grace & Co.-Conn. As a liquid slurry or a dry densified.

H. Dampproofing Admixture: Provide stearic acid based dampproofing admixture. Subject to compliance with requirements, provide Darapel® series admixtures by W. R. Grace & Co.-Conn.

I. Synthetic Fiber Admixture: Alkali-resistant, non-absorptive, non-corrosive synthetic fiber admixture complying with ASTM C 1116, Type 111, and manufactured from 100 percent virgin polypropylene in a micro filament form. Subject to compliance with requirements, provide the following synthetic fiber admixture by W. R. Grace & Co.-Conn.:

1. Grace MicroFiber™, for enhanced-finishing performance and crack reduction.

J. Controlled Low Strength Material Additive: Subject to compliance with requirements, provide DaraFill® by W. R. Grace & Co.-Conn. Coordinate with excavating, backfilling and compaction requirements.

## 2.03 Concrete Mixes

A. Mix Design - all mix designs shall be proportioned in accordance with ACI 318 Chapter 4 and 5. If trial batches are used before construction start up, they shall be prepared by the concrete producer and may be witnessed by an independent testing laboratory approved by Engineer. (Expenses for mix design preparations shall be paid by_____). All mix designs to be used in Project shall be approved by the Engineer prior to use in Project. (Contractor/Subcontractor) shall be responsible for incorporating concrete of minimum strengths specified into structures (as noted on drawings). During the project, concrete mix design may be altered for workability requirements and weather conditions.

B. Proportions - all concrete shall be proportioned within limitations of Table A.

**TABLE A. FORMAT FOR SPECIFYING MIX DESIGN AND PERFORMANCE:**

Class A-

Class B-

| Class | Minimum Cementitious Lbs. Per CY* | Minimum Compressive Strengths P.S.I. (MPA) 7-Day | 28Day | Max. Size of Aggregate Inches (mm) | Air Entrained W/C ratio** | Special Admixtures Requirements | Slump Inches (mm) | Entrained Air Content |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| A. | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| B. | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| C. | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |

Class C-

* Cementitious is minimum. Increase as necessary to meet conditions.

** Water-to-cementitious ratio is given for aggregates in saturated-surface-dry condition. Thus, total moisture of all aggregates, calculated by ASTM C 566 (84), less absorption of aggregate (ASTM C 127 and C 128) shall represent total free moisture in aggregate. To determine water/cementitious ratio, total free moisture of aggregates shall be added to batch water to estimate water content of concrete.

C. Chloride Limits - All concrete shall not exceed ACI 318 maximum chloride limits.

D. High Range Water Reducers - Specified water-to-cementitious ratio shall be adhered to. All concrete containing high range water reducers shall have a maximum (10) inches (250mm) slump unless otherwise approved.

1. High range water reducers shall meet all requirements of ASTM C 494 Type F (and G) (CSA 266.6) and shall be used in accordance with manufacturer's recommendations as required by project conditions.

2. The following concrete shall contain specified high range water-reducer:

   a. All concrete with a water-to-cementitious ratio of 0.45 or less.

   b. Specialty concrete such as made with microsilica, corrosion inhibitors, or concrete in potentially corrosive environments as defined by ACI 318-89.

   c. At the contractor's request any other concrete if approved in submitted mix designs.

E. Corrosion Inhibitor Concrete

NTS **Add Section 03315 "Corrosion-Inhibiting Concrete Admixture" here. Since the chloride loading rate and final concrete quality are unknown factors, Grace can not guarantee the longevity of the protection offered by DCI. Quality concrete as recommended by ACI will slow the ingress of chlorides into the concrete while DCI will significantly reduce the corrosion rate once the chlorides reach the**

**rebar. Neither quality concrete nor DCI will stop corrosion forever, but both will retard the onset of corrosion and increase a structure's service life.**

F. Microsilica Concrete

NTS **Specifier should add Section 03320 "Microsilica Concrete" here.**

G. Fiber Reinforcement for Concrete

NTS **Specifier should add Section 03240 "Fiber Reinforcement for Concrete" here.**

H. Dampproofing Concrete

NTS **Dampproofing Admixtures (water repellents) improve the overall durability of concrete subjected to damp conditions. Moisture transmission is lowered, efflorescence is greatly reduced or prevented and an algal growth is discouraged. An ASTM specification has not been developed for products of this type, however, simple absorption tests involving complete or partial immersion in water are used. Dampproofers may have a small affect on other concrete properties. Because it is a dispersion, a slight increase in the level of entrained air will occur. Adjustments to the mix to maintain the desired level of air is recommended. Trial mixes incorporating the specific materials (cement, sand, admixes) to be employed must be made to ascertain proper performance.**

1. Dampproofing (water repellent) admixtures for ready-mixed concrete shall be added to all exterior exposed concrete. These admixtures shall be hydrophobic and shall increase the contact angle of water, so reducing wetting of the surfaces. The admixture shall be a liquid or a dispersion and shall be added to the mix at the time of batching.

2. Provide Darapel® by W. R. Grace & Co.-Conn.

I. Controlled Low Strength Material

NTS **Specifier should add Section 02225 "Controlled Low Strength Material" here.**

J. Crack-Resistant Concrete Finishing System

NTS **Specifier should add Section 03350 "Crack-Resistant Concrete Finishing System" here.**

## PART III EXECUTION

### 3.01 Admixture Manufacturer's Field Service

A. General

1. Admixture manufacturer shall provide a source for incidental consultation through completion of the concrete portion of the project as herein before specified.

2. Where concrete contains high range water-reducer, non-chloride accelerator, corrosion inhibitor or microsilica, a qualified manufacturer's representative shall observe project start-up of concrete placements and offer recommendations.

B. Preconstruction Conference and Trial Mixtures for Concrete Containing Corrosion Inhibitor, Microsilica, and High Range Water Reducers Containing Concrete.

1. A preconstruction meeting of Engineer, Contractor, Finisher and Concrete Producer shall take place at least two weeks prior to project start-up. A representative from W. R. Grace & Co.-Conn. shall be present to discuss corrosion inhibitor (DCI), microsilica (Force 10,000), or high range water-reduced concrete. Topics of discussion shall include: concrete handling, placing, finishing and curing.

2. A minimum of 4 cubic yard (3 cubic meters) trial mixture containing (corrosion inhibitor DCI , microsilica Force 10,000 or high range water-reducer Daracem-100/WRDA-19) shall

be placed at the project site utilizing proposed concrete mix and methods of placing, finishing and curing. This shall occur at least one week before actual concreting (with particular admixture) begins. A representative from W. R. Grace & Co.-Conn. shall be present.

3. This specification for concrete shall be made available to the manufacturer of the concrete admixture (corrosion inhibitor, microsilica, high range water-reducer) at least three weeks prior to the invitation to bid by the design engineer.

C. Project Start-Up

1. A representative of W. R. Grace & Co.-Conn. shall be present during project start-up if required by the design engineer.

**3.02 Admixture Additions on Job Site**

Job site additions shall be limited to high range water reducers, non-chloride accelerators, and corrosion inhibitors. Instructions to discharge admixtures shall be furnished as herein before specified. Material Safety Data Sheet and storage labeling shall be available at job site and conform to current governing regulations.

A. High Range Water Reducers:

1. Concrete shall arrive at a slump of 2 to 4 inches (50 to 100 mm). Water additions at job site shall be limited to comply with water-to-cementitious ratio requirements.

2. Following addition of high range water-reduced concrete, a minimum of 70 revolutions or 5 minutes of mixing shall be completed to assure a consistent mixture.

B. All concrete with other admixture additions shall mix a minimum of 70 revolutions or 5 minutes to assure a consistent mixture.

**3.03 Environmental Conditions**

A. Hot weather concreting shall follow recommendations of ACI 305. When concrete temperatures exceed 80° F, ASTM C 494 Type D and G, water reducing, and high range water reducing retarding admixtures shall be used in accordance with manufacturer's recommendations.

B. Cold weather concreting shall follow recommendations of ACI 306, particularly Table 1.4.1-"Recommended Concrete Temperatures" and Table 1.4.2-"Protection Recommended for Concrete Placed in Cold Weather". When ambient placement temperatures are less than 50° F, all concrete shall contain PolarSet accelerating admixture. At temperatures above 50° F, the contractor has option to use this admixture for all other concrete to accelerate early strength gains.

NTS **Non-chloride accelerating admixtures should not be considered a concrete "anti-freeze" agent. Fresh concrete is considered protected from deleterious freezing effects after initial set is achieved and concrete is protected from ingress of additional water. Use of non-chloride accelerators should not substitute recommendations for protection from concrete freezing as detailed in ACI 306. Standard industry precautions should be employed to properly cure concrete.**

**3.04 Finishing And Curing**

A. High air content concrete, corrosion inhibitor concrete, microsilica concrete, and high range water-reduced concrete do not bleed similarly to normal concrete. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather ACI 302 "Guide for Concrete Floor and Slab Construction" and ACI 308 "Standard Practice for Curing Concrete" shall be followed during the handling, finishing or curing of the concrete. To overcome possible concrete shrinkage problems, the use of wind breaks, sun shades, and fog misting is recommended. In general, the surface shall be maintained at a high humidity during placing and finishing operations. Free-standing water is not allowed.

**NTS Research has found that the use of polypropylene fibers reduces plastic shrinkage cracking potential. See "Fiber Reinforcement for Concrete" Section 03240, for further information.**

B. Fog misting is required when the rate of evaporation exceeds 0.2 lb./ $ft^3$/hr (ACI 308 section 1.2.1) (0.1 lb./ $ft^3$/hr for Force 10,000 and DCI concrete). Fogging shall continue after the finishing operation until prewetted burlap or other approved curing material is placed over the concrete. Fog misting is not to be used to apply water to the surface of the concrete to facilitate lubrication for finishing purposes.

C. An acceptable fog misting system includes the following items, available from commercial rental agencies: Nozzle: Brand "Mi-T-M Corp." (Peosta, Iowa). Wide angle (45°, to 50° angle) for low wind operation; sharp angle (10°, to 15°) for windy operations. Water Pressure System: Brand "Mi-T-M Corp." (Peosta, Iowa). 2,500 psi, 2 to 3 gallons per minute.

D. Water cure is the best method for curing concrete with reduced bleeding. When the weather conditions are dry and windy, fogging above the surface of the concrete shall continue after the finishing operation until prewetted burlap can be placed over the flatwork surface. The burlap shall cover all flatwork and be kept wet for a minimum of seven days or until the time necessary to attain 70% of specified compressive strength (ACI 308 section 3.1.3).

| Type A | Type B | Type C | Type D (& B) | Type E | Type F | Type G |
|---|---|---|---|---|---|---|
| WRDA® | | DARASET®<br>DCI®<br>DARACCEL®<br>POLARSET® | | DARACCEL | DARACEM® 19<br>DARACEM® 100<br>DARACEM ML 330<br>ADVA® Flow<br>ADVA® Cast | DARACEM® 100 |

## END OF SECTION

**Visit our website at: www.gcp-grace.com**

W.R. Grace & Co.-Conn. 62 Whittemore Avenue Cambridge, MA 02140 Tel: 617-876-1400

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We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the user's consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. Grace Construction Products, W.R. Grace & Co.-Conn, 62 Whittemore Ave., Cambridge, MA 02140. In Canada, W.R. Grace & Co. Canada, Ltd. 294 Clements Road West, Ajax, Ontario, L1S 3C6.

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# Air-Entraining Agents

## *Daravair® Series of Air-Entraining Admixtures*

### Daravair® 1000 Air-Entraining Admixture

A liquid admixture that provides freeze-thaw resistance, yield control and finishability performance across the full range of concrete mix designs. For use where the purposeful entrainment of air is required by concrete specifications.

DATA SHEETS · SPECIFICATIONS

### Daravair® 1400 Air-Entraining Admixture

A liquid admixture that provides freeze-thaw resistance, yield control and finishability performance across the full range of concrete mix designs. For use where the purposeful entrainment of air is required by concrete specifications.

DATA SHEETS · SPECIFICATIONS

### Daravair® AT60 Air-Entraining Admixture

A liquid admixture that provides freeze-thaw resistance, yield control and finishability characteristics of concrete and allows concrete producers to accurately control yield. For use in all ready-mix, precast and prestress and other concrete product plants where the intentional entrainment of a specified level of air is required.

DATA SHEETS · SPECIFICATIONS

## *Darex® Series of Air-Entraining Admixtures*

### Darex® AEA® Air-Entraining Admixture

A liquid admixture for use as an air-entraining agent, providing freeze thaw durability. Contains a catalyst for

more rapid and complete hydration of portland cement. As it imparts workability into the mix, Darex AEA is particularly effective with slag, lightweight, or manufactured aggregates which tend to produce harsh concrete.

● DATA SHEETS ● SPECIFICATIONS

**Darex® II AEA® Air-Entraining Admixture**

An air-entraining admixture which generates a highly stable air void system for increased protection against damage from freezing and thawing, severe weathering or deicer chemicals. Particularly effective in maintaining air content during longer haul times. Performs well in conventional concrete and is particularly effective in plasticizing mixes and with slag, lightweight, or manufactured aggregates which tend to produce harsh concrete.

● DATA SHEETS ● SPECIFICATIONS

Specifications | Contact Us | Links | Product Guide | Project Profiles | FAQs

Grace Constructon Products Home Page | W.R. Grace & Co. Home Page

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# Transmittal

COPY

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www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | Flood Control District Maricopa County | Sender: | Chuck Gopperton |
| | | ☑ | For Your Information |
| Attention: | Tom Johnson c/o Shewa Shivaswamy | ☐ | For Your Approval |
| | | ☐ | For Your Review |
| Date: | 26 June 2000 | ☐ | As Requested |
| File: | 82000157 | | |

**Reference: Golden Eagle Park Dam**

Attached is the original concrete break results for tired mixtures for your records. The results are to be reviewed for conformance with specifications.

If you have any questions or concerns with these documents please do not hesitate to contact me.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton

Chuck Gopperton, PE
Water Resources,
Project Engineer

c. Tom Renckly, FCDMC

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Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on 6-26-00 by Maricopa Ready Mix for Concrete mix design #340145:

- Compressive strength tests (3 and 4 day) and measurements of slump and air content of trial mixtures

The submittals were reviewed, and the design strength of 4,000 psi is generally exceeded after 3 days. The following additional information is needed prior to approval of the concrete mix design:

- Aggregate quality tests

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Mark V. Ferrante

Date: 6/26/00

# Dan Peters & Associates

Quality Control, Quality Assurance, Inspection
Materials Testing & Specialty Testing

## COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

Client: Maricopa Ready Mix

DPA Project No. 2218
DPA Lab No. 00C-562
Report Date: 6/20/00
Reviewed By:

Project Name: Misc. Concrete Testing
Sampled By: D. Youngkin
Project Location: Alma School Rd & Loop 202
Sample Date: 6/16/00
Contractor:
Authorized By:
Location of Sample: Batch Plant
Concrete Supplier: Maricopa Ready Mix
Measured Slump: 3 Inches
Ticket Number: 18912
Measured Air Content: 4.6 %
Batch Size (cu. yds.): 5.0
Concrete Temp.: 86 F
Mix Identification: 340145
Air Temp.: 95 F
Design Strength (28 days): 4000 psi
Plastic Ut. Wt.: 8.43 pcf
Max. Aggregate Size (Inches):
No. of Specimens Molded 6
Water Added on Job (gal.):
Mold Size (4x8)

Test Procedure: ASTM C39, ASTM C143, ASTM C138, ASTM C231, ASTM C1064

Remarks: Set #1

Average Weight / cylinder: 8.43 lbs

| Specimen Number | Date Tested | Age in Days | Area Inches | Comp. Strength Max. Load Pounds Force | Comp. Strength Max. Load PSI / MPa | Diameter in Inches | Type of Fracture | Tested By |
|---|---|---|---|---|---|---|---|---|
| 00C-562 | 19-Jun | 3 | 12.57 | 59446 | 4730 | 4.0 | S | JBL |
| 00C-562 | 23-Jun | 7 | | | | | | |
| 00C-562 | 30-Jun | 14 | | | | | | |
| 00C-562 | 14-Jul | 28 | | | | | | |
| 00C-562 | 14-Jul | 28 | | | | | | |
| 00C-562 | 11-Aug | 56 | | | | | | |

5751 W. Galveston Street, Building A Chandler, AZ 85226 (602) 753-1996 Fax (602) 753-1979 Toll Free 1 (866) 756-0663

# Dan Peters & Associates

Quality Control, Quality Assurance, Inspection
Materials Testing & Specialty Testing

## COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

Client: Maricopa Ready Mix

DPA Project No. 2216
DPA Lab No. 00C-564
Report Date: 6/20/00
Reviewed By:

Project Name: Misc. Concrete Testing
Sampled By: D. Youngkin
Project Location: Alma School Rd & Loop 202
Sample Date: 6/16/00
Contractor:
Authorized By:
Location of Sample: Batch Plant
Concrete Supplier: Maricopa Ready Mix
Measured Slump: 4 inches
Ticket Number: 18993
Measured Air Content: 4.5 %
Batch Size (cu. yds.): 5.0
Concrete Temp.: 89 F
Mix Identification: 340145
Air Temp.: 108 F
Design Strength (28 days): 4000 psi
Plastic Ut. Wt.: 8.37 pcf
Max. Aggregate Size (inches):
No. of Specimens Molded 6
Water Added on Job (gal.):
Mold Size (4x8)

Test Procedure: ASTM C39, ASTM C143, ASTM C138, ASTM C231, ASTM C1064

Remarks: Set #3

Average Weight / cylinder: 8.37 lbs

| Specimen Number | Date Tested | Age in Days | Area Inches | Comp. Strength Max. Load Pounds Force | Comp. Strength Max. Load PSI / MPa | Diameter in Inches | Type of Fracture | Tested By |
|---|---|---|---|---|---|---|---|---|
| 00C-564 | 19-Jun | 3 | 12.57 | 56879 | 4520 | 4.0 | | JBL |
| 00C-564 | 23-Jun | 7 | | | | | | |
| 00C-564 | 30-Jun | 14 | | | | | | |
| 00C-564 | 14-Jul | 28 | | | | | | |
| 00C-564 | 14-Jul | 28 | | | | | | |
| 00C-564 | 11-Aug | 56 | | | | | | |

6751 W. Galveston Street, Building A Chandler, AZ 85226 (602) 753-1998 Fax (602) 753-1970 Toll Free 1 (888) 753-0553

**Dan Peters & Associates**

Quality Control, Quality Assurance, Inspection

Materials Testing & Specialty Testing

## COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

Client: Maricopa Ready Mix

DPA Project No. 2218
DPA Lab No. 00C-563
Report Date: 6/20/00
Reviewed By:

Project Name: Misc. Concrete Testing
Sampled By: D. Youngkin
Project Location: Alma School Rd & Loop 202
Sample Date: 6/16/00
Contractor:
Authorized By:
Location of Sample: Batch Plant
Concrete Supplier: Maricopa Ready Mix
Measured Slump: 3 inches
Ticket Number: 18944
Measured Air Content: 5.0 %
Batch Size (cu. yds.): 5.0
Concrete Temp.: 87 F
Mix Identification: 340145
Air Temp.: 105 F
Design Strength (28 days): 4000 psi
Plastic Ut. Wt.: 8.5 pcf
Max. Aggregate Size (inches):
No. of Specimens Molded 6
Water Added on Job (gal.):
Mold Size (4x8)

Test Procedure: ASTM C39, ASTM C143, ASTM C138, ASTM C231, ASTM C1064

Remarks: Set #2

Average Weight / cylinder: 8.50 lbs

| Specimen Number | Date Tested | Age in Days | Area Inches | Comp. Strength Max. Load Pounds Force | Comp. Strength Max. Load PSI / MPa | Diameter in Inches | Type of Fracture | Tested By |
|---|---|---|---|---|---|---|---|---|
| 00C-563 | 19-Jun | 3 | 12.57 | 53947 | 4290 | 4.0 | S | JBL |
| 00C-563 | 23-Jun | 7 | | | | | | |
| 00C-563 | 30-Jun | 14 | | | | | | |
| 00C-563 | 14-Jul | 28 | | | | | | |
| 00C-563 | 14-Jul | 28 | | | | | | |
| 00C-563 | 11-Aug | 56 | | | | | | |

6751 W. Galveston Street, Building A Chandler, AZ 85226 (602) 753-1996 Fax (602) 753-1970 Toll Free 1 (888) 753-0693

**Dan Peters & Associates**

Quality Control, Quality Assurance, Inspection
Materials Testing & Specialty Testing

## COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

Client: Maricopa Ready Mix

DPA Project No. 2218
DPA Lab No. 00C-559
Report Date: 6/20/00
Reviewed By:

Project Name: Misc. Concrete Testing
Sampled By: D. Youngkin
Project Location: Alma School Rd & Loop 202
Sample Date: 6/15/00
Contractor:
Authorized By:
Location of Sample: Batch Plant Truck #109
Concrete Supplier: Maricopa Ready Mix
Measured Slump: 5.5 inches
Ticket Number: 18639
Measured Air Content: 7.0 %
Batch Size (cu. yds.): 5.0
Concrete Temp.: 86 F
Mix Identification: 340145
Air Temp.: 92 F
Design Strength (28 days): 4000 psi
Plastic Ut. Wt.: 8.36 pcf
Max. Aggregate Size (inches):
No. of Specimens Molded 6
Water Added on Job (gal.):
Mold Size (4x8)

Test Procedure: ASTM C39, ASTM C143, ASTM C138, ASTM C231, ASTM C1064

Remarks: Set #1

Average Weight / cylinder: 8.36 lbs

| Specimen Number | Date Tested | Age in Days | Area Inches | Comp. Strength Max. Load Pounds Force | Comp. Strength Max. Load PSI / MPa | Diameter in Inches | Type of Fracture | Tested By |
|---|---|---|---|---|---|---|---|---|
| 00C-559 | 19-Jun | 4 | 12.57 | 41747 | 3320 | 4.0 | C | AY |
| 00C-559 | 22-Jun | 7 | | | | | | |
| 00C-559 | 29-Jun | 14 | | | | | | |
| 00C-559 | 13-Jul | 28 | | | | | | |
| 00C-559 | 13-Jul | 28 | | | | | | |
| 00C-559 | 10-Aug | 56 | | | | | | |

9731 W. Galveston Street, Building A Chandler, AZ 85225 (602) 753-1996 Fax (602) 753-1970 Toll Free 1 (866) 753-0853

# Dan Peters & Associates

Quality Control, Quality Assurance, Inspection
Materials Testing & Specialty Testing

## COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

Client: Maricopa Ready Mix

DPA Project No. 2218
DPA Lab No. 00C-560
Report Date: 8/20/00
Reviewed By:

Project Name: Misc. Concrete Testing
Sampled By: D. Youngkin
Project Location: Alma School Rd & Loop 202
Sample Date: 6/15/00
Contractor:
Authorized By:
Location of Sample: Batch Plant
Concrete Supplier: Maricopa Ready Mix
Measured Slump: 3.25 inches
Ticket Number: 18682
Measured Air Content: 4.6 %
Batch Size (cu. yds.): 5.0
Concrete Temp.: 88 F
Mix Identification: 340145
Air Temp.: 95 F
Design Strength (28 days): 4000 psi
Plastic Ut. Wt.: 8.4 pcf
Max. Aggregate Size (inches):
No. of Specimens Molded 8
Water Added on Job (gal.):
Mold Size (4x8)

Test Procedure: ASTM C39, ASTM C143, ASTM C138, ASTM C231, ASTM C1064

Remarks: Set #2

Average Weight / cylinder: 8.40 lbs

| Specimen Number | Date Tested | Age in Days | Area Inches | Comp. Strength Max. Load Pounds Force | Comp. Strength Max. Load PSI / MPa | Diameter in Inches | Type of Fracture | Tested By |
|---|---|---|---|---|---|---|---|---|
| 00C-560 | 19-Jun | 4 | 12.57 | 61779 | 4910 | 4.0 | C | AY |
| 00C-560 | 22-Jun | 7 | | | | | | |
| 00C-560 | 29-Jun | 14 | | | | | | |
| 00C-560 | 13-Jul | 28 | | | | | | |
| 00C-560 | 13-Jul | 28 | | | | | | |
| 00C-560 | 10-Aug | 56 | | | | | | |

8781 W. Galveston Street, Building A Chandler, AZ 85226 (602) 753-1996 Fax (602) 753-1970 Toll Free 1 (888) 753-0653

# Dan Peters & Associates

Quality Control, Quality Assurance, Inspection
Materials Testing & Specialty Testing

## COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

Client: Maricopa Ready Mix

DPA Project No. 2218
DPA Lab No. 00C-561
Report Date: 6/20/00
Reviewed By:

Project Name: Misc. Concrete Testing
Sampled By: D. Youngkin
Project Location: Alma School Rd & Loop 202
Sample Date: 6/15/00
Contractor:
Authorized By:
Location of Sample: Batch Plant
Concrete Supplier: Maricopa Ready Mix
Measured Slump: 3.75 inches
Ticket Number: 18707
Measured Air Content: 4.7 %
Batch Size (cu. yds.): 5.0
Concrete Temp.: 89 F
Mix Identification: 340145
Air Temp.: 100 F
Design Strength (28 days): 4000 psi
Plastic Ut. Wt.: 8.35 pcf
Max. Aggregate Size (inches):
No. of Specimens Molded 6
Water Added on Job (gal.):
Mold Size (4x8)

Test Procedure: ASTM C39, ASTM C143, ASTM C138, ASTM C231, ASTM C1064

Remarks: Set #3

Average Weight / cylinder: 8.35 lbs

| Specimen Number | Date Tested | Age in Days | Area Inches | Comp. Strength Max. Load Pounds Force | Comp. Strength Max. Load PSI / MPa | Diameter in Inches | Type of Fracture | Tested By |
|---|---|---|---|---|---|---|---|---|
| 00C-561 | 19-Jun | 4 | 12.57 | 57453 | 4570 | 4.0 | C | AY |
| 00C-561 | 22-Jun | 7 | | | | | | |
| 00C-561 | 29-Jun | 14 | | | | | | |
| 00C-561 | 13-Jul | 28 | | | | | | |
| 00C-561 | 13-Jul | 28 | | | | | | |
| 00C-561 | 10-Aug | 56 | | | | | | |

8761 W. Galveston Street, Building A Chandler, AZ 85226 (602) 753-1996 Fax (602) 753-1970 Toll Free 1 (800) 799-9999

Lumer Construction, Inc.
1752 East Jacinto Circle, Mesa, AZ 85204
602-321-6844 Fax 480-497-3698

# LETTER OF TRANSMITTAL

| TO: HUNTER CONTRACTING | DATE 7/5/00 | JOB NO. 115 |
|---|---|---|
| ATTN: BOB CARLSON | RE: GEOTEXTILE FOR GABION | |

We are forwarding: ☐ Attached ☐ Under separate cover via :

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☒ Specifications
☐ Copy of Letter ☐ Change Order ☐ Other:

| NO. | COPIES | DATE | DESCRIPTION |
|---|---|---|---|
| 1 | 7 | 7/5/00 | MIRAFI 180N GEOTEXTILE |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**PLEASE USE AS NOTED:**

☒ For Review ☐ Reviewed as Submitted ☐ Resubmit Copies for Review
☐ For Your Use ☐ Reviewed as Noted ☐ Submit Copies for Distribution
☐ As Requested ☐ Returned for Corrections ☐ Return Corrected Prints
☐ FOR BIDS DUE ON ☐ Other:

**REMARKS:**

Copy to:

already approved

SIGNED: Chuck Lumer

Chuck Lumer

# Mirafi 180N

Mirafi 180N is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. 180N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

| Mechanical Properties | Test Method | Unit | Minimum Average Roll Value | |
|---|---|---|---|---|
| | | | MD | CD |
| Grab Tensile Strength | ASTM D 4632 | kN (lbs) | 0.9 (205) | 0.9 (205) |
| Grab Tensile Elongation | ASTM D 4632 | % | 50 | 50 |
| Trapezoid Tear Strength | ASTM D 4533 | kN (lbs) | 0.36 (80) | 0.36 (80) |
| Mullen Burst Strength | ASTM D 3786 | kPa (psi) | 2756 (400) | |
| Puncture Strength | ASTM D 4833 | kN (lbs) | 0.58 (130) | |
| Apparent Opening Size (AOS) | ASTM D 4751 | mm (U.S. Sieve) | 0.180 (80) | |
| Permittivity | ASTM D 4491 | $sec^{-1}$ | 1.2 | |
| Permeability | ASTM D 4491 | cm/sec | 0.28 | |
| Flow Rate | ASTM D 4491 | $l/min/m^2$ ($gal/min/ft^2$) | 3866 (95) | |
| UV Resistance (at 500 hours) | ASTM D 4355 | % strength retained | 70 | |

| Physical Properties | Test Method | Unit | Typical Value |
|---|---|---|---|
| Weight | ASTM D 5261 | $g/m^2$ ($oz/yd^2$) | 278 (8.2) |
| Thickness | ASTM D 5199 | mm (mils) | 2.3 (90) |
| Roll Dimensions (width x length) | -- | m (ft) | 4.5 x 91 (15 x 300) |
| Roll Area | -- | $m^2$ ($yd^2$) | 418 (500) |
| Estimated Roll Weight | -- | kg (lb) | 124 (273) |

**DISCLAIMER:** TC Mirafi warrants our products to be free from defects in material and workmanship when delivered to TC Mirafi's customers and that our products meet our published specifications. Contact your local TC Mirafi Representative for detailed product specification and warranty information.

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

To: Sheen Shivaswami
Sender: Chuck Gopperton
Attention: FCDMC
Tel. No: 438-2200
Fax No (480) 836 4530
Fax No: 431-9562
Date: 7/6/00
2 page(s) total includes cover sheet
File:
Original will **NOT** follow by mail.

THE CONTENT OF THIS FAX IS CONFIDENTIAL. IF THE READER IS NOT THE INTENDED RECIPIENT OR ITS AGENT, BE ADVISED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THE CONTENT OR OF THIS FAX IS PROHIBITED. IF YOU HAVE RECEIVED THIS FAX IN ERROR, PLEASE NOTIFY US IMMEDIATELY AND RETURN THE ORIGINAL FAX TO US BY MAIL AT OUR EXPENSE. THANK YOU.

**Reference:** Golden Eagle Park Dam

Attachments: Submittal for concrete aggregates

Message: reviewed -

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on 7-4-00 by FCDMC for the proposed fine and coarse aggregate to be used in the Class AA concrete:

- Sieve Analysis of sand and sand equivalent
- Sieve Analysis of #5 and #7 aggregate
- Specific Gravity and absorption tests for the sand and coarse aggregate
- Petrographic analysis for the sand and coarse aggregate
- Alkalai reactivity tests for the sand and coarse aggregate
- Soundness tests for the sand and coarse aggregate

The submittals were reviewed, and the aggregate meets the required gradation, and all locally accepted requirements for soundness, durability, reactivity and deleterious substances.

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Mark Toppen

Date: 7/6/00

ATL, INC.
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# REPORT OF SIEVE ANALYSIS - FINE AGGREGATE

| | | | |
|---|---|---|---|
| **CLIENT:** | Cemex | **DATE SAMPLED:** | 01/05/00 |
| **ADDRESS:** | 2625 South 19th Ave. | **ATL JOB NO.:** | 200001 |
| | Phoenix, AZ 85009 | **CHANGE ORDER NO.:** | |
| | | **ATL LAB NO.:** | 00-001 |
| **PROJECT NAME:** | Annual Lab Testng | **LAB METHOD:** | ASTM C-136 |
| **ATTENTION:** | Mr. Jason Straka | **SAMPLED BY:** | Client |
| **MATERIAL SOURCE:** | Plant #61 | **TESTED BY:** | JL/HM |
| **MATERIAL:** | Concrete Sand | **REPORT DATE:** | 01-Feb-00 |

| SIEVE (mm) | WT. RETAINED | %RET. | % PASSING | SPECIFICATIONS |
|---|---|---|---|---|
| 3" (75) | | | | |
| 2 1/2" (63) | | | | |
| 2" (50) | | | | |
| 1 ½" (37.5) | | | | |
| 1" (25) | | | | |
| 3/4" (19) | | | | |
| 1/2" (12.5) | | | | |
| 3/8" (9.5) | | | | |
| 1/4" (6.3) | | | 100 | |
| #4 (4.75) | 1 | 0 | 100 | |
| | | W.B.W. (WET): | | 806 |
| | | W.B.W. (DRY): | | 737 |
| | | W.A.W: | | 728 |
| | | ELUTRIATION: | | 9.0 |
| #8 (2.36) | 97 | 13 | 87 | |
| #10 (2.0) | 21 | 3 | 84 | |
| #16 (1.18) | 111 | 15 | 69 | |
| #30 (0.600) | 165 | 22 | 46 | |
| #40 (0.425) | 109 | 15 | 32 | |
| #50 (0.300) | 92 | 12 | 19 | |
| #100 (0.150) | 101 | 14 | 5 | |
| #200 (0.075) | 30 | 4 | 1.4 | |
| Pan | 1 | | | |
| Total | 728 | | | |

| | MOISTURE |
|---|---|
| Wet Wt. (g) | 800.0 |
| Dry Wt. (g) | 736.9 |
| Wt. Water (g) | 63.1 |
| % Moisture | 8.6 |

| FACTORS |
|---|
| Fine |
| 0.135685 |

**ATTERBERG LIMITS**
ASTM D4318 - AASHTO T-89/90

| | |
|---|---|
| LL | Not tested |
| PL | Not tested |
| PI | Not tested |

**SAND EQUIVALENT**
ASTM D-2419

| | |
|---|---|
| SE 1 | 87 |
| SE 2 | 86 |
| SE 3 | 88 |
| SE AVERAGE | 87 |

Remarks:

Reviewed By:

Input By: AO

Respectfully Submitted:

Ammi Osorio
Laboratory Engineer

ATL, INC.
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# REPORT OF SIEVE ANALYSIS - COARSE AGGREGATE

| | | | |
|---|---|---|---|
| **CLIENT:** | Cemex | **DATE SAMPLED:** | 01/05/00 |
| **ADDRESS:** | 2625 South 19th Ave. | **ATL JOB NO.:** | 200001 |
| | Phoenix, AZ 85009 | **CHANGE ORDER NO.:** | |
| | | **ATL LAB NO.:** | 00-006 |
| **PROJECT NAME:** | Annual Lab Testing | **LAB METHOD:** | ASTM C-136 |
| **ATTENTION:** | Mr. Jason Straka | **SAMPLED BY:** | Client |
| **MATERIAL SOURCE:** | Plant #61 | **TESTED BY:** | JL/AT |
| **MATERIAL:** | #5 Aggregate | **REPORT DATE:** | 01-Feb-00 |

| SIEVE (mm) | WT. RETAINED | %RET. | % PASSING | SPECIFICATIONS |
|---|---|---|---|---|
| 3" (75) | | | | |
| 2 1/2" (63) | | | | |
| 2" (50) | | | | |
| 1 ½" (37.5) | | | 100 | |
| 1" (25) | 559 | 4.0 | 96 | |
| 3/4" (19) | 5976 | 40 | 56 | |
| 1/2" (12.5) | 7511 | 50 | 6 | |
| 3/8" (9.5) | 656 | 4 | 2 | |
| 1/4" (6.3) | 117 | 1 | 1 | |
| #4 (4.75) | 16 | 0 | 1 | |
| [redacted] | | | | |
| [redacted] | | W.B.W. (WET): | | 15021.2 |
| [redacted] | | W.B.W. (DRY): | | 14970 |
| [redacted] | | W.A.W: | | 14894 |
| [redacted] | | ELUTRIATION: | | 75.7 |
| #8 (2.36) | 6 | 0 | 1 | |
| #10 (2.0) | 2 | 0 | 1 | |
| #16 (1.18) | 3 | 0 | 1 | |
| #30 (0.600) | 5 | 0 | 1 | |
| #40 (0.425) | 4 | 0 | 1 | |
| #50 (0.300) | 4 | 0 | 1 | |
| #100 (0.150) | 9 | 0 | 1 | |
| #200 (0.075) | 11 | 0 | 0.6 | |
| Pan | 15 | | | |
| Total | 14894 | | | |

| | MOISTURE |
|---|---|
| Wet Wt. (g) | 15021.2 |
| Dry Wt. (g) | 14969.7 |
| Wt. Water (g) | 51.5 |
| % Moisture | 0.3 |

| FACTORS |
|---|
| Coarse |
| 0.006680 |

| ATTERBERG LIMITS<br>ASTM D4318 - AASHTO T-89/90 | |
|---|---|
| LL | Not tested |
| PL | Not tested |
| PI | Not tested |

Remarks:

Reviewed By:

Input By: AO

Respectfully Submitted:

Ammi Osorio
Laboratory Engineer

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# REPORT OF SIEVE ANALYSIS - COARSE AGGREGATE

| | | | |
|---|---|---|---|
| **CLIENT:** | Cemex | **DATE SAMPLED:** | 01/05/00 |
| **ADDRESS:** | 2625 South 19th Ave. | **ATL JOB NO.:** | 200001 |
| | Phoenix, AZ 85009 | **CHANGE ORDER NO.:** | |
| | | **ATL LAB NO.:** | 00-009 |
| **PROJECT NAME:** | Annual Lab Testing | **LAB METHOD:** | ASTM C-136 |
| **ATTENTION:** | Mr. Jason Straka | **SAMPLED BY:** | Client |
| **MATERIAL SOURCE:** | Plant #61 | **TESTED BY:** | JL/KP |
| **MATERIAL:** | #7 Aggregate | **REPORT DATE:** | 01-Feb-00 |

| SIEVE (mm) | WT. RETAINED | %RET. | % PASSING | SPECIFICATIONS |
|---|---|---|---|---|
| 3" (75) | | | | |
| 2 1/2" (63) | | | | |
| 2" (50) | | | | |
| 1 ½" (37.5) | | | | |
| 1" (25) | | | | |
| 3/4" (19) | | | 100 | |
| 1/2" (12.5) | 1085 | 21 | 79 | |
| 3/8" (9.5) | 1574 | 31 | 48 | |
| 1/4" (6.3) | 1696 | 33 | 16 | |
| #4 (4.75) | 540 | 10 | 5 | |
| [redacted] | | | | |
| [redacted] | | W.B.W. (WET): | | 5210 |
| [redacted] | | W.B.W. (DRY): | | 5157 |
| [redacted] | | W.A.W: | | 5148 |
| [redacted] | | ELUTRIATION: | | 9.0 |
| #8 (2.36) | 234 | 5 | 1 | |
| #10 (2.0) | 3 | 0 | 1 | |
| #16 (1.18) | 2 | 0 | 0 | |
| #30 (0.600) | 1 | 0 | 0 | |
| #40 (0.425) | 2 | 0 | 0 | |
| #50 (0.300) | 2 | 0 | 0 | |
| #100 (0.150) | 3 | 0 | 0 | |
| #200 (0.075) | 3 | 0 | 0.2 | |
| Pan | 3 | | | |
| Total | 5148 | | | |

| | MOISTURE |
|---|---|
| Wet Wt. (g) | 5210.2 |
| Dry Wt. (g) | 5156.5 |
| Wt. Water (g) | 53.7 |
| % Moisture | 1.0 |

| FACTORS |
|---|
| Coarse |
| 0.019391 |

| ATTERBERG LIMITS<br>ASTM D4318 - AASHTO T-89/90 | |
|---|---|
| LL | Not tested |
| PL | Not tested |
| PI | Not tested |

Remarks:

Reviewed By:

Input By: AO

Respectfully Submitted:

Ammi Osorio
Laboratory Engineer

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# SPECIFIC GRAVITY AND ABSORPTION OF AGGREGATES

| | | | |
|---|---|---|---|
| **Client:** | Cemex<br>2625 South 19th Ave.<br>Phoenix, AZ 85009 | **Job No.:**<br>**Lab No.:**<br>**Date Sampled:** | 200001<br>00-001<br>01/05/00 |
| **Attn:** | Mr. Jason Straka | **Tested by:** | JB |
| **Project:** | Annual Lab Testing | **Material Type:** | Concrete Sand |
| **Source of Material:** | Plant # 61 | **Report Date:** | 01/27/00 |

## AASHTO T84
### FINE AGGREGATE

| | |
|---|---|
| Bulk Specific Gravity = | 2.567 |
| Bulk Specific Gravity (SSD) = | 2.588 |
| Apparent Specific Gravity = | 2.623 |
| Absorption, (%) = | 0.83% |

Remarks:

Input By: AO

Respectfully Submitted:
**ATL,Inc.**

Ammi Osorio
Laboratory Engineer

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

**PHOENIX – CORPORATE OFFICE**
2912 W. Clarendon • Phoenix, AZ 85017
(602) 241-1097 • Fax (602) 277-1306
**www.atlquality.com**

# SPECIFIC GRAVITY AND ABSORPTION OF AGGREGATES

| | | | |
|---|---|---|---|
| **Client:** | Cemex<br>2625 South 19th Ave.<br>Phoenix, AZ 85009 | **Job No.:**<br>**Lab No.:**<br>**Date Sampled:** | 200001<br>00-006<br>01/05/00 |
| **Attn:** | Mr. Jason Straka | **Tested by:** | AT |
| **Project:** | Annual Lab Testing | **Material Type:** | #5 Aggregate |
| **Source of Material:** | Plant # 61 | **Report Date:** | 01/24/00 |

## AASHTO T85
### COARSE AGGREGATE

| | |
|---|---|
| Bulk Specific Gravity = | 2.603 |
| Bulk Specific Gravity (SSD) = | 2.629 |
| Apparent Specific Gravity = | 2.672 |
| Absorption, (%) = | 0.99% |

Remarks:

Input By: AO

Respectfully Submitted:
**ATL,Inc.**

Ammi Osorio
Laboratory Engineer

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

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**www.atlquality.com**

# SPECIFIC GRAVITY AND ABSORPTION OF AGGREGATES

| | | | |
|---|---|---|---|
| **Client:** | Cemex<br>2625 South 19th Ave.<br>Phoenix, AZ 85009 | **Job No.:**<br>**Lab No.:**<br>**Date Sampled:** | 200001<br>00-009<br>01/05/00 |
| **Attn:** | Mr. Jason Straka | **Tested by:** | AT |
| **Project:** | Annual Lab Testing | **Material Type:** | #7 Aggregate |
| **Source of Material:** | Plant # 61 | **Report Date:** | 01/24/00 |

## AASHTO T85
### COARSE AGGREGATE

| | |
|---|---|
| Bulk Specific Gravity = | 2.554 |
| Bulk Specific Gravity (SSD) = | 2.595 |
| Apparent Specific Gravity = | 2.662 |
| Absorption, (%) = | 1.59% |

Remarks:

Input By: AO

Respectfully Submitted:
**ATL,Inc.**

Ammi Osorio
Laboratory Engineer

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

**PHOENIX – CORPORATE OFFICE**
2912 W. Clarendon • Phoenix, AZ 85017
(602) 241-1097 • Fax (602) 277-1306
**www.atlquality.com**

# SUMMARY SHEET

| | | | |
|---|---|---|---|
| **CLIENT:** | Cemex | **DATE SAMPLED:** | 01/05/00 |
| **ADDRESS:** | 2625 South 19th Ave.<br>Phoenix, AZ 85009 | **ATL JOB NO.:** | 200001 |
| | | **CHANGE ORDER NO.:** | |
| | | **ATL LAB NOS.:** | 00-006 & 00-009 |
| **PROJECT NAME:** | Annual AggregateTesting | **LAB METHOD:** | |
| **ATTENTION:** | Mr. Jason Straka | **SAMPLED BY:** | Client |
| **MATERIAL SOURCE:** | Plant #61 | **REPORTED BY:** | AO |
| **MATERIAL:** | Combined No. 5 and No. 7 | **REPORT DATE:** | 10-Feb-00 |

## Plant No. 61

| Sieve | Grading No. 7 | Grading No. 5 | 40% No. 7 | 60% No. 5 | Combined | Specifications |
|---|---|---|---|---|---|---|
| 1 ½" | 100 | 100 | 40 | 60 | 100 | 100 |
| 1" | 100 | 96 | 40 | 57.6 | 98 | 95 - 100 |
| 3/4" | 100 | 56 | 40 | 33.6 | | |
| ½" | 79 | 6 | 31.6 | 3.6 | 35 | 25 - 60 |
| 3/8" | 48 | 2 | 19.2 | 1.2 | | |
| #4 | 5 | 1 | 2 | 0.6 | 3 | 0 - 10 |
| #8 | 1 | 1 | 0 | 0.6 | 1 | 0 - 5 |

Remarks:

Reviewed By:

Input By: AO

Respectfully Submitted:

Ammi Osorio
Laboratory Engineer

Mean

AMERICAN
PETROGRAPHIC
SERVICES, INC.

# PETROGRAPHIC ANALYSIS OF AGGREGATE

**PROJECT:**

#57 ROCK
PO#2148PO1006

**REPORTED TO:**

WESTERN TECHNOLOGIES, Inc.
3737 EAST BROADWAY ROAD
PHOENIX, AZ 85040-2966

**ATTN:** MICHAEL WHITMAN

**APS JOB NO:** 10-00417ca

**DATE:** JANUARY 8, 1998

## INTRODUCTION

This report presents the results of laboratory work performed by our firm on one coarse aggregate sample submitted to us by Mr. Michael Whitman of Western Technologies, Inc., on December 14, 1998. The scope of our work was limited to performing petrographic analysis testing (ASTM: C295) on the aggregate sample to provide a geological description of the material as well as identify any potentially deleterious properties when it is used as concrete aggregate.

## SAMPLE IDENTIFICATION

| | |
|---|---|
| Sample Designation: | #57 Rock |
| Sample Type: | Natural Coarse Aggregate |
| Original Sample Size, lbs: | 50.4 |

## TEST RESULTS

Our complete petrographic analysis test results appear on the attached data sheets. A summary of our analysis and opinions are as follows:

1. The material consists of a naturally occurring gravel, most likely from an alluvial or fluvial (river) deposit. A majority of the particles were subrounded to well rounded in the coarser fractions.

2. The aggregate was very clean and was free of any secondary mineral coatings such as calcite, manganese, or iron - oxide. However, 0.68% of the particles were coated with an asphalt-like product.

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3. The dominant rock types comprising the sample are of igneous origin, with smaller amounts of metamorphic and sedimentary lithologies. The igneous material is made up of mostly felsite, granite, and basalt. Thin section analysis of a few aphanitic volcanics reveals no presence of glass, a reactive component in volcanic igneous particles. Softer, weathered particles totaled 5.6%.

4. Approximately 7.5% of the sample consists of metamorphic lithologies. Thin section analysis of a few gneissic particles reveals stable, fully recrystallized textures. The quartzite thin sections do not exhibit severely strained quartz or obvious reactive textures.

5. In the sedimentary grouping, potentially deleterious particles numbered under 1% total. The great majority of the sandstone and chert particles were considered hard and durable.

6. In general, the aggregate is considered hard and durable. We believe the potential for alkali-silica reaction (ASR) is very low, but may exist in some particles under highly alkaline conditions. Unless an adequate service history exists to support this or related material's soundness, we suggest potential reactivity testing such as ASTM:C227, "Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)".

## TEST PROCEDURES

Petrographic analysis testing was performed on December 15, 1998 and subsequent dates. The petrographic analysis was performed on representative hand samples and in thin section. A total of ten petrographic thin sections were produced to further study unknown or potentially reactive lithologies. Observations were made using an Olympus polarizing-lig4ht microscope with magnification up to 1000x and an Olympus stereozoom microscope with magnification up to 130x. Testing was performed in accordance with APS Standard Operating Procedure 00 LAB 004, "Petrographic Examination of Aggregates for Concrete, ASTM:C295".

In general, the test procedure including conducting a gradation on the submitted sample. The percent retained was determined for each of the sieve sizes 1", 3/4", 1/2", 3/8", #4, and #8. At least 150 particles were split from the material retained on each sieve and each particle identified lithologically. The weight percent of each lithology by sieve size in the entire sample was calculated by multiplying the lithologic percentage for a particular size fraction by the percent retained on that sieve.

## REMARKS

The test sample will be retained for at least thirty days from the date of this report. Unless further instructions are received by that time, the sample may be discarded.

Report Prepared By:

Gerard Moulzolf, PG
Geologist/Petrographer
MN License #30023

Report Reviewed By:

Scott Wolter, PG
President
MN License #30024

## Percent of Rock Type Retained in Each Sieve Size

| Lithology | 1" | 3/4" | 1/2" | 3/8" | #4 | #8 |
|---|---|---|---|---|---|---|
| **Igneous** | | | | | | |
| Basalt | 0.0 | 3.3 | 1.2 | 1.8 | 3.7 | 1.7 |
| Basalt, Soft, Weathered | 0.0 | 3.3 | 0.6 | 2.5 | 2.5 | 2.3 |
| Felsite | 12.5 | 32.4 | 27.8 | 36.3 | 33.5 | 25.5 |
| Felsite, Soft, Weathered | 0.0 | 0.0 | 2.4 | 4.9 | 8.1 | 5.2 |
| Granite | 25.0 | 3.3 | 13.0 | 6.1 | 15.5 | 16.2 |
| Granite, Graphic | 0.0 | 1.1 | 2.4 | 0.6 | 3.7 | 2.9 |
| Diorite | 0.0 | 2.2 | 2.4 | 1.8 | 1.2 | 0.0 |
| Asphalt Coated Particles | 0.0 | 0.0 | 1.2 | 1.2 | 0.0 | 0.6 |
| **Metamorphic** | | | | | | |
| Quartzite | 25.0 | 8.9 | 5.9 | 8.0 | 2.5 | 2.3 |
| Gneiss | 0.0 | 2.2 | 2.4 | 0.0 | 0.0 | 0.0 |
| Schist | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 |
| **Sedimentary** | | | | | | |
| Sandstone | 37.5 | 32.2 | 28.2 | 28.3 | 20.0 | 31.6 |
| Sandstone, Soft, Weathered | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 |
| Siltstone | 0.0 | 0.0 | 0.6 | 1.8 | 0.6 | 2.9 |
| Chert | 0.0 | 8.9 | 8.9 | 4.9 | 8.1 | 5.8 |
| Chert, Soft, Sandy | 0.0 | 0.0 | 0.6 | 0.6 | 0.0 | 0.6 |
| Carbonate | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Chalcedony | 0.0 | 1.1 | 1.8 | 1.2 | 0.0 | 0.0 |
| Iron Formation | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 1.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

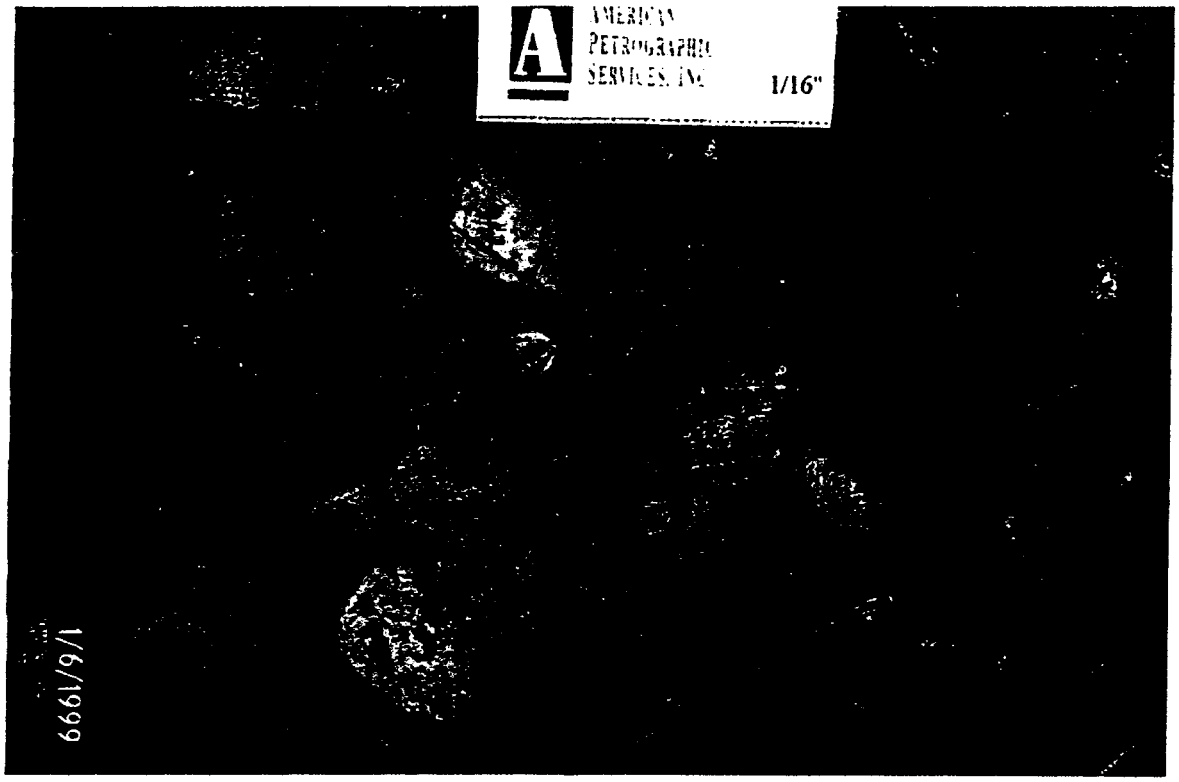
# Calculated Percentage in Entire Sample

| Lithology | 1" | 3/4" | 1/2" | 3/8" | #4 | #8 | -#8 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **Igneous** | | | | | | | | |
| Basalt | 0.0000 | 0.5445 | 0.4680 | 0.2916 | 0.8695 | 0.0476 | | 2.2212 |
| Basalt, Soft, Weathered | 0.0000 | 0.5445 | 0.2340 | 0.4050 | 0.5875 | 0.0644 | | 1.8354 |
| Felsite | 0.1500 | 5.3460 | 10.8420 | 5.8806 | 7.8725 | 0.7140 | | 30.8051 |
| Felsite, Soft, Weathered | 0.0000 | 0.0000 | 0.9360 | 0.7938 | 1.9035 | 0.1456 | | 3.7789 |
| Granite | 0.3000 | 0.5445 | 5.0700 | 0.9882 | 3.6425 | 0.4536 | | 10.9988 |
| Granite, Graphic | 0.0000 | 0.1815 | 0.9360 | 0.0972 | 0.8695 | 0.0812 | | 2.1654 |
| Diorite | 0.0000 | 0.3630 | 0.9360 | 0.2916 | 0.2820 | 0.0000 | | 1.8726 |
| Asphalt Coated Particles | 0.0000 | 0.0000 | 0.4680 | 0.1944 | 0.0000 | 0.0168 | | 0.6792 |
| **Metamorphic** | | | | | | | | |
| Quartzite | 0.3000 | 1.4685 | 2.3010 | 1.2960 | 0.5875 | 0.0644 | | 6.0174 |
| Gneiss | 0.0000 | 0.3630 | 0.9360 | 0.0000 | 0.0000 | 0.0000 | | 1.2990 |
| Schist | 0.0000 | 0.0000 | 0.2340 | 0.0000 | 0.0000 | 0.0000 | | 0.2340 |
| **Sedimentary** | | | | | | | | |
| Sandstone | 0.4500 | 5.3130 | 10.9980 | 4.5846 | 4.7000 | 0.8848 | | 26.9304 |
| Sandstone, Soft, Weathered | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0336 | | 0.0336 |
| Siltstone | 0.0000 | 0.0000 | 0.2340 | 0.2916 | 0.1410 | 0.0812 | | 0.7478 |
| Chert | 0.0000 | 1.4685 | 3.4710 | 0.7938 | 1.9035 | 0.1624 | | 7.7992 |
| Chert, Soft, Sandy | 0.0000 | 0.0000 | 0.2340 | 0.0972 | 0.0000 | 0.0168 | | 0.3480 |
| Carbonate | 0.0000 | 0.1815 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.1815 |
| Chalcedony | 0.0000 | 0.1815 | 0.7020 | 0.1944 | 0.0000 | 0.0000 | | 1.0779 |
| Iron Formation | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1410 | 0.0336 | | 0.1746 |
| Total | 1.2 | 16.5 | 39.0 | 16.2 | 23.5 | 2.8 | | 99.2000 |
| % Retained | 1.2 | 16.5 | 39.0 | 16.2 | 23.5 | 2.8 | 0.8* | 99.2 |

*0.8% of the sample passed through a #8 sieve

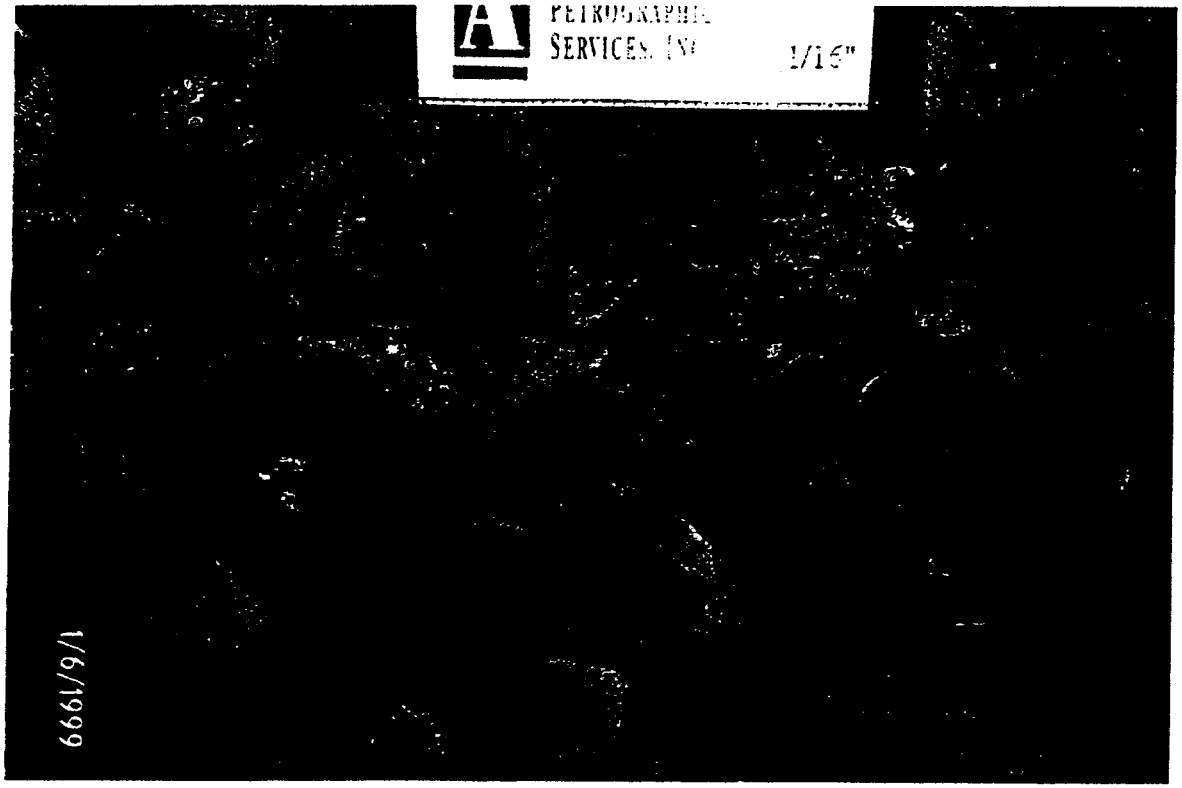
APS# 10-00417
PROJECT: #57 Rock
#2148PO1006

DATE: January 11, 1998




SAMPLE IDENTIFICATION: #57 Rock

SAMPLE DESCRIPTION: Material retained on the 3/4" sieve. 1/16" scale

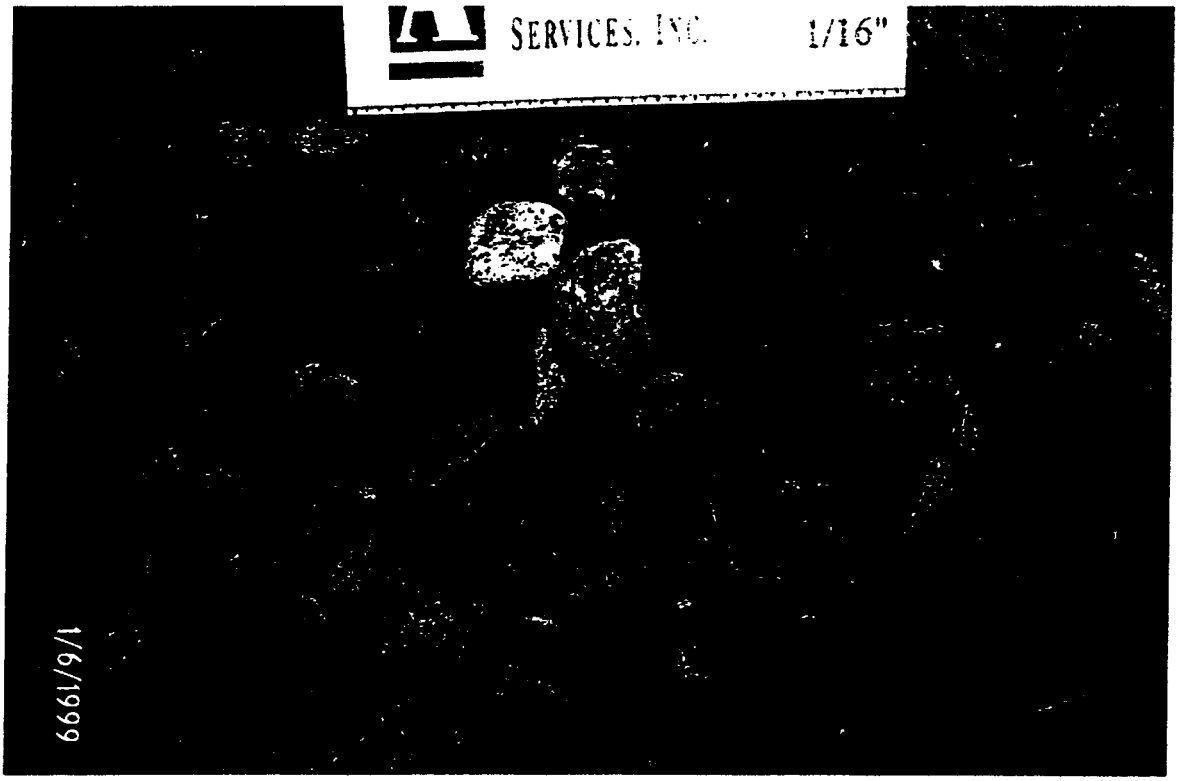



SAMPLE IDENTIFICATION: #57 Rock

SAMPLE DESCRIPTION: Material retained on the 1/2" sieve.

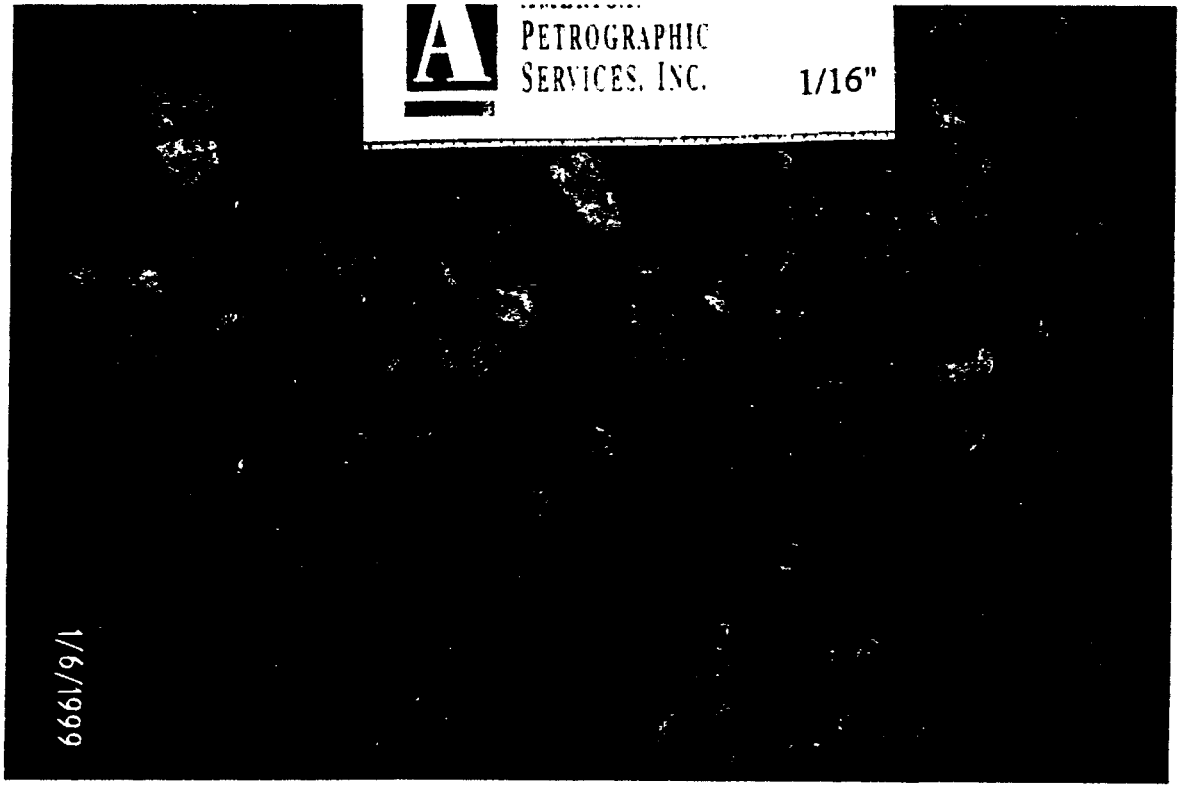
APS# 10-00417
PROJECT: #57 Rock
#2148PO1006

DATE: January 11, 1998




SAMPLE IDENTIFICATION: #57 Rock

SAMPLE DESCRIPTION: Material retained on the 3/8" sieve. 1/16" scale




SAMPLE IDENTIFICATION: #57 Rock

SAMPLE DESCRIPTION: Material retained on the #4 sieve.

AMERICAN
PETROGRAPHIC
SERVICES, INC.

# PETROGRAPHIC ANALYSIS OF AGGREGATE

**PROJECT:**

CONCRETE SAND
PO#2148PO1006

**REPORTED TO:**

WESTERN TECHNOLOGIES, Inc.
3737 EAST BROADWAY ROAD
PHOENIX, AZ 85040-2966

**ATTN:** MICHAEL WHITMAN

**APS JOB NO:** 10-00417fa

**DATE:** JANUARY 8, 1998

## INTRODUCTION

This report presents the results of laboratory work performed by our firm on one fine aggregate sample submitted to us by Mr. Michael Whitman of Western Technologies, Inc., on December 14, 1998. The scope of our work was limited to performing petrographic analysis testing (ASTM: C295) on the aggregate sample to provide a geological description of the material as well as identify any potentially deleterious properties when it is used as concrete aggregate.

## SAMPLE IDENTIFICATION

| | |
|---|---|
| Sample Designation: | Concrete Sand |
| Sample Type: | Natural Fine Aggregate |
| Original Sample Size, lbs: | 14.8 |

## TEST RESULTS

Our complete petrographic analysis test results appear on the attached data sheets. A summary of our analysis and opinions are as follows:

1. The material consists of a lithic sand, most likely from an alluvial or fluvial (river) deposit. the particles ranged in shape from well rounded to very angular.

2. The aggregate was clean and was free of any secondary mineral coatings such as calcite, manganese, or iron - oxide. However, 0.82% of the particles were coated with an asphalt-like product.

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3. The dominant rock types comprising the sample are of igneous origin, with smaller amounts of metamorphic and sedimentary lithologies. The igneous material is made up of mostly felsite and granite. Thin section analysis of the material revealed one glassy igneous particle. Glass is a reactive component which may be found in volcanic igneous particles. Softer, weathered, igneous particles totaled 1.8%.

4. Approximately 5% of the sample consists of the metamorphic lithologies quartzite and schist. Thin section analysis reveals mostly stable quartz, with some undulatory extinction, a sign of strain. No severely strained quartz or obvious reactive textures were observed.

5. In general, the aggregate is considered hard and durable. We believe the potential for alkali-silica reaction (ASR) is very low, but may exist in some particles under highly alkaline conditions. Unless an adequate service history exists to support this or related material's soundness, we suggest potential reactivity testing such as ASTM:C227, "Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)".

## TEST PROCEDURES

Petrographic analysis testing was performed on December 15, 1998 and subsequent dates. The petrographic analysis was performed on representative hand samples and in thin section. Observations were made using an Olympus polarizing-light microscope with magnification up to 1000x and an Olympus stereozoom microscope with magnification up to 130x. Testing was performed in accordance with APS Standard Operating Procedure 00 LAB 004, "Petrographic Examination of Aggregates for Concrete, ASTM:C295".

In general, the test procedure including conducting a gradation on the submitted sample. The percent retained was determined for each of the sieve sizes #200, # 100, #50, #30, #16, #8 and #4. At least 150 particles were split from the material retained on each sieve and each particle identified lithologically. The weight percent of each lithology by sieve size in the entire sample was calculated by multiplying the lithologic percentage for a particular size fraction by the percent retained on that sieve.

## REMARKS

The test sample will be retained for at least thirty days from the date of this report. Unless further instructions are received by that time, the sample may be discarded.

Report Prepared By:

Gerard Moulzolf, PG
Geologist/Petrographer
MN License #30023

Report Reviewed By:

Scott Wolter, PG
President
MN License #30024

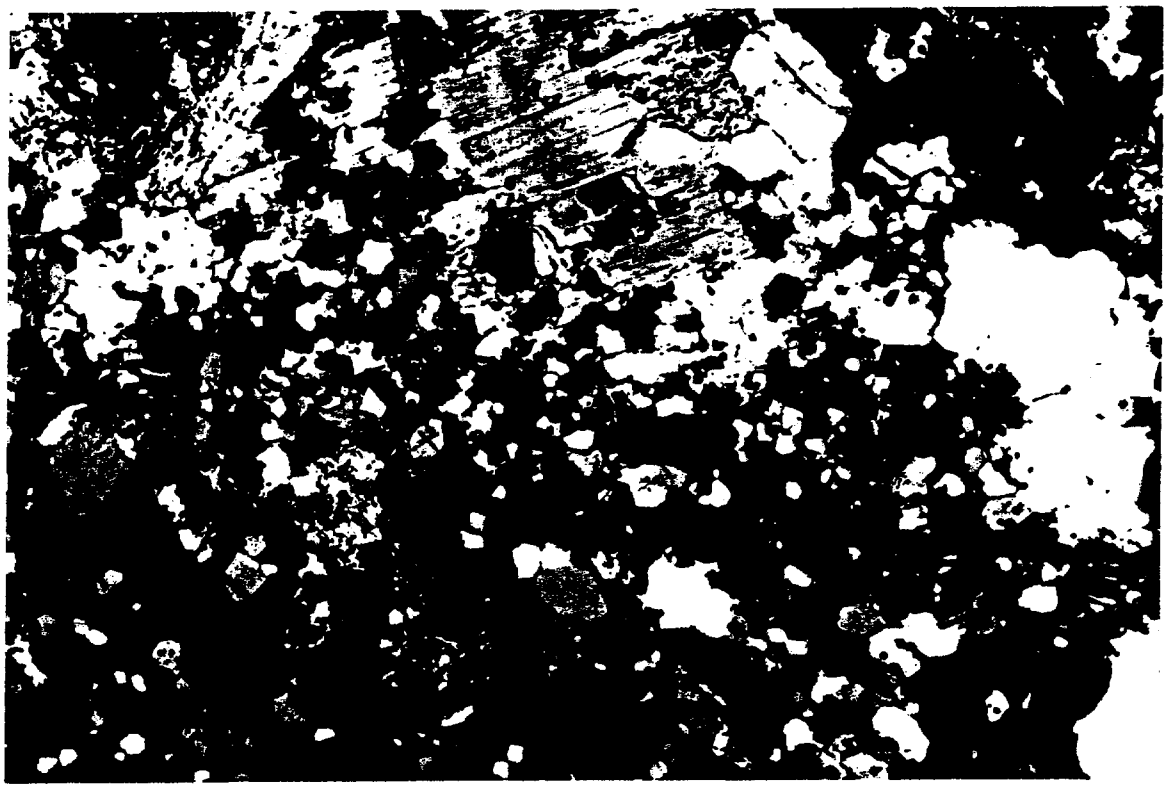
# Calculated Percentage in Entire Sample

| Lithology | #8 | #16 | #30 | #50 | #100 | #200 | #200 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **Igneous** | | | | | | | | |
| Basalt | 0.2295 | 0.1152 | 0.1582 | 0.0000 | 0.0000 | 0.0000 | | 0.5029 |
| Basalt, Soft, Weathered | 0.1530 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.1530 |
| Felsite | 4.8960 | 4.2624 | 6.9382 | 4.1574 | 0.8255 | 0.0720 | | 21.1515 |
| Felsite, Glassy | | | | | | | | |
| Felsite, Soft, Weathered | 0.9180 | 0.5952 | 0.1582 | 0.0000 | 0.0000 | 0.0000 | | 1.6714 |
| Granite | 3.9780 | 3.5328 | 3.4126 | 3.1980 | 1.5621 | 0.2440 | | 15.9275 |
| Granite, Graphic | 0.2295 | 1.3440 | 0.8814 | 0.1476 | 0.0000 | 0.0000 | | 2.6025 |
| Diorite | 0.2295 | 0.1152 | 0.1582 | 0.3198 | 0.0762 | 0.0240 | | 0.9229 |
| Mafic | 0.0000 | 0.0000 | 0.0000 | 0.3198 | 0.0000 | 0.0000 | | 0.3198 |
| Asphalt Coated Particles | 0.1530 | 0.3648 | 0.1582 | 0.1476 | 0.0000 | 0.0000 | | 0.8236 |
| **Metamorphic** | | | | | | | | |
| Quartzite | 0.3060 | 1.8240 | 0.7232 | 0.9594 | 0.6604 | 0.0720 | | 4.5450 |
| Schist | 0.0000 | 0.1152 | 0.1582 | 0.0000 | 0.1651 | 0.0000 | | 0.4385 |
| **Sedimentary** | | | | | | | | |
| Sandstone | 2.8305 | 2.9184 | 2.5312 | 1.5990 | 0.9906 | 0.1480 | | 11.0177 |
| Siltstone | 0.0000 | 0.0000 | 0.0000 | 0.3198 | 0.1651 | 0.0000 | | 0.4849 |
| Chert | 0.6885 | 1.2096 | 1.0396 | 0.6396 | 0.6604 | 0.1720 | | 4.4097 |
| Chert, Soft | 0.2295 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.2295 |
| **Mineral** | | | | | | | | |
| Quartz | 0.0000 | 0.5952 | 1.9436 | 5.7810 | 4.3053 | 1.5120 | | 14.1371 |
| Feldspar | 0.4590 | 2.0928 | 4.3392 | 6.7158 | 3.0480 | 1.3440 | | 17.9988 |
| Mica | 0.0000 | 0.0000 | 0.0000 | 0.1476 | 0.0762 | 0.0960 | | 0.3198 |
| Amphibole | 0.0000 | 0.0000 | 0.0000 | 0.1476 | 0.0000 | 0.0720 | | 0.2196 |
| Magnatite | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1651 | 0.1480 | | 0.3131 |
| Heavy Mineral | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0960 | | 0.0960 |
| Total | 15.3 | 19.1 | 22.6 | 24.6 | 12.7 | 4.0 | | 98.2848 |
| % Retained | 15.3 | 19.2 | 22.6 | 24.6 | 12.7 | 4.0 | 1.6* | 98.4 |

*1.6% of the sample passed through a #200 sieve

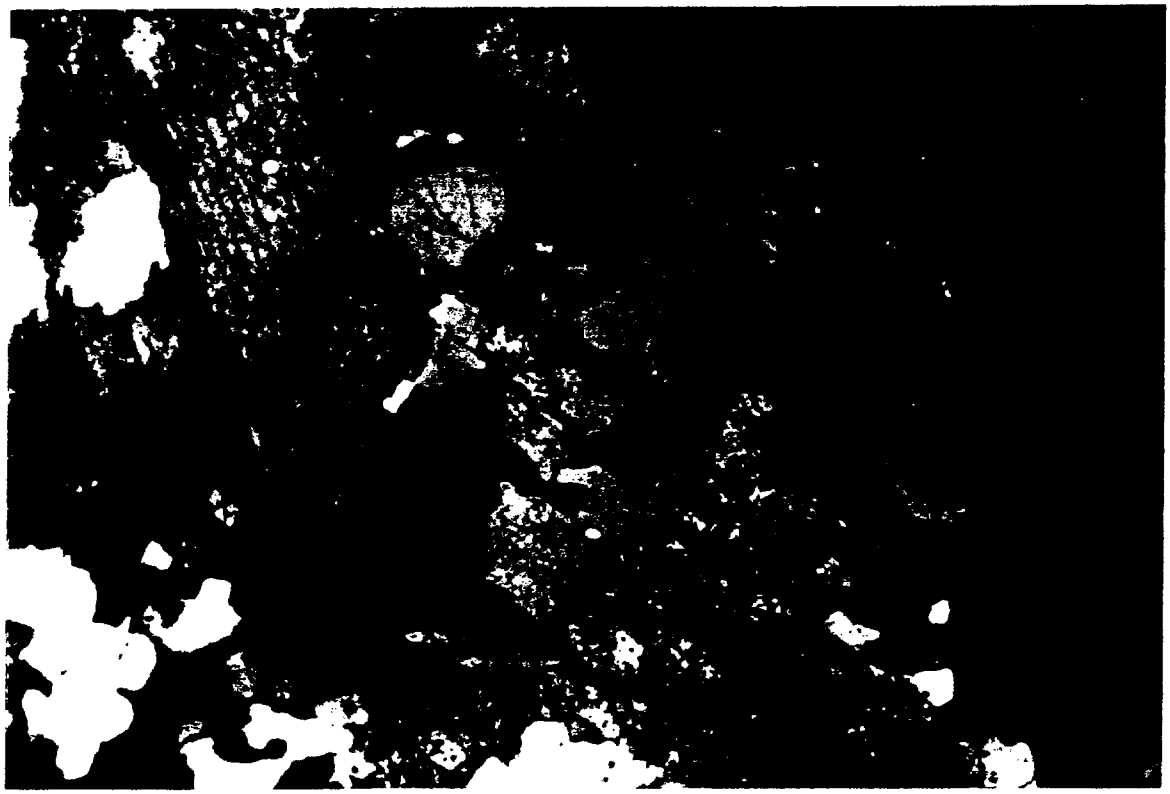
APS# 10-00417 DATE: January 11, 1997

PROJECT: #57 Rock
#2148PO1006



SAMPLE IDENTIFICATION: Thin Section #2
MAGNIFICATION: 40x

SAMPLE DESCRIPTION: Fine recrystallization of quartz and feldspar in gneiss. Quartz exhibits mostly strain free, unit extinction under cross polarized light. 0.08" field of view



SAMPLE IDENTIFICATION: Thin Section #7
MAGNIFICATION: 40x

SAMPLE DESCRIPTION: Stable, strain free quartz (clean, gray to white) within granitic particle, under cross polarized light, 0.08" field of view.

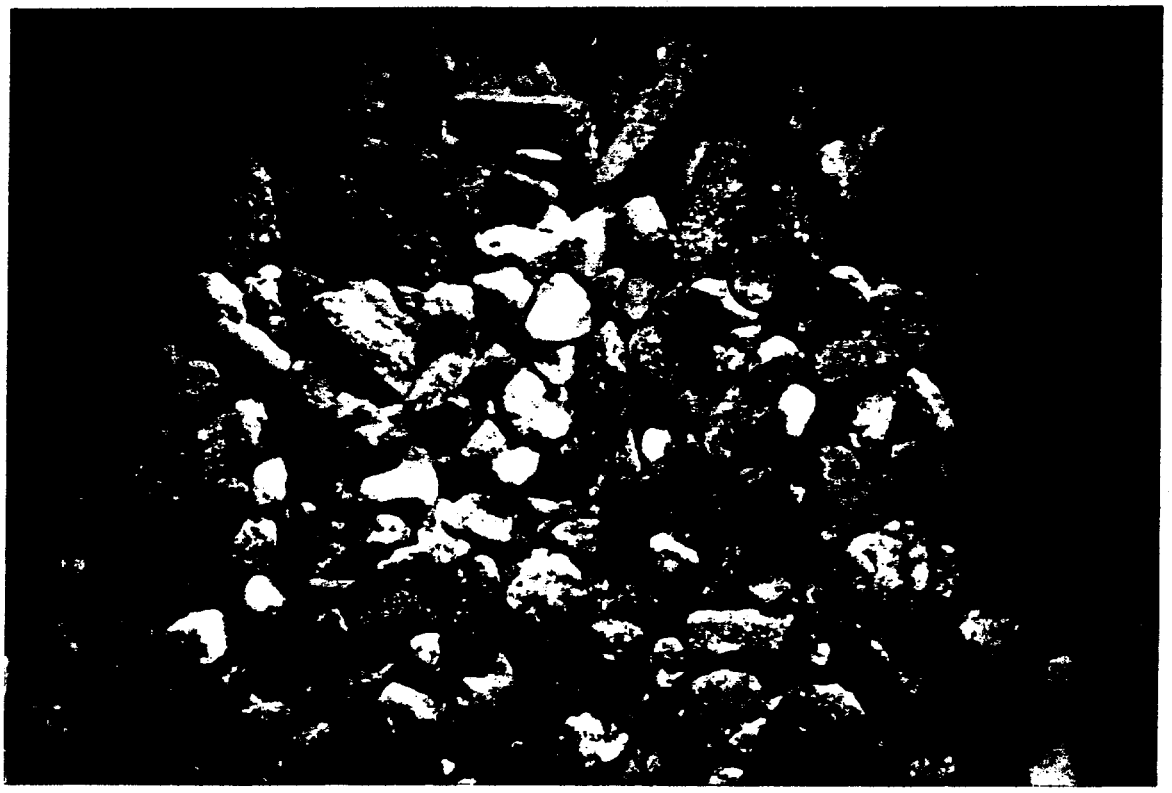
## Percent of Rock Type Retained in Each Sieve Size

| Lithology | #8 | #16 | #30 | #50 | #100 | #200 |
|---|---|---|---|---|---|---|
| **Igneous** | | | | | | |
| Basalt | 1.5 | 0.6 | 0.7 | 0.0 | 0.0 | 0.0 |
| Basalt, Soft, Weathered | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Felsite | 32.0 | 22.2 | 30.7 | 16.9 | 6.5 | 1.8 |
| Felsite, Glassy | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| Felsite, Soft, Weathered | 6.0 | 3.1 | 0.7 | 0.0 | 0.0 | 0.0 |
| Granite | 26.0 | 18.4 | 15.1 | 13.0 | 12.3 | 6.1 |
| Granite, Graphic | 1.5 | 7.0 | 3.9 | 0.6 | 0.0 | 0.0 |
| Diorite | 1.5 | 0.6 | 0.7 | 1.3 | 0.6 | 0.6 |
| Mafic | 0.0 | 0.0 | 0.0 | 1.3 | 0.0 | 0.0 |
| Asphalt Coated Particles | 1.0 | 1.9 | 0.7 | 0.6 | 0.0 | 0.0 |
| **Metamorphic** | | | | | | |
| Quartzite | 2.0 | 9.5 | 3.2 | 3.9 | 5.2 | 1.8 |
| Schist | 0.0 | 0.6 | 0.7 | 0.0 | 1.3 | 0.0 |
| **Sedimentary** | | | | | | |
| Sandstone | 18.5 | 15.2 | 11.2 | 6.5 | 7.8 | 3.7 |
| Siltstone | 0.0 | 0.0 | 0.0 | 1.3 | 1.3 | 0.0 |
| Chert | 4.5 | 6.3 | 4.6 | 2.6 | 5.2 | 4.3 |
| Chert, Soft | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Mineral** | | | | | | |
| Quartz | 0.0 | 3.1 | 8.6 | 23.5 | 33.9 | 37.8 |
| Feldspar | 3.0 | 10.9 | 19.2 | 27.3 | 24.0 | 33.6 |
| Mica | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 2.4 |
| Amphibole | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 1.8 |
| Magnatite | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 3.7 |
| Heavy Mineral | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

APS# 10-00417fa DATE: January 11, 1997

PROJECT: Concrete Sand
#2148PO1006

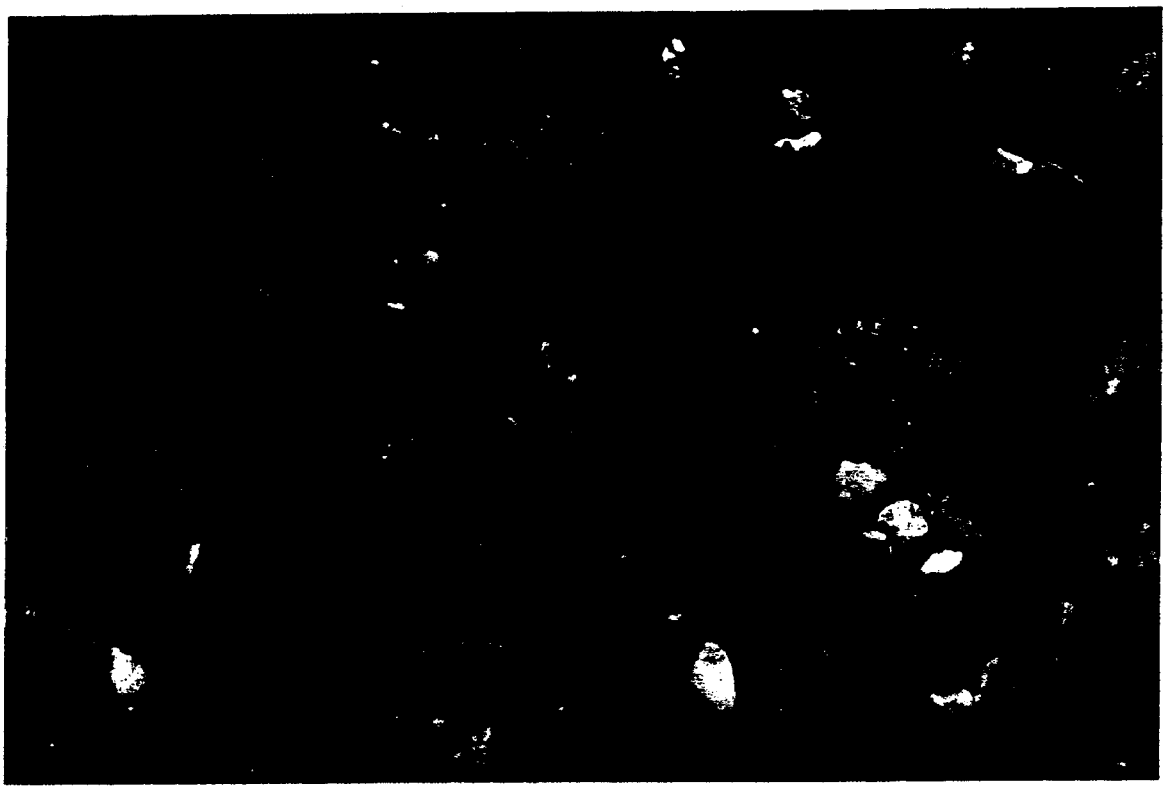
SAMPLE IDENTIFICATION: Concrete Sand SAMPLE DESCRIPTION: Material retained on the #8 sieve.
MAGNIFICATION: 3.75x



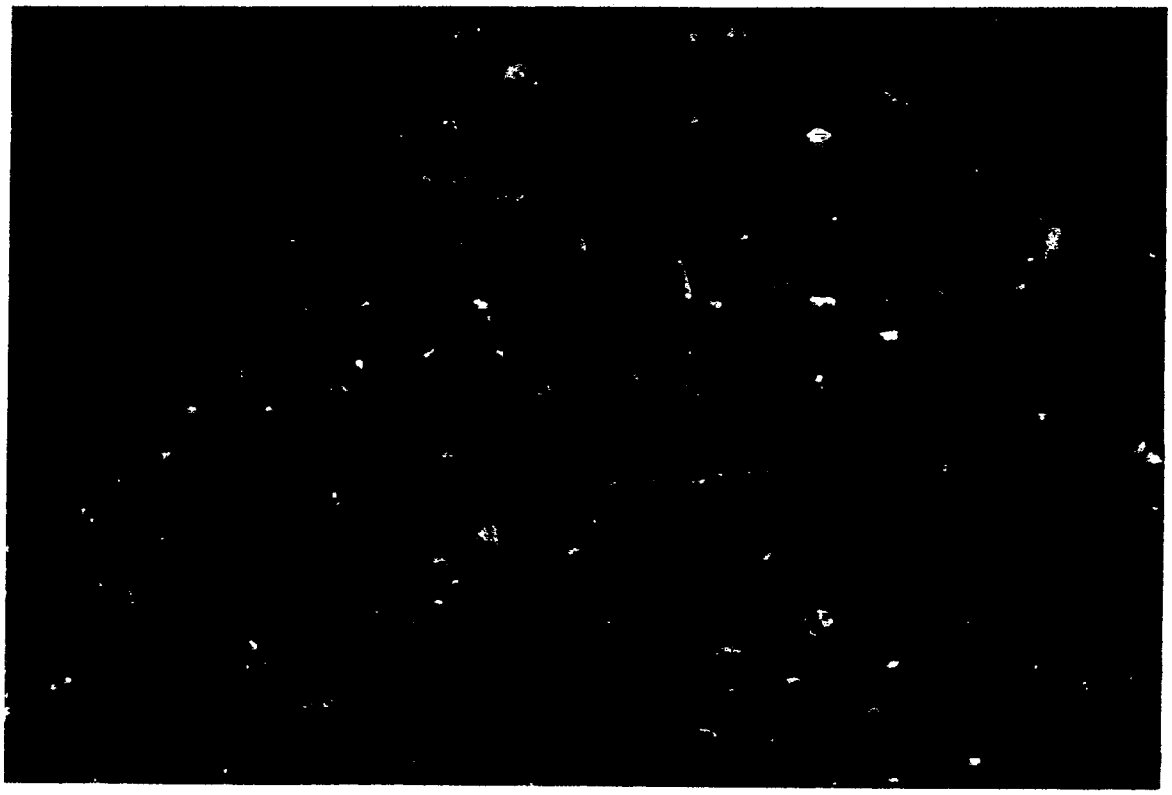
SAMPLE IDENTIFICATION: Concrete Sand SAMPLE DESCRIPTION: Material retained on the #16 sieve.
MAGNIFICATION: 3.75x

APS# 10-00417fa DATE: January 11, 1997

PROJECT: Concrete Sand
#2148PO1006



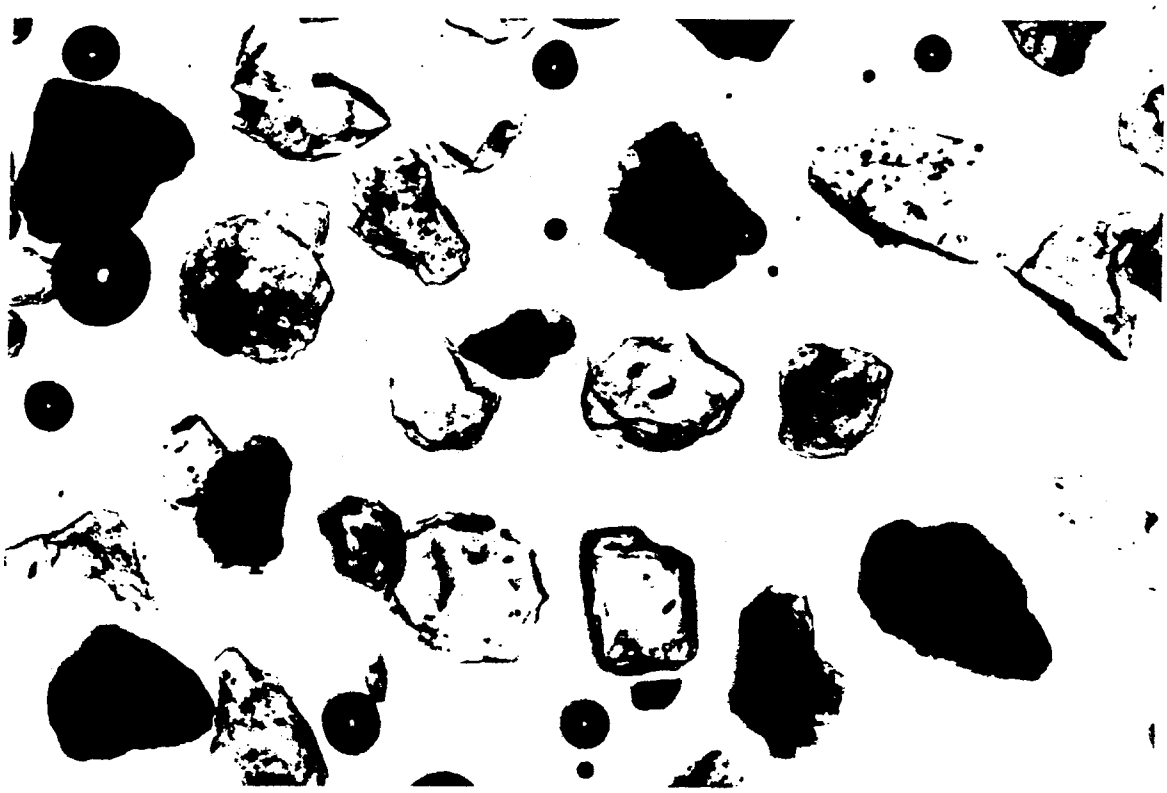
SAMPLE IDENTIFICATION: Concrete Sand SAMPLE DESCRIPTION: Material retained on the #30 sieve.
MAGNIFICATION: 7.5x



SAMPLE IDENTIFICATION: Concrete Sand SAMPLE DESCRIPTION: Material retained on the #50 sieve.
MAGNIFICATION: 7.5x

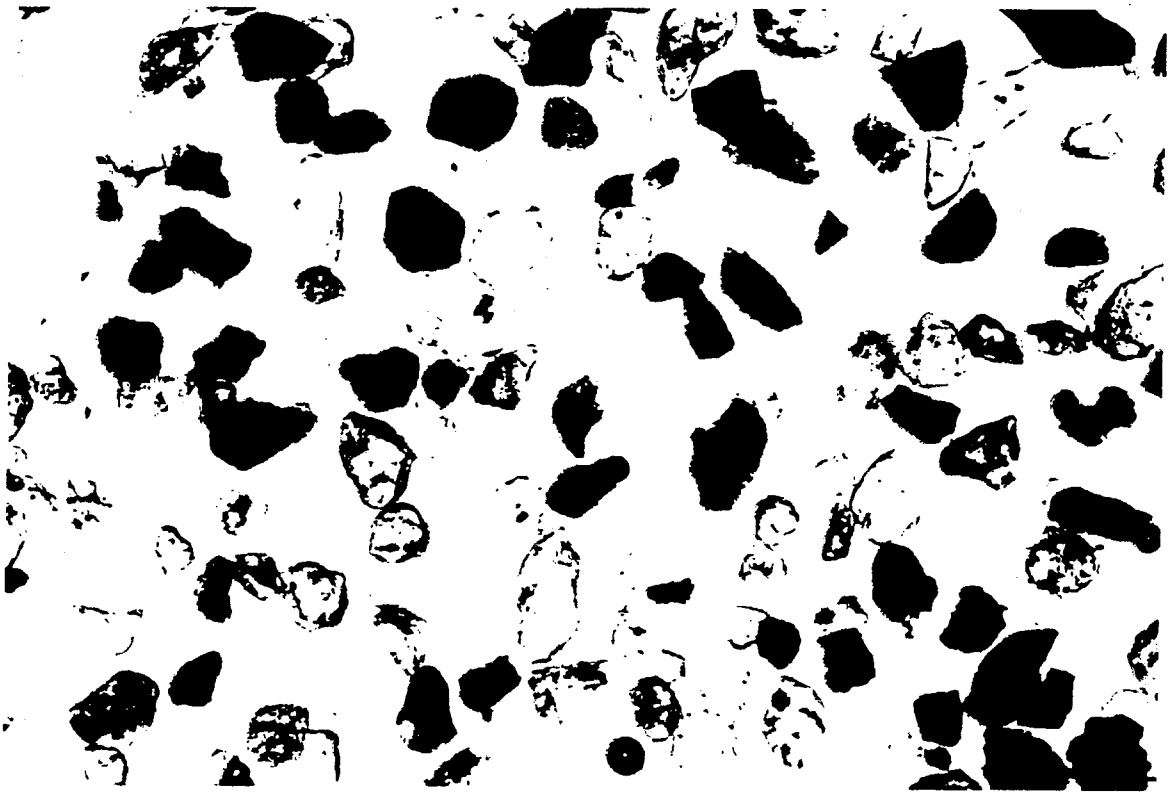
APS# 10-00417fa DATE: January 11, 1997

PROJECT: Concrete Sand
#2148PO1006



SAMPLE IDENTIFICATION: Concrete Sand
MAGNIFICATION: 40x

SAMPLE DESCRIPTION: Material retained on the #100 sieve, in thin section under plane polarized light.

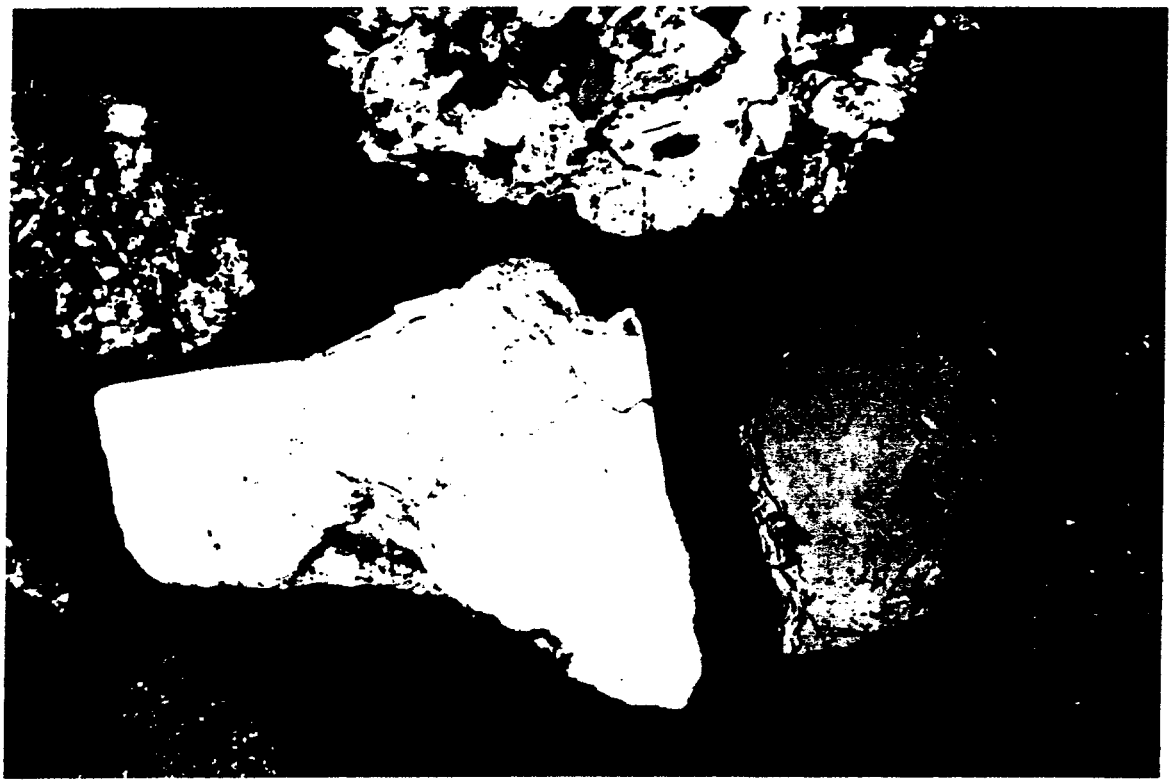


SAMPLE IDENTIFICATION: Concrete Sand
MAGNIFICATION: 40x

SAMPLE DESCRIPTION: Material retained on the #200 sieve, in thin section under plane polarized light.

APS# 10-00417fa DATE: January 11, 1997

PROJECT: Concrete Sand
#2148PO1006



SAMPLE IDENTIFICATION: Concrete Sand
MAGNIFICATION: 40x

SAMPLE DESCRIPTION: Quartz, quartzite, and granitic particle, retained on the #30 sieve, in thin section under cross polarized light.

SAMPLE IDENTIFICATION: Concrete Sand
MAGNIFICATION: 40x

SAMPLE DESCRIPTION: Mostly quartz and feldspar retained on the #50 sieve, in thin section under cross polarized light.

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The Quality People
Since 1955

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(602) 437-3737 • fax 470-1341

# LABORATORY REPORT

Date of Report **11-25-98 FINAL**
Job No. **2147JB040**
Event / Invoice No. **P040-29** Lab No. **1**
Authorized By **SM/RON** Date **4-11-97**
Sampled By **SM/RON** Date **4-11-97**
Submitted By **SM/DAVIS** Date **4-11-97**

Client **SUNWARD MATERIALS**
**ATTN MR GREG DAVIS**
**2625 S 19TH AVE**
**PHOENIX AZ 85009**

Project **QUALITY CONTROL**
Contractor - -
Type / Use of Material **CONCRETE SAND**
Sample Source / Location **SALT RIVER**
Reference: **ASTM C227 MORTAR BAR EXPANSION**
Special Instructions:

Location - -
Arch. / Engr. - -
Supplier / Source **SUNWARD MATERIALS**
Source / Location Desig. By **SM/DAVIS** Date - -

## TEST RESULTS

**CEMENT/SUNBELT II LOW ALKALI**
**WATER/CEMENT RATIO 0.53**

| | | | |
|---|---|---|---|
| 1 MONTH | 0.00 | 5 MONTH | 0.01 |
| 2 MONTH | 0.01 | 6 MONTH | 0.01 |
| 3 MONTH | 0.01 | 9 MONTH | 0.01 |
| 4 MONTH | 0.01 | 12 MONTH | 0.01 |

NOT USING Type II cement

Comments:
**SAND RUN AS RECEIVED**

Copies To: **CLIENT (1)**

LABORATORY TEST RESULTS REPORTED HEREIN APPLY ONLY TO THE SPECIFIC SAMPLE ON WHICH THE TEST WAS RUN. THE ABOVE SERVICES AND REPORT WERE PERFORMED PURSUANT TO THE TERMS AND CONDITIONS OF THE CONTRACT BETWEEN WT AND CLIENT. WT WARRANTS THAT THIS WAS PERFORMED UNDER THE STANDARD OF REASONABLE CARE APPLICABLE TO TESTING FACILITIES. NO OTHER WARRANTY, GUARANTY, OR REPRESENTATION, EXPRESSED OR IMPLIED, IS INCLUDED OR INTENDED.

REVIEWED BY

150095WT1
062806

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# LABORATORY REPORT

Date of Report **11-25-98 FINAL**
Job No. **2147JB040**
Event / Invoice No. **P040-29** Lab No. **2**
Authorized By **SM/RON** Date **4-11-97**
Sampled By **SM/RON** Date **4-11-97**
Submitted By **SM/DAVIS** Date **4-11-97**

Client **SUNWARD MATERIALS**
**ATTN MR GREG DAVIS**
**2625 S 19TH AVE**
**PHOENIX AZ 85009**

Project **QUALITY CONTROL**
Contractor - -
Type / Use of Material **#57 AGGREGATE**
Sample Source / Location **SALT RIVER**
Reference: **ASTM C227 MORTAR BAR EXPANSION**
Special Instructions:

Location - -
Arch. / Engr. - -
Supplier / Source **SUNWARD MATERIALS**
Source / Location Desig. By **SM/DAVIS** Date - -

## TEST RESULTS

**CEMENT/SUNBELT II LOW ALKALI**
**WATER/CEMENT RATIO 0.57**

| | | | |
|---|---|---|---|
| 1 MONTH | 0.00 | 5 MONTH | 0.01 |
| 2 MONTH | 0.01 | 6 MONTH | 0.01 |
| 3 MONTH | 0.01 | 9 MONTH | 0.01 |
| 4 MONTH | 0.01 | 12 MONTH | 0.02 |

NOT USING TYPE II CEMENT

Comments:
**AGGREGATE WAS GRADED PER TABLE I**

Copies To: **CLIENT (1)**

LABORATORY TEST RESULTS REPORTED HEREIN APPLY ONLY TO THE SPECIFIC SAMPLE ON WHICH THE TEST WAS RUN. THE ABOVE SERVICES AND REPORT WERE PERFORMED PURSUANT TO THE TERMS AND CONDITIONS OF THE CONTRACT BETWEEN WT AND CLIENT. WT WARRANTS THAT THIS WAS PERFORMED UNDER THE STANDARD OF REASONABLE CARE APPLICABLE TO TESTING FACILITIES. NO OTHER WARRANTY, GUARANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, IS INCLUDED OR INTENDED.

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# LABORATORY REPORT ON AGGREGATES

Date of Report **3-19-98**
Job No. **2149JL029**
Event / Invoice No. **R029-11A** Lab No. **2**
Authorized By **SM/DAVIS** Date **1-27-99**
Sampled By **SM/WALTER** Date **1-27-99**
Submitted By **SM/WALTER** Date **1-27-99**

Client **SUNWARD MATERIALS**
**ATTN MR GREG DAVIS**
**2625 S 19TH AVE**
**PHOENIX AZ 85009**

Project **ANNUAL TESTING**
Location **MESA PLANT**
Contractor - -
Arch. / Engr. - -
Type / Use of Aggregate **#5 AGGREGATE**
Supplier / Source **SUNWARD MATERIALS**
Sample Source / Location **PLANT #71**
Source / Location Desig. By **SM/WALTER** Date **1-27-99**
Reference **SOUNDNESS OF AGGREGATES BY USE OF** [X] **SODIUM SULFATE** [ ] **MAGNESIUM SULFATE**
[X] **ASTM C88** [ ] **AASHTO T104**
General Data: Sulfate Used [ ] Fresh [ ] Used
Cycles Used [X] 5 Cycles [ ]

## TEST RESULTS

| SIEVE SIZE | GRADING OF ORIGINAL SAMPLE, % | WEIGHT OF TEST FRACTIONS BEFORE TEST, GRAMS | PASSING DESIGNATED SIEVE AFTER TEST, % | WEIGHTED PERCENTAGE LOSS | ALLOWABLE PERCENTAGE LOSS | |
|---|---|---|---|---|---|---|
| | | | | | SODIUM | MAGNESIUM |
| **SOUNDNESS TEST OF FINE AGGREGATE** | | | | | | |
| MINUS NO. 100 | | | | | | |
| NO. 50 TO NO. 100 | | | | | | |
| NO. 30 TO NO. 50 | | | | | | |
| NO. 16 TO NO. 30 | | | | | | |
| NO. 8 TO NO. 16 | | | | | | |
| NO. 4 TO NO. 8 | | | | | | |
| 3/8 IN. TO NO. 4 | | | | | | |
| TOTAL | | | | | | |
| **SOUNDNESS TEST OF COARSE AGGREGATE** | | | | | | |
| 2 1/2 IN. TO 1 1/2 IN. | | | | | | |
| 1 1/2 IN. TO 3/4 IN. | | | | | | |
| 3/4 IN. TO 3/8 IN. | 47.1 | 1000.4 | 1.1 | 0.5 | | |
| 3/8 IN. TO NO. 4 | | | | | | |
| TOTAL | | | | 1 | | |

**QUALITATIVE EXAMINATION OF COARSE SIZE PARTICLES EXHIBITING DISTRESS**

| SIEVE SIZE | SPLITTING | | CRUMBLING | | CRACKING | | FLAKING | | TOTAL NO. PARTICLES BEFORE TEST |
|---|---|---|---|---|---|---|---|---|---|
| | NO. | % | NO. | % | NO. | % | NO. | % | |
| 2 1/2 IN. TO 1 1/2 IN. | | | | | | | | | |
| 1 1/2 IN. TO 3/4 IN. | | | | | | | | | |

Comments **GRADATION DOES NOT ALLOW FOR SOUNDNESS GRADING**

Copies To **CLIENT (1)**

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030998

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# LABORATORY REPORT ON AGGREGATES

Date of Report **3-19-98**
Job No. **2149JL029**
Event / Invoice No. **R029-11A** Lab No. **3**
Authorized By **SM/DAVIS** Date **1-27-99**
Sampled By **SM/WALTER** Date **1-27-99**
Submitted By **SM/WALTER** Date **1-27-99**

Client **SUNWARD MATERIALS**
**ATTN MR GREG DAVIS**
**2625 S 19TH AVE**
**PHOENIX AZ 85009**

Project **ANNUAL TESTING**
Location **MESA PLANT**
Contractor - -
Arch. / Engr. - -
Type / Use of Aggregate **CONCRETE SAND**
Supplier / Source **SUNWARD MATERIALS**
Sample Source / Location **PLANT #71**
Source / Location Desig. By **SM/WALTER** Date **1-27-99**
Reference **SOUNDNESS OF AGGREGATES BY USE OF** [X] **SODIUM SULFATE** [ ] **MAGNESIUM SULFATE**
[X] **ASTM C88** [ ] **AASHTO T104**
General Data Sulfate Used [ ] Fresh [ ] Used
Cycles Used [X] 5 Cycles [ ]

## TEST RESULTS

| SIEVE SIZE | GRADING OF ORIGINAL SAMPLE, % | WEIGHT OF TEST FRACTIONS BEFORE TEST, GRAMS | PASSING DESIGNATED SIEVE AFTER TEST, % | WEIGHTED PERCENTAGE LOSS | ALLOWABLE PERCENTAGE LOSS | |
|---|---|---|---|---|---|---|
| | | | | | SODIUM | MAGNESIUM |
| **SOUNDNESS TEST OF FINE AGGREGATE** | | | | | | |
| MINUS NO. 100 | 4.9 | - - | | | | |
| NO. 50 TO NO. 100 | 12.0 | - - | | | | |
| NO. 30 TO NO. 50 | 22.9 | 100.3 | 7.2 | 1.6 | | |
| NO. 16 TO NO. 30 | 18.8 | 100.3 | 4.4 | 0.8 | | |
| NO. 8 TO NO. 16 | 19.7 | 100.1 | 4.7 | 0.9 | | |
| NO. 4 TO NO. 8 | 21.8 | 100.0 | 4.8 | 1.0 | | |
| 3/8 IN. TO NO. 4 | | - - | | | | |
| TOTAL | 100.0 | | | 4 | | |
| **SOUNDNESS TEST OF COARSE AGGREGATE** | | | | | | |
| 2 1/2 IN. TO 1 1/2 IN. | | | | | | |
| 1 1/2 IN. TO 3/4 IN. | | | | | | |
| 3/4 IN. TO 3/8 IN. | | | | | | |
| 3/8 IN. TO NO. 4 | | | | | | |
| TOTAL | | | | | | |

**QUALITATIVE EXAMINATION OF COARSE SIZE PARTICLES EXHIBITING DISTRESS**

| SIEVE SIZE | SPLITTING | | CRUMBLING | | CRACKING | | FLAKING | | TOTAL NO. PARTICLES BEFORE TEST |
|---|---|---|---|---|---|---|---|---|---|
| | NO. | % | NO. | % | NO. | % | NO. | % | |
| 2 1/2 IN. TO 1 1/2 IN. | | | | | | | | | |
| 1 1/2 IN. TO 3/4 IN. | | | | | | | | | |

Comments

Copies To CLIENT (1)

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# LABORATORY REPORT ON AGGREGATES

Date of Report **3-19-98**
Job No. **2149JL029**
Event / Invoice No. **R029-11A** Lab No. **1**
Authorized By **SM/DAVIS** Date **1-27-99**
Sampled By **SM/WALTER** Date **1-27-99**
Submitted By **SM/WALTER** Date **1-27-99**

Client **SUNWARD MATERIALS**
**ATTN MR GREG DAVIS**
**2625 S 19TH AVE**
**PHOENIX AZ 85009**

Project **ANNUAL TESTING** Location **MESA PLANT**
Contractor - - Arch. / Engr. - -
Type / Use of Aggregate **#7 AGGREGATE** Supplier / Source **SUNWARD MATERIALS**
Sample Source / Location **PLANT #71** Source / Location Desig. By **SM/WALTER** Date **1-27-99**
Reference **SOUNDNESS OF AGGREGATES BY USE OF** ☒ **SODIUM SULFATE** ☐ **MAGNESIUM SULFATE**
☒ **ASTM C88** ☐ **AASHTO T104**
General Data: Sulfate Used ☐ Fresh ☐ Used
Cycles Used ☒ 5 Cycles ☐

## TEST RESULTS

| SIEVE SIZE | GRADING OF ORIGINAL SAMPLE, % | WEIGHT OF TEST FRACTIONS BEFORE TEST, GRAMS | PASSING DESIGNATED SIEVE AFTER TEST, % | WEIGHTED PERCENTAGE LOSS | ALLOWABLE PERCENTAGE LOSS | |
|---|---|---|---|---|---|---|
| | | | | | SODIUM | MAGNESIUM |
| **SOUNDNESS TEST OF FINE AGGREGATE** | | | | | | |
| MINUS NO. 100 | | | | | | |
| NO. 50 TO NO. 100 | | | | | | |
| NO. 30 TO NO. 50 | | | | | | |
| NO. 16 TO NO. 30 | | | | | | |
| NO. 8 TO NO. 16 | | | | | | |
| NO. 4 TO NO. 8 | | | | | | |
| 3/8 IN. TO NO. 4 | | | | | | |
| TOTAL | | | | | | |
| **SOUNDNESS TEST OF COARSE AGGREGATE** | | | | | | |
| 2 1/2 IN. TO 1 1/2 IN. | | | | | | |
| 1 1/2 IN. TO 3/4 IN. | | | | | | |
| 3/4 IN. TO 3.8 IN. | 47.1 | 1000.4 | 1.1 | 0.5 | | |
| 3.8 IN. TO NO. 4 | | | | | | |
| TOTAL | | | | 1 | | |

**QUALITATIVE EXAMINATION OF COARSE SIZE PARTICLES EXHIBITING DISTRESS**

| SIEVE SIZE | SPLITTING | | CRUMBLING | | CRACKING | | FLAKING | | TOTAL NO. PARTICLES BEFORE TEST |
|---|---|---|---|---|---|---|---|---|---|
| | NO. | % | NO. | % | NO. | % | NO. | % | |
| 2 1/2 IN. TO 1 1/2 IN. | | | | | | | | | |
| 1 1/2 IN. TO 3/4 IN. | | | | | | | | | |

Comments

Copies To **CLIENT (1)**

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OBSERVED OR SAMPLE(S) TESTED AT THE TIME AND PLACE STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY [illegible] 3-19-99

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

To: SHEWA SHIVASWAMI
Sender: Chuck Gopperton
Attention: FCDMC
Tel. No: 438-2200
Fax No: (480) 836-4530
Fax No: 431-9562
Date: 7/6/00
3 page(s) total includes cover sheet
File: 82000157
Original will **NOT** follow by mail.

THE CONTENT OF THIS FAX IS CONFIDENTIAL. IF THE READER IS NOT THE INTENDED RECIPIENT OR ITS AGENT, BE ADVISED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THE CONTENT OR OF THIS FAX IS PROHIBITED. IF YOU HAVE RECEIVED THIS FAX IN ERROR, PLEASE NOTIFY US IMMEDIATELY AND RETURN THE ORIGINAL FAX TO US BY MAIL AT OUR EXPENSE. THANK YOU.

**Reference:** Golden Eagle Park Dam

Attachments: Submittal for Concrete Pipe

Message: Reviewed - need more info

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on 7-4-00 by FCDMC for the proposed reinforced concrete pipe to be used in the principal outlet works:

- Pipe class, joint type and wall thickness data from Hanson Pipe Products for 24" and 60" RCP.

The submittals were reviewed, and the pipe meets the specification requirements, however, I need the following:

- Certified test results for the pipe and gaskets
- Hydrostatic test results for the joint design

The following specification for the hydrostatic testing of the pipe shall be followed:

**HYDROSTATIC TEST ON WATERTIGHT JOINTS**

A hydrostatic test shall be made on the watertight joint types as proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty design or workmanship, an additional sample joint may be tested. During the test period, gaskets or other jointing material shall be protected from extreme temperatures which might adversely affect the performance of such materials. Performance requirements for joints in reinforced and nonreinforced concrete pipe shall conform to AASHTO M 198 or ASTM C 443.

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Martha Van Hoppertin

Date: 7/4/00

# Project: Golden Eagle Dam Park

## Contractor: Hunter Contracting

## Owner: Maricopa Flood Control District

## Date: 06/19/2000

**Hanson Pipe and Products**
**3450 North 27th Ave**
**Phoenix, AZ 85017**
602-258-7515

Hanson

| | | | |
|---|---|---|---|
| PROJECT: | **Golden Eagle Dam Park** | DATE: | **05/25/2000** |
| OWNER: | **Maricopa County Flood** | PLANT: | **4650** |
| CONTRACTOR: | **Hunter Contracting** | | |
| ENGINEER: | | | |

| | |
|---|---|
| DIAMETER: | **60** INCHES |
| SPECIFICATION: | **ASTM C-76** |
| CLASS: | **IV** |
| JOINT TYPE: | **R-4** |
| WALL THICKNESS: | **6.75" (C-WALL)** |

| | INNER CAGE | OUTER CAGE |
|---|---|---|
| REQ'D AREA | **0.41** SQ. IN./L.F. | **0.2346** SQ. IN./L.F. |
| MESH SIZE | **W7.0 X W3.0** | **W4.0 X W2.0** |
| SPACING | **2" X 8"** | **2" X 8"** |
| ACTUAL AREA | **0.42** SQ. IN./L.F. | **0.24** SQ. IN./L.F. |
| WEIGHT | **26.35** LBS./L.F. | **17.75** LBS./L.F. |

TOTAL REINF. WEIGHT **44.1** LBS./L.F.

MINIMUM CONCRETE STRENGTH **4,000** PSI

PROJECT: Golden Eagle Dam Park
OWNER: Maricopa County Flood
CONTRACTOR: Hunter Contracting
ENGINEER:

DATE:
PLANT:

| | |
|---|---|
| DIAMETER: | 24 INCHES |
| SPECIFICATION: | ASTM C-76 |
| CLASS: | 3000-D CLASS V |
| JOINT TYPE: | RG |
| WALL THICKNESS: | 3." (B-WALL) |

| | INNER CAGE | OUTER CAGE |
|---|---|---|
| REQ'D AREA | 0.3 SQ. IN./L.F. | |
| MESH SIZE | W 5.0 X W 2.0 | |
| SPACING | 2" X 6" | |
| ACTUAL AREA | 0.3 SQ. IN./L.F. | |
| WEIGHT | LBS./L.F. | |

TOTAL REINF. WEIGHT LBS./L.F.

MINIMUM CONCRETE STRENGTH 6,000 PSI

# Gifford Hill Pipe Comp

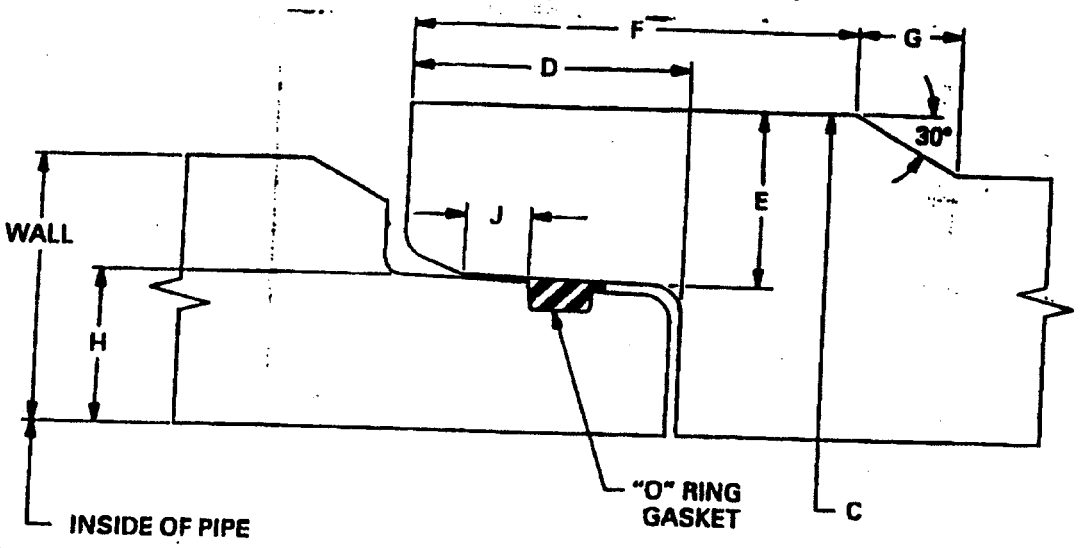


Table of Dimensions and Weights

| Pipe Inside Diameter Inches | Wall Thickness Inches | Pipe OD @ Bell C Inches | Bell Depth D Inches | Bell Thickness E Inches | Outside Bell Depth F Inches | Gasket Diameter H Inches | J Inches | Nominal Laying Length Feet |
|---|---|---|---|---|---|---|---|---|
| 12 | 2 | 19.5 | 3 | 2 | 4.25 | 0.75 | 0.96 | 8 |
| 15 | 2.25 | 23.08 | 3 | 2.28 | 4.28 | 0.75 | 0.77 | 8 |
| 18 | 2.5 | 26.38 | 4 | 2.25 | 4.48 | 0.75 | 0.9 | 8 |
| 24 | 3 | 33.42 | 3.625 | 2.5 | 5.31 | 0.75 | 1.09 | 8 |
| 30 | 3.5 | 43.338 | 4 | 3.625 | 7 | 0.75 | 1.25 | 8 |
| 36 | 4 | | | | | 0.75 | | |
| 42 | 5.25 | 60.5 | 4.25 | 4.18 | 8 | 0.75 | 1.31 | 8 |
| 48 | 5.75 | 63.61 | 4.25 | 4.18 | 8 | 0.75 | 1.31 | 8 |
| 54 | 6.25 | 69.61 | 4.25 | 4.18 | 8 | 0.75 | 1.31 | 8 |
| 60 | 6.75 | 73.5 | 4.25 | 4.18 | 8 | 0.75 | 1.31 | 8 |
| 66 | 7.25 | 80.5 | 4.25 | 4.18 | 8 | 0.75 | 1.31 | 8 |
| 72 | 7.75 | 87.5 | 4.25 | 4.18 | 5 | 0.75 | 1.31 | 8 |
| 78 | 8.25 | 94.5 | 4.25 | 4.18 | 5 | 0.75 | 1.31 | 8 |
| 84 | 8.75 | 101.5 | 5 | 5.31 | 5 | 0.75 | 1.68 | 8 |
| 90 | 9.25 | 108.5 | 5 | 5.31 | 5 | 0.75 | 1.68 | 8 |
| 96 | 9.75 | 115.5 | 5 | 5.31 | 5 | 0.75 | 1.68 | 8 |

Gifford Hill Pipe Co.
3460 North 27th Ave
Phoenix, Arizona 85017
Phone 258-7614
Fax 258-7105

# Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | Flood Control District of Maricopa County | Sender: | Chuck Gopperton |
| | | ☑ | For Your Information |
| Attention: | Tom Johnson C/O Shewa Shivaswamy | ☐ | For Your Approval |
| | | ☐ | For Your Review |
| Date: | 14 July 2000 | ☐ | As Requested |
| File: | 82000157 | | |

**Reference: Golden Eagle Park Dam**

Enclosed are the approval sheets and submittals.

If you have any questions or concerns about the following documents please do not hesitate to contact me.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton

Chuck Gopperton, P.E.
Water Resources,
Project Engineer

mas p:\82000157\construction\correspondence\transmittals\tjohnson fcdmc, 071400.doc

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | Flood Control Dist. of Maricopa County | Sender: | Chuck Gopperton |
| Attention: | Shewa Shivaswamy | Tel. No: | 602-438-2200 |
| Fax No: | (480) 836-4530 | Fax No: | 602-431-9562 |
| Date: | 14 July 2000 | **6** page(s) total includes cover sheet | |
| File: | 82000157 | Original will follow by mail | |

The content of this fax is confidential. If the reader is not the intended recipient or its agent, be advised that any dissemination, distribution or copying of the content of this fax is prohibited. If you have received this fax in error, please notify us immediately and return the original fax to us by mail at our expense. Thank you.

**Reference: Golden Eagle Park Dam**

Being faxed over are the approval sheets.

If you have any questions or concerns please do not hesitate to contact me.

Thank you.

**STANTEC CONSULTING INC.**

Chuck Gopperton

Chuck Gopperton, PE
Water Resources, Project Engineer

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Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on July 12, 2000 by Hunter Contracting:

- Sieve analysis of 1/4" chips from Dobson stockpile 130

The material is proposed to be used as pervious material with a coeffieient of Uniformity of less than 6 above the sand filter blanket downstream of the sand diaphragm. The material meets the specifications and is approved.

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Chuck Gossett

Date: 7/13/00

\\phxserv06\wrproj\82000157\construction\submittals\chips.doc

***'OCKPILE 130***

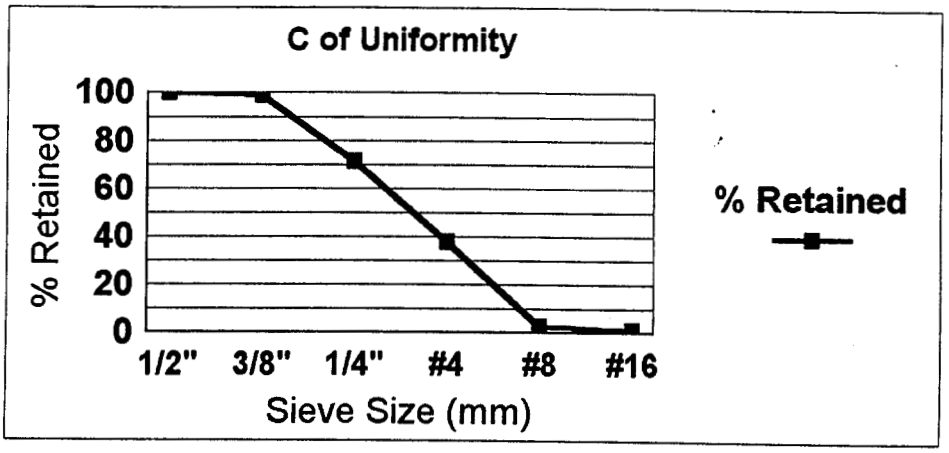
***DOBSON***

***1/4 " CHIPS***

| | |
|---|---|
| DATE | 07/08/00 |
| TYPE | **1/4 " CHIPS** |
| SOURCE | **STOCKPILE 130** |
| LOCATION | DOBSON |
| SMPL BY | GS |
| TIME | 0710 |
| TEST BY | GS |

| | |
|---|---|
| TOTAL WT. OF MATERIAL | 1221 |
| COARSE FACTOR | 0.0819 |

| SIEVE | IND. WT | % RET IND | % PASSING | TARGET |
|---|---|---|---|---|
| 1/2" 12.5mm | | 0.0 | **100** | |
| 3/8" 9.5 mr | 10.0 | 0.8 | **99** | 85 to 100 |
| 1/4" 6.3 mr | 340.0 | 27.8 | **71** | |
| #4 4.75 mr | 407.0 | 33.3 | **38** | 10 to 85 |
| #8 2.36 mm | 430.0 | 35.2 | **3** | 0 to 30 |
| 1/2" 12.5m | 16 | 1.3 | **1** | 0 to 10 |
| PAN .075 r | 18.0 | 1.5 | | |
| TOTAL | | | | |



Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on July 12, 2000 by Hunter Contracting:

- Concrete grout mix for encasing 24" concrete pipe - meets the specifications and is approved

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: _____

Date: 7/13/00

p:\82000157\construction\submittals\mix design class c encasement.doc

# LETTER OF TRANSMITTAL

FROM: **HUNTER CONTRACTING COMPANY INC.**
701 N. COOPER RD.
PO BOX 900
GILBERT AZ 85299

PHONE: 1-480-892-0521
FAX: 1-480-892-4932

| | |
|---|---|
| DATE: 07/11/00 | TRANSMITTAL #: 22 |
| PROJECT #: | FCD 1999C071 |
| PROJECT: | GOLDEN EAGLE PARK DAM MODIFICATION |
| LOCATION: | FOUNTAIN HILLS |
| REGARDING: | CONCRETE MIX DESIGN FOR ENCASING 24 IN. RGRCP PIPE |

TO: **MARICOPA COUNTY FLOOD CONTROL DIS**
ATTN: **H.N. SHIVASWAMY**
2802 W. DURANGO ST.
PHOENIX, AZ 85010

WE ARE SENDING YOU:

X Attached
___ Change order
___ Copy of letter
___ Under separate cover via
___ Plans
___ Prints
___ Samples
___ the following items:
___ Shop drawings
___ Specifications

| Copies | Date | No. | Description |
|---|---|---|---|
| | | | |
| 6 | | | CONCRETE MIX DESIGN FOR ENCASING 24 IN. RGRCP PIPE |
| | | | ENCASEMENT |

THESE ARE TRANSMITTED as checked below:

X For approval
___ For your use
___ As requested
___ For Review & Comment
___ FOR BIDS DUE _____ 19____
___ Submit dist copies
___ Return corrections
___ Approved as Noted
___ Approved as Submitted
___ Returned for Corrections
___ Resubmit for copies approval
PRINTS RETURNED AFTER LOAN TO US

REMARKS

THIS MIX IS PROPOSED TO REPLACE THE CLASS "C" CONCRETE SPECIFIED. WE CANNOT PUMP THE MAG C CONCRETE SPECIFIED. THIS IS A NO COST CHANGE.

COPY TO: _____

SIGNED: _____
BOB CARLSON (PROJECT MANAGER)

# MARICOPA READY MIX

**CUSTOMER:** Hunter Contracting **DATE:** 07/06/00
Location: Fountain Hills
**PROJECT:** Golden Eagle Park Dam Modifications
Flood Control District of Maricopa Co.
**MIX #:** 265800 **DESCRIPTION:** 6.5 SACK GROUT - 2500 psi

THE FOLLOWING IS OUR PROPOSED CONCRETE MIX DESIGN FOR THE ABOVE NOTED PROJECT. ALL QUANTITIES ARE LISTED FOR ONE CUBIC YARD NET AND AGGREGATE WEIGHTS ARE FOR AGGREGATES IN A SATURATED, SURFACE DRY CONDITION. CORRECTIONS MUST BE MADE FOR AGGREGATES THAT VARY FROM THESE MOISTURE CONDITIONS

| MIX PROPORTIONS | | | | | VOLUME |
|---|---|---|---|---|---|
| Water | | | 42 gal | 350 lb. | 5.61 cu. ft. |
| Cement | | | ASTM C - 150 Type 2 | 450 lb. | 2.29 cu. ft. |
| Fly Ash | | | ASTM C - 618 | 161 lb. | 1.19 cu. ft. |
| Coarse Aggregate | | 1 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | | 1/2 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | | 3/8 inch | ASTM C-33 | 685 lb. | 4.14 cu. ft. |
| Sand | | | ASTM C - 33 | 2053 lb. | 12.42 cu. ft. |
| WRA | WRDA 64 | | ASTM 394 TYPE A | 25.0 oz | |
| AEA | DARAVAIR | | ENTRAINED AIR @ 5.0% | 6.0 oz. | 1.35 cu. ft. |
| HRWR | | | ASTM 394 TYPE F | 0.0 oz. | |
| | | | | **TOTAL** | 27.0 cu. ft. |

**CONCRETE PROPERTIES**

| | |
|---|---|
| Water/Cementicious Ratio (by weight) | 0.573 |
| Slump (+/- 1 inch) | 7.0 inches |
| Air Content (+/- 1%) | 5.0 % |
| Unit Weight of Mixed Concrete: | 137.0 lb./cubic ft. |
| Mix Density | 3699 lb./cubic yd. |

| MATERIAL | SOURCE | SPEC. GRAVITY |
|---|---|---|
| Cement | Cemex or Arizona Portland | 3.15 |
| Fly Ash (if used) | Material Resources Technologies | 2.16 |
| 1" Rock | Salt River Sand and Rock | 2.65 |
| Sand | Salt River Sand and Rock | 2.65 |
| Water Reducer | W.R. Grace | N/A |
| Air Entrainer | W.R. Grace | N/A |

7400 E. McDonald, Suite 120 • Scottsdale, AZ 85250 • (602) 607-3999 • Fax (602) 607-3335

# MARICOPA READY MIX

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| MIX PROPORTIONS | | | | | VOLUME |
|---|---|---|---|---|---|
| Water | | 42 gal | | 350 lb. | 5.61 cu. ft. |
| Cement | | ASTM C - 150 Type 2 | | 450 lb. | 2.29 cu. ft. |
| Fly Ash | | ASTM C - 618 | | 161 lb. | 1.19 cu. ft. |
| Coarse Aggregate | 1 inch | ASTM C-33 | | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | 1/2 inch | ASTM C-33 | | 0 lb. | 0.00 cu. ft. |
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| Sand | | ASTM C - 33 | | 2053 lb. | 12.42 cu. ft. |
| WRA | WRDA 64 | ASTM 394 TYPE A | | 25.0 oz | |
| AEA | DARAVAIR | ENTRAINED AIR @ 5.0% | | 6.0 oz. | 1.35 cu. ft. |
| HRWR | | ASTM 394 TYPE F | | 0.0 oz. | |
| | | | | **TOTAL** | 27.0 cu. ft. |

**CONCRETE PROPERTIES**

| | |
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|---|---|---|
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| Sand | Salt River Sand and Rock | 2.65 |
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| Air Entrainer | W.R. Grace | N/A |

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| MIX PROPORTIONS | | | | | VOLUME |
|---|---|---|---|---|---|
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| Coarse Aggregate | 1 inch | ASTM C-33 | | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | 1/2 inch | ASTM C-33 | | 0 lb. | 0.00 cu. ft. |
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| Sand | | ASTM C - 33 | | 2053 lb. | 12.42 cu. ft. |
| WRA | WRDA 64 | ASTM 394 TYPE A | | 25.0 oz | |
| AEA | DARAVAIR | ENTRAINED AIR @ 5.0% | | 6.0 oz. | 1.35 cu. ft. |
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| | | | **TOTAL** | | 27.0 cu. ft. |

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| | |
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| Fly Ash | | | ASTM C - 618 | 161 lb. | 1.19 cu. ft. |
| Coarse Aggregate | | 1 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | | 1/2 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
| Coarse Aggregate | | 3/8 inch | ASTM C-33 | 685 lb. | 4.14 cu. ft. |
| Sand | | | ASTM C - 33 | 2053 lb. | 12.42 cu. ft. |
| WRA | WRDA 64 | | ASTM 394 TYPE A | 25.0 oz | |
| AEA | DARAVAIR | | ENTRAINED AIR @ 5.0% | 6.0 oz. | 1.35 cu. ft. |
| HRWR | | | ASTM 394 TYPE F | 0.0 oz. | |
| | | | | **TOTAL** | 27.0 cu. ft. |

**CONCRETE PROPERTIES**

| | |
|---|---|
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# MARICOPA READY MIX

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| Fly Ash | | | ASTM C - 618 | 161 lb. | 1.19 cu. ft. |
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| Coarse Aggregate | | 1/2 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
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| Sand | | | ASTM C - 33 | 2053 lb. | 12.42 cu. ft. |
| WRA | WRDA 64 | | ASTM 394 TYPE A | 25.0 oz | |
| AEA | DARAVAIR | | ENTRAINED AIR @ 5.0% | 6.0 oz. | 1.35 cu. ft. |
| HRWR | | | ASTM 394 TYPE F | 0.0 oz. | |
| | | | | **TOTAL** | 27.0 cu. ft. |

**CONCRETE PROPERTIES**

| | |
|---|---|
| Water/Cementicious Ratio (by weight) | 0.573 |
| Slump (+/- 1 inch) | 7.0 inches |
| Air Content (+/- 1%) | 5.0 % |
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7400 E. McDonald, Suite 120 • Scottsdale, AZ 85250 • (602) 607-3999 • Fax (602) 607-3335

# MARICOPA READY MIX

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| | | | | **TOTAL** | 27.0 cu. ft. |

**CONCRETE PROPERTIES**

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| Water/Cementicious Ratio (by weight) | 0.573 |
| Slump (+/- 1 inch) | 7.0 inches |
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7400 E. McDonald, Suite 120 • Scottsdale, AZ 85250 • (602) 607-3999 • Fax (602) 607-3335

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on July 12, 2000 by Hunter Contracting:

- Certifications for T-Post from American Fence Company - meets the specifications and is approved

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: [signature]

Date: 7/12/00

p:\82000157\construction\submittals\t-post.doc

Lumer Construction, Inc.
1752 East Jacinto Circle, Mesa, AZ 85204
602-321-6844 Fax 480-497-3698

# LETTER OF TRANSMITTAL

| TO: HUNTER CONTRACTING | DATE 7/6/00 | JOB NO. 115 |
|---|---|---|
| ATTN: BOB CARLSON | RE: GOLDEN EAGLE | |

We are forwarding: ☐ Attached ☐ Under separate cover via :

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ Other:

| NO. | COPIES | DATE | DESCRIPTION |
|---|---|---|---|
| 1 | 7 | 7/6/00 | CERTIFICATION FOR T-POST |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**PLEASE USE AS NOTED:**

☒ For Review ☐ Reviewed as Submitted ☐ Resubmit Copies for Review
☐ For Your Use ☐ Reviewed as Noted ☐ Submit Copies for Distribution
☐ As Requested ☐ Returned for Corrections ☐ Return Corrected Prints
☐ FOR BIDS DUE ON ☐ Other:

**REMARKS:**

Copy to:

SIGNED: Chuck Lumer

Chuck Lumer

**Field Lining Systems, Inc.**

*Installers of Quality Lining Systems*

P.O. Box 7 • Peoria, Arizona 85380
(623) 842-1255 • Fax (623) 930-1766

# TRANSMITTAL

Thursday, July 06, 2000 Total Number of Pages: 02

**COMPANY:** Lumer Construction Inc.

**CONTACT:** Chuck Lumer

**RE:** **8' T-POST SUBITTAL DATA**

Fax: 480-497-3698 Phone: 480-321-6844

Dear Chuck:

Enclosed is the Submittal Data for the 8' T-Post.

If you have any questions or comments please feel free to contact me at (623) 842-1255.

Thank you for all your cooperation.

**FROM:** Beverley Ramos **FIELD LINING SYSTEMS, INC.**

*"Field Lining Systems, Inc. is a Minority Business Enterprise and an Equal Opportunity Employer"*

7301 1st St.
Prescott Valley, Arizona 86314
Telephone (520) 772-6320 Fax (520) 772-0756
Arizona Contractor's License #'s 069390, 069389, 016349

# AMERICAN FENCE COMPANY

July 6, 2000

Field Lining Systems

Dear Sir or Madam:

This is a product certification regarding fence posts to be provided to Field Lining Systems.

The following post specifications apply:

**8' T-POST**

**Weight : 1.33 lbs. Per ft.**

**Finish: Painted green**

**Industry standard product.**

Sincerely,

Patrick Schiffgen

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted on July 12, 2000 by Hunter Contracting:

- Certification for concrete pipe
- Hydrostatic test results for concrete pipe
- Certification for rubber gaskets

The tests and certifications meet specifications and are approved.

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Charles V. Zappacosta

Date: 7/13/00

p:\82000157\construction\submittals\reinforced concrete pipe 2.doc

Hanson

Hanson Pipe & Products, Inc.
3450 N 27th Ave.
Phoenix AZ 85017-5097

Tel (602) 258-7514
Fax (602) 256-7105

# CERTIFICATE OF COMPLIANCE

PROJECT: GOLDEN EAGLE BARN BRIDGE/FLOODGATE SIGNS

~~MCDOT~~ CONTRACT FCD 1999C071

GENERAL CONTRACTOR: HUNTER CONTRACTING

15 pcs. 24" X 8' RGRCP CL-V R-4

3 PCS. 60" X 8' RGRCP CL-V R-4 IN LEIU OF CL-IV

HANSON PIPE & PRODUCTS certifies that the pipe and gaskets that will be supplied for this project will comply with all specification requirements of ASTM C-76. Gaskets are in accordance with ASTM C-361 and as modified in MAG Standard Specifications Section 765.

By: _____
Gregg Moriarty, Production Manager or Joe Ortiz, Plant Foreman

SUBSRCRIBED AND SWORN TO BEFORE ME THIS 10th DAY OF JULY 2000.

G. L. Parkhill
Notary Public

OFFICIAL SEAL
G. L. PARKHILL
Notary Public - State of Arizona
MARICOPA COUNTY
My Comm. Expires July 20, 2001

QUALITY ASSURANCE PROGRAM

# HYDROSTATIC TEST REPORT

| PLANT | TYPE OF PIPE | PRODUCTION METHOD | SPECIFICATION |
|---|---|---|---|
| 4680 | Packerhead | Packerhead | C-76 |

| | | | |
|---|---|---|---|
| Inside Diameter or Span | 24 inch | Age of Test | 14 |
| Wall Thickness | 3 inch | Pipe Number | |
| Length | 8 feet | Test Number | |
| Number of Pieces in Test | 2 | Pre Soak Time | 8 hours 0 psi |

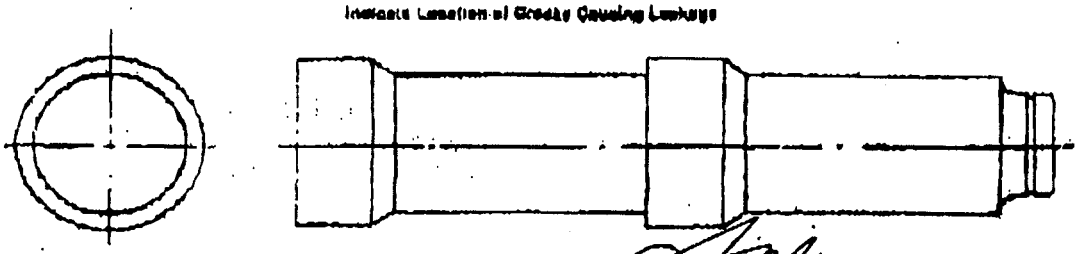
## JOINT CENTERED

| GAGE PRESSURE (psi) | TEST TIME (min) | REQUIRED TIME (min) | SPECIFIED LEAKAGE | OBSERVED LEAKAGE | REMARKS—Note whether dry, damp, spotted or wet |
|---|---|---|---|---|---|
| 13 | 30 | 20 | -0- | -0- | no wet spots |
| | | | | | |
| | | | | | |
| | | | | | |

## JOINT DEFLECTED (3/4 inches)

| GAGE PRESSURE (psi) | TEST TIME (min) | REQUIRED TIME (min) | SPECIFIED LEAKAGE | OBSERVED LEAKAGE | REMARKS—Note whether dry, damp, spotted or wet |
|---|---|---|---|---|---|
| 13 | 20 | 20 | -0- | -0- | no wet spots |
| | | | | | |
| | | | | | |
| | | | | | |

Indicate Location of Cracks Causing Leakage



TESTED BY

1-19-99

DATE

# Pipe Seal Certification

The results shown were obtained by testing extruded samples made from compound as noted.

Customer Hanson – Pheonix Purchase Order: 1338 Ship Date: 2/16/00

| ORIGINAL PROPERTIES | | | | | | | | | | | RETAINED PROPERTIES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CORD DIAMETER | LOT NUMBER | PIPE DIAMETER | TENSILE PSI ASTM D412 | % ELONG ASTM D412 | DURO ASTM D2240 | COMP SET % ASTM D3958 | WATER ASORP % ASTM D471 | SPECIFIC GRAVITY ASTM D297 | OZONE RESIST RATING ASTM D1149 | #3 OIL RESIST RATING % SWELL ASTM D471 | TENSILE % ORIG ASTM D412 | ELONG % ORIG ASTM D412 | DURO INCR. | QUAN |
| 25/32" | AO 0425 | 60" | 2730 | 580 | 40 | 9.1 | 3.0 | 1.07 | 0 | | 90.2 | 89.6 | 3 | 252 |
| | | | | | | | | | | | | | | |
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It is certified that this materials meets or exceed the physical requirements

of specification ASTM C 361and ASTM C443

Lab Tech: GB

**CUSTOM RUBBER EXTRUSIONS**

Richard Mazer

Stantec

| | |
|---|---|
| Reviewed | ☒ |
| Reviewed as Modified | ☐ |
| Revise and Re-submit | ☐ |
| Not Reviewed | ☐ |

The following were reviewed as submitted by Hunter Contracting on July 12, 2000:

- Gabion Certification, specifications and brochure for Terra Aqua Gabions and King-Hughes hog rings

The gabions and fasteners meet the specifications and are approved.

This review by Stantec Consulting Inc. is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that Stantec Consulting Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and coordination of the work of all subtrades.

STANTEC CONSULTING, INC.

By: Mark Spratt

Date: 7/13/00

p:\82000157\construction\submittals\gabions.doc

TerraAqua

GABION SYSTEMS

June 12, 2000

Lumer Construction, Inc.
1752 East Jacinto Circle
Mesa, Arizona 85204
Attn: Chuck Lumer

Re: Golden Eagle Park Gabions

Dear Chuck,

Thank you for your recent order for gabion baskets for the above referenced project. Terra Aqua's standard procedure for manufacturing the 99x9x1 gabion basket is with 3x3 cells and roll top lids.

If you have any questions or require additional information, please do not hesitate to call me.

Sincerely,
TERRA AQUA GABIONS

Noel C. Cline

Noel C. Cline
Account Manager

ADMINISTRATIVE OFFICE: P.O. BOX 7546 • RENO, NV 89510 • (775) 828-1390 • FAX (775) 828-1394
FACTORY: 1415 NORTH 32ND STREET • FT. SMITH, AR 72904 • (501) 785-5344 • FAX (501) 785-0633

TerraAqua and Water

GABION SYSTEMS

CERTIFICATE OF COMPLIANCE

June 12, 2000

Lumer Construction, Inc.
1752 East Jacinto Circle
Mesa, Arizona 85204
Attn: Chuck Lumer

Project: Golden Eagle Park Gabions

This is to certify that the galvanized gabion baskets to be shipped to you for the above referenced project conform to the dimensions and fabrication requirements as given in this enclosed specification and to Federal Standards. The galvanized steel wire used in the fabrication of these gabion baskets meet the tensile strength, weights of zinc coating requirements and elongation criteria stipulated in Federal Specification QQW-461H and ASTM A641. The gabions are manufactured at our production facility in Fort Smith, Arkansas, from wire sourced in the United States of America.

Sincerely,
TERRA AQUA GABIONS

Noel C. Cline

Noel C. Cline
Account Manager

encl.

ADMINISTRATIVE OFFICE: P.O. BOX 7546 • RENO, NV 89510 • (775) 828-1390 • FAX (775) 828-1394
FACTORY: 1415 NORTH 32ND STREET • FT. SMITH, AR 72904 • (501) 785-5344 • FAX (501) 785-0633

TerraAqua

GABION SYSTEMS

# GALVANIZED GABION SPECIFICATION

## SCOPE

This specification covers the use of galvanized steel wire mesh baskets filed with stone used as retaining walls, slope paving, river bank protection, outfall structures, weirs and drop structures, etc.

## DEFINITIONS

a) Gabions are defined as galvanized steel wire mesh box-shaped baskets, of various sizes. The baskets are filled on site with clean, hard stones.

b) The selvedges of the gabions are the thicker perimeter and edge wires to which the wire mesh is securely tied to withstand sudden or gradual stress from any direction.

c) Reinforcing wires are the thicker wires incorporated into the netting during fabrication.

d) The diaphragms are internal wire mesh partitions which divide the gabion into cells.

e) Tiger-Tite Interlocking Fastener (TM) is used to assemble and join gabion units as an alternate to lacing wire to speed gabion construction time.

f) Lacing or binding wire is the wire used to assemble and join the gabion units.

g) Connecting wires are the internal wires used to prevent the gabions from bulging.

h) Tact Ties (TACT) are fabricated, preformed internal cross tie wires.

## FABRICATION

Galvanized Steel Wire Mesh Gabions. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown on the drawings. Gabions shall be of single unit construction; the base, lid, ends, and sides shall be either woven into a single unit or one edge of these members connected to the base section of the gabion in such a manner that strength and flexibility at the connecting point does not compromise the engineered structural design of the gabion. Where the length of the gabion exceeds one and one-half its horizontal width, the gabion shall be divided by diaphragms of the same mesh and gauge as the body of the gabion 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 in such a manner that no additional tying is required at this juncture.

ADMINISTRATIVE OFFICE: P.O. BOX 7546 • RENO, NV 89510 • (775) 828-1390 • FAX (775) 828-1394
FACTORY: 1415 NORTH 32ND STREET • FT. SMITH, AR 72904 • (501) 785-5344 • FAX (501) 785-0633

Non-Raveling. The wire mesh is to be fabricated in such a manner as to be non-raveling. This is defined as the ability to resist pulling apart at any of the twists or connections forming the mesh when a single wire strand in a section of mesh is cut.

MATERIALS

Galvanized Steel Wire Mesh Gabions: Gabion basket 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. The hexagonal mesh shall be hot dipped galvanized steel wire having a diameter of 0.120 inches (US gauge 11) after galvanization. The steel wire used shall be galvanized prior to weaving into mesh. All gabion diaphragams and frame wires shall equal or exceed Federal Specification QQ-W-461H, possess a maximum tensile strength of 70,000 PSI with a Finish 5, Class 3 zinc coating in accordance with the current ASTM A-641. The weight of zinc coating shall be determined by ASTM A-90. The grade of zinc used for coating shall be High Grade or Special High Grade as prescribed in ASTM B-6, Table 1. Uniformity of coating shall equal or exceed four 1-minute dips by the Preece test, as determined by ASTM A-239. The mesh opening shall be hexagonal in shape and uniform in size measuring not more than 3 1/4 inches by 4 1/2 inches. Selvedge or perimeter basket frame wire shall be of a heavier gauge than the mesh wire with a diameter of 0.150 inches after galvanization. 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 galvanization. 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 1400 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 3/4 square inch inside area to properly confine the required selvedge wires. Tiger-Tite Interlocking Fasteners are an approved alternate joint material. 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.

GABION STANDARD SIZES

| Letter Code | Dimensions | No. of Cells | Capacity Cubic Yards |
|---|---|---|---|
| A | 6' x 3' x 3' | 2 | 2 |
| B | 9' x 3' x 3' | 3 | 3 |
| C | 12' x 3' x 3' | 4 | 4 |
| D | 6' x 3' x 1'6" | 2 | 1 |
| E | 9' x 3' x 1'6" | 3 | 1.5 |
| F | 12' x 3' x 1'6" | 4 | 2 |
| G | 6' x 3' x 1' | 2 | 0.666 |
| H | 9' x 3' x 1' | 3 | 1 |
| I | 12' x 3' x 1' | 4 | 1.33 |

Tolerances. All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturer's stated size.

## MESH DEFORMATION

The wire mesh shall have deformability sufficient to permit a minimum mesh elongation equivalent to 10% of the unstretched length of the mesh test section without reducing the gauge or tensile strength of the individual wire strands to values less than those for similar wire, one gauge smaller in diameter.

## GABION FILL

The material used for gabion fill shall be clean, hard stone with pieces ranging from four (4) to eight (8) inches in the greatest dimension. Stone filling shall not exceed a 12 inch vertical drop above the gabion basket.

## ASSEMBLING AND PLACING

a) Each gabion shall be assembled by tying or fastening all untied edges. The binding wire shall be tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. The Tiger-Tite Interlocking Fastener shall be applied at approximately 4" to 6" intervals. A minimum of two (2) interlocking fasteners per 1 foot, three (3) interlocking fasteners per 1.5 foot and six (6) interlocking fasteners per 3 foot vertical or horizontal edge seam is required.

b) A line of empty gabions, with joints staggered, shall be placed into position according to the contract drawings. Binding wire or Interlocking Fasteners shall be used to secure each unit to the adjoining one along the vertical reinforced edges and the top selvedges. An approved corner closure tool shall be used to adjoin adjacent gabions to insure a tight, neat seam and minimize gabion wire joint deformation. The base of the empty gabions placed on top of a filled line of gabions shall be tightly wired or fastened to the latter at front and back. The lid shall be secured with an approved closure tool to insure proper closure without excessive mesh deformation.

c) To achieve optimum alignment and finish for retaining walls, a minimum amount of stretching may be required.

d) Connecting wires shall be inserted during the filling operation in the following manner:

<u>36" GABIONS & 18" GABIONS FOR VERTICAL STRUCTURES ON THE EXPOSED FACE</u>

I) Gabions shall be filled to a depth of twelve (12) inches.

II) For end units, two connecting wires or preformed TACT Tie wires in each direction shall be tightly tied to opposite faces of the end gabion cell at a height of twelve (12) inches above the base. Internal compartments shall have internal connecting wires connecting front face to back face of the gabion. Preformed TACT Ties are placed diagonal in the gabion cell.

III) Gabions shall be filled a further depth of twelve (12) inches, and two connecting or preformed TACT Tie wires shall similarly be placed at this level.

IV) Gabions shall be filled to the top. Care shall be taken to insure gabion is not under filled.

All connecting wires shall be looped around two mesh openings and the ends of the wires shall be securely twisted to prevent their loosening. TACT Tie wires envelope one horizontal twist on the front face and envelopes one vertical twist on the side face.

# *KING-HUGHES FASTENERS CORP.*

KH11G40 & KH11SS40 Fastener (hog ring) Specification

C-Ring - Open Dimension - 11/2 inches (3.81cm)
Closure inside dimension, 9/16 - 5/8 inch (1.43 - 1.59cm)
Wire Diameter - .120 inch (11 gauge), 3.05mm
Packaging: 1,600 pieces per box, 40 pieces per strip, 96 boxes per pallet
Weight per box: 16 lbs. (7.3 kilograms)

Material Specification: KH11G40 - The galvanized rings shall conform to ASTM A 641-92 for zinc coatings; ASTM A 764-93 for chemical and mechanical specifications; and ASTM E 8/MPT 2004 for tensile strength requirements.

KH11SS40 - Shall conform to ASTM A 313 type 302, Class I; and ASTM E 8/MPT 2004 for tensile strength requirements.

KH11A40 - Shall conform to ASTM B 341, and shall have a minimum weight of aluminum coating of .32 oz./sq.ft.

**KH11G40 & KH 11SS40 Hog Rings (compatible with Spenax SC-50 Pneumatic Fastening Tool)

*25776 D'Hondt Ct. Chesterfield, MI 48051 (810) 949-3900*
*1-800-779-3762 Fax (810) 949-9402*

# AMERICA'S GABION

- PERMEABILITY
- DURABILITY
- FLEXIBILITY
- ECONOMY

TerraAqua® Land Water GABIONS

P.O. BOX 7546, RENO, NEVADA 89510
775-828-1390 - FAX: 775-828-1394 - 800-736-9089

# PACKING & ASSEMBLY

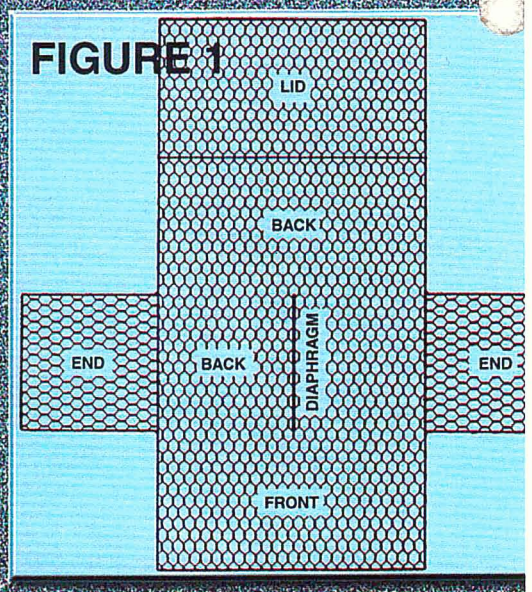

FIGURE 1

## PACKING

For ease of handling and shipping, the gabions are supplied folded flat.

A color stripe applied on the side of each folded gabion identifies the size.

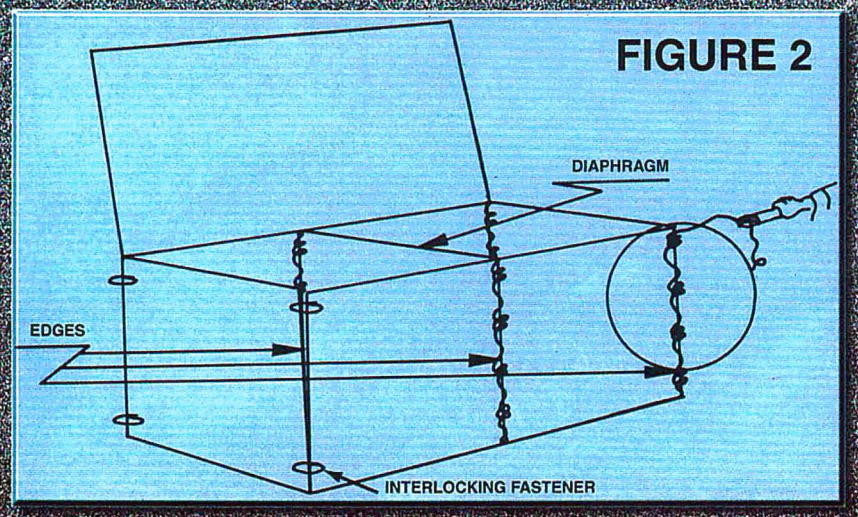

FIGURE 2

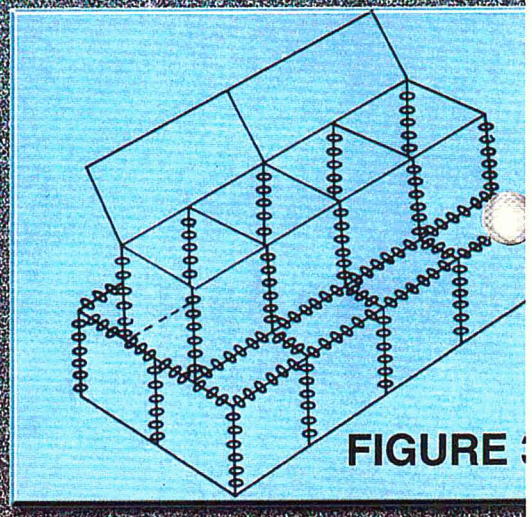
FIGURE 3

## ASSEMBLY

1. Open the bundle and unfold each unit. (See Figure 1)
2. Lift the sides, the ends and the diaphragms of each unit into vertical position. (See Figure 2)
3. Attach the edges of four corners together with locking wire fastener or lacing wire with the diaphragms to the front and back of the gabion. (See Figures 2 and 4)

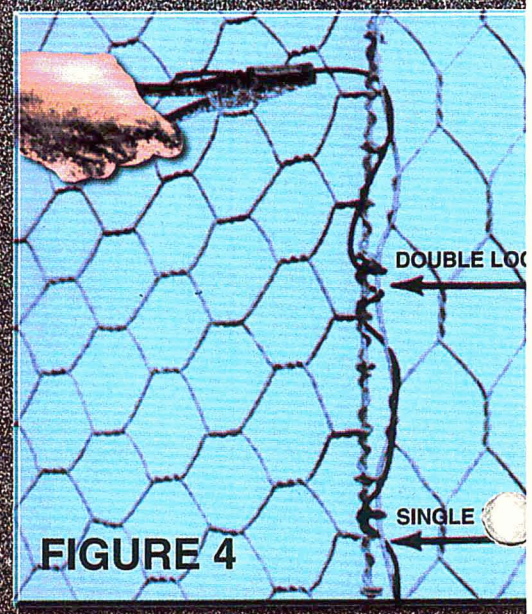

FIGURE 4

# INSTALLATION

INSTALLATION

1 Level the base to the elevation required.

2 Place a line of empty gabions into position according to the contract drawings.

3 Using an approved fastener or lacing wire, attach each unit to the adjoining one along the vertical reinforcement edges (corners) and the top. (Figures 3 and 5)

4 The approved fastener should be evenly spaced along seams at recommended intervals. The lacing wire is then tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. (See Figure 4)

5 To achieve better alignment and finish in retaining walls, after a line of gabions has been wired together, minimum stretching is recommended.

6 Empty gabion sections placed on top of completed sections must be fastened or wired to filled section at front and back. (See Figures 3 and 5)

When the upper section only partially overlaps the lower section, the attachment will be done at the point where the front edge of the upper section meets the lower section, and where the back edge of the lower section meets the base of the upper section. (See Figure 6)

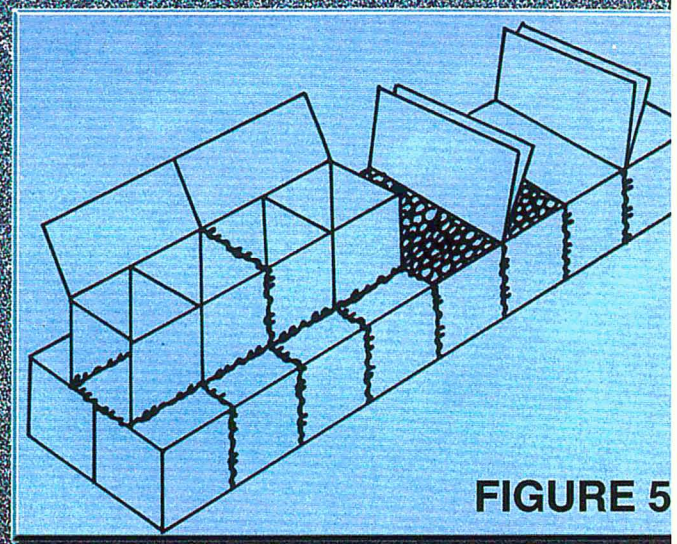

FIGURE 5

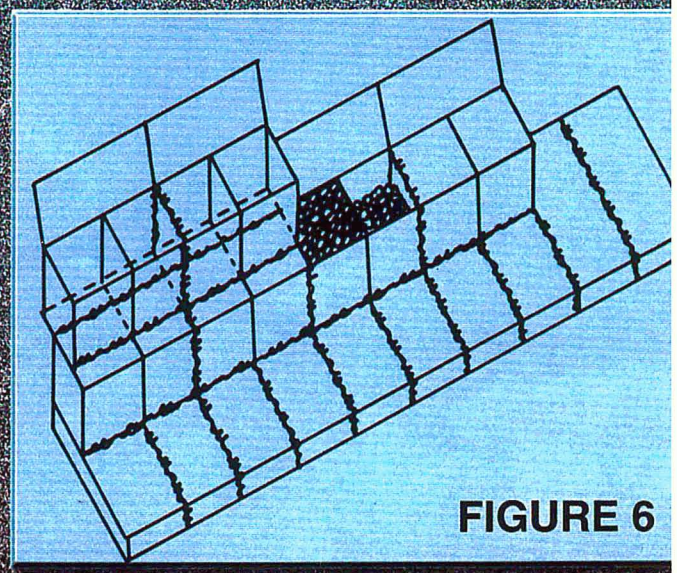

FIGURE 6

# AMERICA'S GABION

TerraAqua® Land Water GABIONS

P.O. BOX 7546, RENO, NEVADA 89510
775-828-1390 · FAX: 775-828-1394 · 800-736-9089

# FILLING & CONNECTING WIRES

## FILLING

1 The material used to fill the gabions must be 4" to 8" durable stone.

2 The filling operation can be carried out with any type of machinery. Every effort should be made to keep voids and bulges in gabions to a minimum in order to ensure proper alignment and neat, compact, square appearance. Also on the exposed area of retaining structures, the stone should be carefully placed.

## CONNECTING WIRES

During the filling operation, connection wires should be inserted in the following manner:

3 Each gabion cell of the 36" high gabion is to be filled to a depth of one third (one foot) after which Internal Connecting Wires or Corner TACT Ties (See Figure 7 for TACT TIES and Figure 8 for Front Face to Back Face Connecting Wires) are placed inside each gabion cell. This operation is to be repeated when the gabion is two thirds (two foot elevation) full. In-line gabions require Internal Connecting Wires or Corner TACT Ties on the exposed gabion face to ensure proper vertical alignment. (See Figure 9)

For thinner gabions, connection wires are not necessary unless the 18" are used to build exposed vertical surfaces and in this case, two wires, one in each direction at 9" from the base, at each end unit. Internal compartments follow the procedure above. (See 3)

4 After the filling operation has been completed the d is then folded to meet the front edge and tightly ound to the rest of the gabion with an appropriate interlocking fastener or lacing wire along all dges and top of diaphragms in the same manner used to assemble gabions.

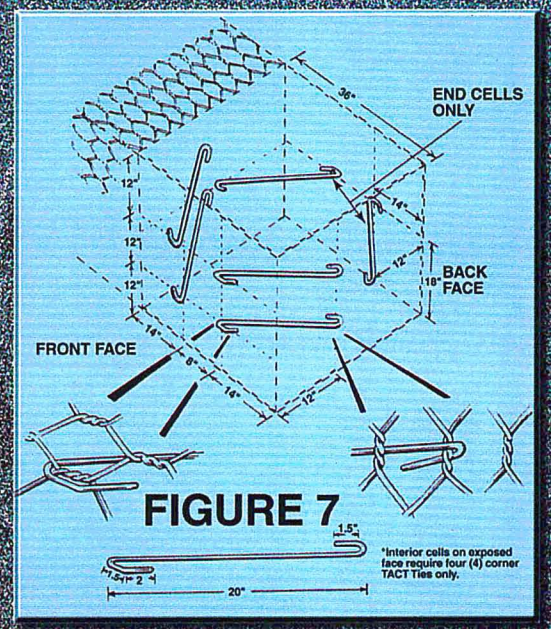


FIGURE 7

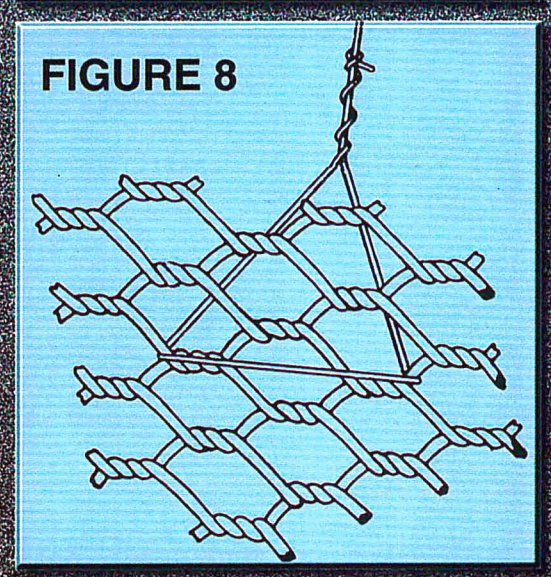

FIGURE 8

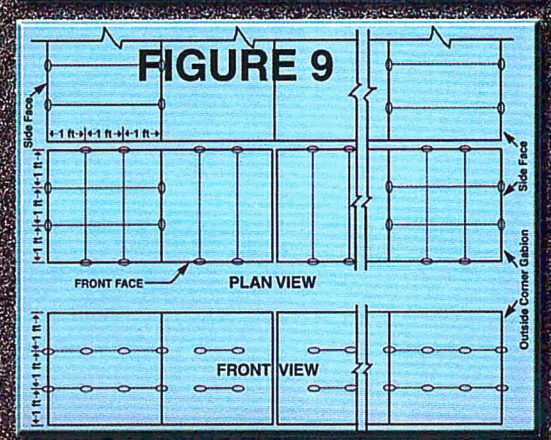


FIGURE 9

FIGURE 9:
Typical internal connecting wires for 3 foot-high gabions on front face and side faces.

NOTES:
No connecting wires or Tact Ties are required for interior cells and the back face.

# RENO MATTRESSES

## Simple Steps to Mattress Construction

For easy handling and shipping, Mattresses are supplied folded flat in bundles of 25. Lids are packaged in separate bundles or in rolls for larger units of Mattresses.

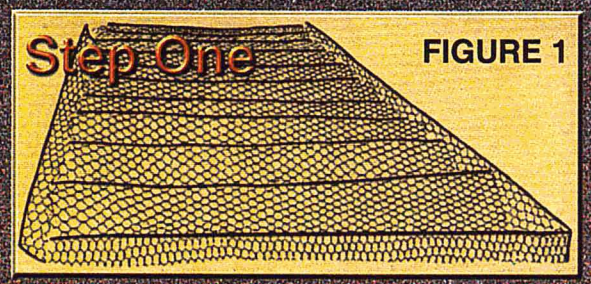


FIGURE 1

Individual Mattress is first unfolded on flat, hard ground and stamped to remove all kinks. The two long sides and both end panels are then lifted upright and secured in position by tying the selvedge wires together (see fig. 1).

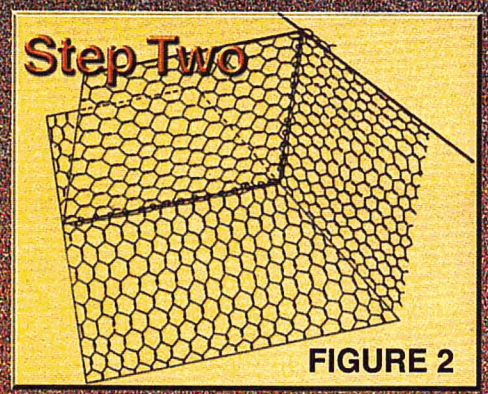


FIGURE 2

The vertical edges of all internal diaphragms are attached to the sides and laced with facing wire or approved interlocking wire fastener (see fig. 2).

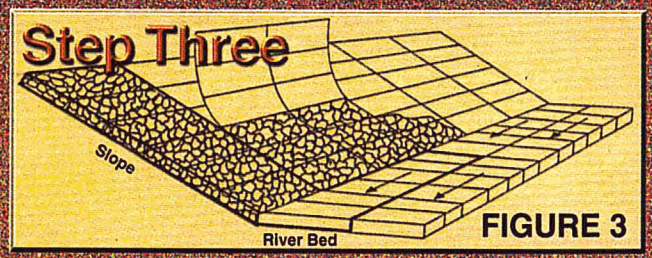


FIGURE 3

The assembled Mattress is then aligned in the required position and tied or fastened to adjacent mattress along the whole length of selvedge wire. Mattress units should be placed in proper position so that movement of rockfill inside the cage - due to gravity or flowing current - is minimal. Thus, on slopes, Mattresses should be placed with internal diaphragms at right angles to the direction of slope.

On river beds, position Mattresses with the internal diaphragms at right angles to the direction of flow (see fig. 3).

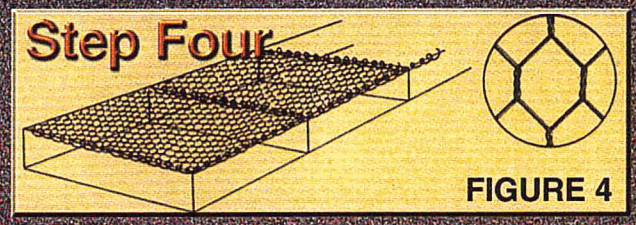


FIGURE 4

Next, the stone is placed into the compartments (cells). If it's a slope, start from the bottom. One or more Mattresses can be filled at the same time.

Sequence the installation by keeping the stone filling crew well ahead of the lid placement crew. Lids or top panels must be securely tied or fastened to side-tops and end panels and also to the top of the inner partitions (see fig. 4).

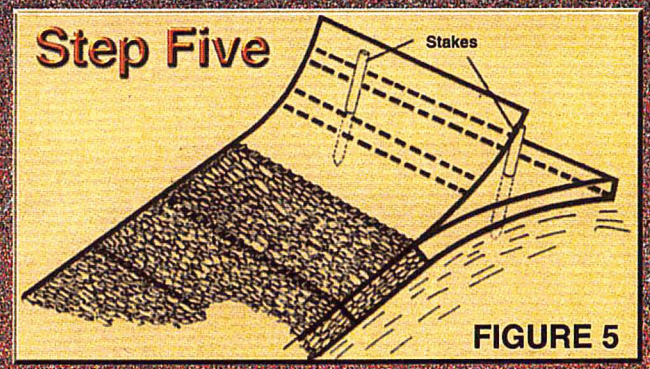


FIGURE 5

If the slope is steeper than 1:1.5, stakes should be driven through the Mattresses into the ground at 1m spacing (2 pegs per 2 m wide mattress) (see fig. 5).

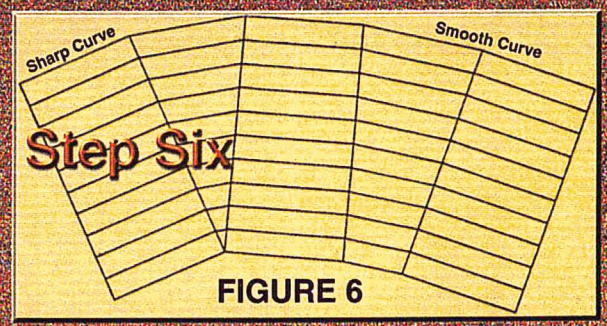


FIGURE 6

The Mattresses may be either telescoped or squashed and tied at required shapes when necessary, e.g. when Mattresses are laid on a radius. For a sharp curve, it may be necessary to cut the Mattress diagonally into triangular section and tie the open side.

# SPECIFICATIONS

## STANDARD SIZES

| LETTER CODE OF SIZE | LENGTH | WIDTH | HEIGHT | NO. OF DIAPHRAGMS | CAPACITY CUBIC YARDS | PAINTED COLOR CODE USED ON EACH UNIT TO DISTINGUISH SIZE |
|---|---|---|---|---|---|---|
| A | 6' | 3' | 3' | 1 | 2.0 | BLUE |
| B | 9' | 3' | 3' | 2 | 3.0 | WHITE |
| C | 12' | 3' | 3' | 3 | 4.0 | BLACK |
| D | 6' | 3' | 1'6" | 1 | 1.0 | RED |
| E | 9' | 3' | 1'6" | 2 | 1.5 | GREEN |
| F | 12' | 3' | 1'6" | 3 | 2.0 | YELLOW |
| G | 6' | 3' | 1' | 1 | 0.66 | BLUE-RED |
| H | 9' | 3' | 1' | 2 | 1.0 | BLUE-YELLOW |
| I | 12' | 3' | 1' | 3 | 1.33 | BLUE-GREEN |
| Q | 9' | 6' | 6" | 2 | 1 | WHITE-YELLOW |
| R | 12' | 6' | 6" | 3 | 1.33 | WHITE-GREEN |
| T | 9' | 6' | 9" | 2 | 1.5 | RED-YELLOW |
| U | 12' | 6' | 9" | 3 | 2 | RED-GREEN |

## METRIC SIZES

| LETTER CODE OF SIZE | LENGTH-WIDTH HEIGHT IN METERS | APPROXIMATE EQUIVALENTS IN FEET | NO. OF DIAPHRAGMS | CAPACITY CUBIC METERS | CAPACITY CUBIC YARDS | PAINTED COLOR CODE USED ON EACH UNIT TO DISTINGUISH SIZE |
|---|---|---|---|---|---|---|
| A | 2x1x1 | 6'6"x3'3"x3'3" | 1 | 2 | 2.616 | BLUE |
| B | 3x1x1 | 9'9"x3'3"x3'3" | 2 | 3 | 3.924 | WHITE |
| C | 4x1x1 | 13'1"x3'3"x3'3" | 3 | 4 | 5.232 | BLACK |
| D | 2x1x.5 | 6'6"x3'3"x1'8" | 1 | 1 | 1.308 | RED |
| E | 3x1x.5 | 9'9"x3'3"x1'8" | 2 | 1.5 | 1.962 | GREEN |
| F | 4x1x.5 | 13'1"x3'3"x1'8" | 3 | 2 | 2.616 | YELLOW |
| G | 2x1x.3 | 6'6"x3'3"x1' | 1 | 0.6 | 0.785 | BLUE-RED |
| H | 3x1x.3 | 9'9"x3'3"x1' | 2 | 0.9 | 1.177 | BLUE-YELLOW |
| I | 4x1x.3 | 13'1"x3'3"x1' | 3 | 1.2 | 1.570 | BLUE-GREEN |
| Q | 3x2x.15 | 9'9"x6'6"x6" | 2 | 0.9 | 1.17 | WHITE-YELLOW |
| R | 4x2x.15 | 13'1"x6'6"x6" | 3 | 1.2 | 1.57 | WHITE-GREEN |
| T | 3x2x.23 | 9'9"x6'6"x9" | 2 | 1.38 | 1.76 | RED-YELLOW |
| U | 4x2x.23 | 13'1"x6'6"x9" | 3 | 1.84 | 2.40 | RED-GREEN |

| GABION | GALVANIZED | PVC TYPE |
|---|---|---|
| Sizes & Mesh Opening: | Hexagonal, approx. 3 1/4"x4 1/2" | Same as for River Type |
| Wire For Netting: | 0.118" diam. (3.0mm) | Core 0.106", finish .146" (2.7mm/3.7mm) |
| Wire For Selvedges & Corners: | 0.150" (3.8mm) | Core 0.133", finish .173" (3.4mm/4.4mm) |
| Wire For Binding: | 0.087" (2.2mm) | Core 0.087", finish .127" (2.2mm/3.2mm) |
| Zinc Coating: | .85 ounces per square foot | .85 ounces per square foot |
| Tolerance: | + or -.005 (.0127cm) | + or -.005 (.0127cm) |

| MATTRESS | GALVANIZED | PVC TYPE |
|---|---|---|
| Sizes & Mesh Opening: | Hexagonal, approx. 2 1/2"x3 1/4" | Same as for River Type |
| Wire For Netting: | 0.087" (2.2mm) | Core 0.087", finish .127" (2.2mm/3.2mm) |
| Wire For Selvedges & Corners: | 0.106" (2.7mm) | Core 0.106", finish .146" (2.7mm/3.7mm) |
| Wire For Binding: | 0.087" (2.2mm) | Core 0.087", finish .127" (2.2mm/3.2mm) |
| Zinc Coating: | .70 ounces per square foot | .70 ounces per square foot |
| Tolerance: | + or -.005 (.0127cm) | + or -.005 (.0127cm) |

**Wire conforms to Federal Specifications QQ-W-461 H, Finish 5, Class 3 and ASTM A-641.**

**Distributed by:**

**Factory:**
**1415 N. 32nd Street**
**Ft. Smith, AR 72904**
**501-785-5344**
**Fax: 501-785-0633**

TerraAqua Land Water GABIONS

**P.O. BOX 7546, RENO, NEVADA 89510**
**775-828-1390 · FAX: 775-828-1394 · 800-736-9089**

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

Stantec

| | | | |
|---|---|---|---|
| To: | FCDMC - GEP Dam Field Office | Sender: | Chuck Gopperton |
| Attention: | Matt Manthey | Tel. No: | 602-438-2200 |
| Fax No: | (480) 836-4530 | Fax No: | 602-431-9562 |
| Date: | 30 November 2000 | **4** page(s) total includes cover sheet | |
| File: | 82000157 | Original will **NOT** follow by mail | |

The content of this fax is confidential. If the reader is not the intended recipient or its agent, be advised that any dissemination, distribution or copying of the content of this fax is prohibited. If you have received this fax in error, please notify us immediately and return the original fax to us by mail at our expense. Thank you.

**Reference: Golden Eagle Park Dam**

I have reviewed the attached mix design for the sidewalk submitted by Chandler Ready Mix. The specs call for MAG Class B (2500 psi). The submitted mix is 3,000 psi with additional flyash and superplasticizer to increase pumpability. Maximum aggregate size is 1/2 inch. Maximum slump after adding the superplasticizer is 8 inches (2 - 4 inches without the admixture).

The mix design is acceptable as submitted.

**STANTEC CONSULTING INC.**

Chuck Gopperton
Engineer

Attachment: mix design for sidewalk

cvg \\phxserv06\wrproj\82000157\construction\correspondence\faxes\cvg113000mmfax.doc

RECEIVED

NOV 2000

STANTEC

amec

Fax

To CHUCK GOPPERT
Company STANTEC
Fax 602-431-9562
Charge no
File no
Fax operator

From MATT
Direct Tel 480-836-4527
Fax 480-836 4530
Pages 3 (inc. this page)
Date 11-30-00
cc

Subject

Chuck.

HUNTER WOULD LIKE TO USE THIS MIX FOR SIDEWALK, SO THEY CAN USE A GROUT PUMP ON THE SLOPES NEAR THE GUARDRAIL. LET ME KNOW IF IT IS APPROVED WITH A FAX. THANKS,

Matt

AMEC Earth & Environmental, Inc.
3232 West Virginia Avenue
Phoenix, Arizona 85009-1502
Tel +1 (602) 272-6848
Fax +1 (602) 272-7239
www.amec.com

This fax message is confidential. If you are not the intended recipient please notify us by telephone as soon as possible and either return the message by post or destroy it. If you are not the intended recipient, any use by you of its contents is prohibited.

Chandler Ready Mix

November 29, 2000

PROJECT: EAGLE MOUNTAIN DAM

Re: READY MIX CONCRETE

230048-3000 PSI @ 28 DAYS W/FLYASH 40% ½ FLOWABLE

Gentlemen:

Chandler Ready Mix, Inc. Is pleased to submit the attached concrete mix proportions for the above noted project. These concrete mixes have been proportioned in accordance with the requirements of the American Concrete Institute (ACI), sections 318, 301 or 211, Maricopa Association of Governments (MAG), or the Arizona Department of Transportation (ADOT). These designs satisfy the requirements of the relevant sections of the project specifications.

All material used by Chandler Ready Mix, Inc. Meets or exceeds the quality requirements of the following ASTM standards. Appropriate certifications are enclosed.

| | | |
|---|---|---|
| ASTM | C-150 | Cement |
| ASTM | C-618 | Fly Ash (if used) |
| ASTM | C-494 | Admixtures |
| ASTM | C-33 | Aggregates |

Chandler Ready Mix, Inc. batching facilities and delivery equipment is certified by the Arizona Rock Products Association, and by the Arizona Department of Transportation. Concrete will be delivered as per the requirements of ASTM C-94.

Chandler Ready Mix, Inc. Warrants that the concrete supplied to this project will meet or exceed the design strength specified on the delivery ticket when evaluated in accordance with ACI-318, ACI-301, and ASTM C-94. The measured slump must not exceed the maximum design slump, and the concrete must be tested in strict accordance with the provisions of ASTM standards C-172, C-143, C-31, C-39 and C-617.

In Accordance with ASTM C-94, please copy our office with all tests results obtained on this concrete by independent testing laboratories.

When placing orders for this project, please order by product mix design number attached.

If you require any additional information or if we can be of further service, please call.

Respectfully,
Chandler Ready Mix, Inc.

Martin Salgado
Quality Control Manager

1855 West Baseline Road, Suite 165 * P.O. Box 928 * Mesa, Arizona 85211-098
Telephone: (480)-892-4490 * Fax: (480) 892-3292

# Mix Specifications

| Date | 11/29/2000 |
|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Strength** | 3000 psi @ 28 Day | **Aggregate Size** | 1/2" | **Type** | Commercial | **Description** | 3000 psi 1/2" w/ Flyash, 40% C/Agg |
| **Client** | HUNTER CONTRACTING | | | | | | |
| **Project** | Eagle Mountain Dam | | | | | **Project #** | |
| **Plants** | ALL PLANTS. | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Mix Properties** | Slump Range | 6.0 to 8.0 ins | Unit Weight | 143.43 lbs | Percent Fine Aggregate | 59.81 |
| **Weight** | Weight per Cubic Yard | 3,872.00 lbs | Water/Cement ratio | 0.686 | Water/(C + P) ratio | 0.543 |
| **Volume** | Total Volume | 27.00 ft³ | | | | |

| Material | Quantity | Unit | Weight (lbs) | S. G. | Volume (ft³) |
|---|---|---|---|---|---|
| **Cement** | | | | | |
| ASTM C 150, Type II, LA | 4.91 | Sacks | 462.00 | 3.150 | 2.350 |
| **Flyash** | | | | | |
| ASTM C618, Type F | 30.69 | % of CM | 122.60 | 2.150 | 0.909 |
| **Water** | | | | | |
| City/Well, (Potable) | 38.06 | Gallons | 317.00 | 1.000 | 5.080 |
| **Fine Aggregate** | | | | | |
| ASTM C-33 | 59.81 | % of Agg | 1,777.00 | 2.620 | 10.809 |
| **Coarse Aggregate** | | | | | |
| ASTM C-33 Size #7 (0.5"); Salt River | 40.19 | % of Agg | 1,194.00 | 2.640 | 7.748 |
| **Entrained Air** | | | | | |
| 0 to 3 % | 2.00 | % of Vol | 0.00 | 0.000 | 0.540 |
| **Liquid Admixture** | | | | | |
| WRDA-64, Grace, ASTM C-494 Type A @ 7-5 oz/cwt | 11.00 | Oz/Yard³ | 0.00 | 0.000 | 0.000 |
| Daracem-30, Grace, ASTM C-494 Type A @ 3-10 oz/cwt | 23.00 | Oz/Yard³ | 0.00 | 0.000 | 0.000 |
| Daracem-55, Grace, ASTM C-494 Type A @ 3-10 oz/cwt | 23.00 | Oz/Yard³ | 0.00 | 0.000 | 0.000 |

Slump 2" to 4" before the addition of superplasticizer at the plant, Slump 8" MAXIMUM after the addition of superplasticizer.

Reviewed By _____

Martin Salgado
Quality Control Manager

This design submittal has been prepared by Chandler Ready Mix(CRM) for the above client and project ONLY. It is not to be used or reproduced by the client or any third party for any other project without the written permission of CRM. CRM may use admixtures or procedures not listed above to control the mixture during Hot or Cold weather, for pumping, long haul, or other special applications, unless approved in writing by the client.

1855 W. Baseline Rd., #155 • Mesa, AZ 85202 • Phone: 480-892-0501 • Fax: 480-892-3292

# CONSTRUCTION SURVEY

Ronald L. Vogel

Barbara A. Vogel

ANSCO INC

Construction Surveying

2829 East Fairfield Street
Mesa, Arizona 85213

Tel. 602-396-9101
Fax 602-396-0570
Mobile 602-228-8027

| | | | |
|---|---|---|---|
| JOB | GOLDEN EAGLE II<br>Atmos crn Yes<br>Record elev Yes | Point Id Numeric (4)<br>C and R crn Yes<br>Sea level crn No | Refract const 0.14 |
| SCALE | S.F. 1.00000000 | | |
| NOTE OO | Current view | | |
| NOTE TS | Jul-19-00 15:42 | | |
| NOTE JS | 11100 | | |
| NOTE | -FLOOD CONTROL DISTRICT OF MARICOPA CO. | | |
| NOTE | -GOLDEN EAGLE PARK DAM MODIFICATIONS | | |
| NOTE | -FCD CONTRACT #1999C071 | | |
| NOTE | -SURVEYING BY ANSCO INC. | | |
| NOTE TS | Aug-02-00 10:22 | | |
| NOTE CJ | Point taken from ORIGINAL X-SEC | | |
| POS KI 0001 | North 893179.030 | East 723502.131 | Elev 1216.173 |
| NOTE CJ | Point taken from ORIGINAL X-SEC | | |
| POS KI 0002 | North 893567.960 | East 724856.860 | Elev 1221.510 |
| NOTE CJ | Point taken from ORIGINAL X-SEC | | |
| POS KI 1004 | North 893274.012<br>Code GS | East 723412.403 | Elev 1211.357 |
| POS KI 1004 | North 893274.012<br>Code GS | East 723412.403 | Elev 1211.357 |
| POS KI 0001 | North 951917.190<br>Code 1004 | East 754961.434 | Elev 1714.763 |
| POS KI 0002 | North 951947.468<br>Code 1 | East 754671.908 | Elev 1727.931 |
| INSTRUMENT | Geod 400/500/600<br>Theo desc <No text><br>V.obs Zenith<br>P.C. mm 0.000 | EDM <No text><br>Theo S/N 000000<br>EDM o/s <Null> | EDM S/N 000000<br>Mount Not applic<br>Refl o/s <Null> |
| NOTE PC | P.C. mm Applied | | |
| STN SO 0002 | North 951947.468<br>Theo ht 4.920 | East 754671.908<br>Code 1 | Elev 1727.931 |
| MOS | Press 29.2 | Temp 100.00 | |
| NOTE PT | Atmos crn Applied | | |
| NOTE TS | Aug-02-00 10:35 | | |

Registered Land Surveyor
CERTIFICATE
19352
RONALD L.
VOGEL
Date Signed 8-09-2000
ARIZONA U S A

| | | | |
|---|---|---|---|
| NOTE TL | V.obs tol. error: | Pt: 0001 5-10'44" | |
| TP 0002-0001 | Azimuth 95-58'13" | H.obs 143-32'40" | |
| TARGET | Target ht 4.920 | | |
| OBS F1 0002-0001 | S.Dist 291.418<br>Code 1004 | V.obs 87-24'41" | H.obs 143-32'40" |
| STN SO 0002 | North 951947.468<br>Theo ht 4.920 | East 754671.908<br>Code 1 | Elev 1727.931 |
| POS KI 0001 | North 951917.190<br>Code 1004 | East 754961.434 | Elev 1727.931 |
| NOTE TL | EDM tol. error: | Pt: 0001 0.323 | |
| NOTE TL | V.obs tol. error: | Pt: 0001 2-35'26" | |
| BKB TP 0002-0001 | Azimuth 95-58'13" | H.obs 143-32'41" | |
| OBS F1 0002-0001 | S.Dist 291.428<br>Code 1004 | V.obs 87-24'35" | H.obs 143-32'41" |
| POS TP 0003 | North 951917.184<br>Code 0001 | East 754961.449 | Elev 1741.086 |
| NOTE SO | Cut 13.155 | ŠNorth 0.006 | ŠEast -0.015 |
| POS KI 0001 | North 951917.190<br>Code 1004 | East 754961.434 | Elev 1714.760 |
| POS KI 0002 | North 951947.468<br>Code 1 | East 754671.908 | Elev 1727.931 |
| STN SO 0001 | North 951917.190<br>Theo ht 4.920 | East 754961.434<br>Code 1004 | Elev 1714.760 |
| NOTE TL | EDM tol. error: | Pt: 0002 0.045 | |
| BKB TP 0001-0002 | Azimuth 275-58'13" | H.obs 143-32'49" | |
| OBS F1 0001-0002 | S.Dist 291.448<br>Code 1 | V.obs 87-24'39" | H.obs 143-32'49" |
| POS TP 0004 | North 951947.475<br>Code 0002 | East 754671.854 | Elev 1727.935 |
| NOTE SO | Cut 0.004 | ŠNorth -0.007 | ŠEast 0.054 |
| NOTE TS | Aug-02-00 10:47 | | |
| POS TP 0005 | North 951877.042<br>Code SIDEWALK | East 755016.827 | Elev 1715.898 |
| POS TP 0006 | North 952520.585<br>Code 1 | East 755214.750 | Elev 1721.609 |
| NOTE TS | Aug-02-00 11:15 | | |

| | | | |
|---|---|---|---|
| POS KI 0010 | North 952686.910<br>Code 1 | East 755155.630 | Elev 1695.000 |
| [illegible] SO 0006 | North 952520.585<br>Theo ht 4.950 | East 755214.750<br>Code 1 | Elev 1721.609 |
| NOTE TS | Aug-02-00 11:25 | | |
| NOTE TL | EDM tol. error: Pt: 0001 0.037 | | |
| BKB TP 0006-0001 | Azimuth 202-46'25" | H.obs 310-51'03" | |
| TARGET | Target ht 4.720 | | |
| OBS F1 0006-0001 | S.Dist 654.412<br>Code 1004 | V.obs 90-37'28" | H.obs 310-51'03" |
| OBS F1 0006-0007 | S.Dist 654.417<br>Code 0001 | V.obs 90-37'06" | H.obs 310-51'04" |
| NOTE SO | Cut 0.026 | ŠNorth -0.031 | ŠEast -0.010 |
| NOTE LN | From 0010 | Azimuth 74-38'04" | Grade Horizontal |
| TARGET | Target ht 4.920 | | |
| OBS F1 0006-0008 | S.Dist 205.795<br>Code 0008 | V.obs 95-28'45" | H.obs 112-19'10" |
| NOTE LN | Cut 6.990 | ŠNorth -0.074 | ŠEast 0.001 |
| NOTE LN | Offline -0.071 | | |
| OBS F1 0006-0009 | S.Dist 210.376<br>Code 0009 | V.obs 95-05'29" | H.obs 111-52'14" |
| NOTE LN | Cut 7.971 | ŠNorth -0.045 | ŠEast -0.034 |
| NOTE LN | Offline -0.035 | | |
| TARGET | Target ht 5.920 | | |
| OBS F1 0006-0011 | S.Dist 175.975<br>Code 0011 | V.obs 97-27'40" | H.obs 116-53'43" |
| NOTE LN | Cut 2.789 | ŠNorth 0.006 | ŠEast -0.026 |
| NOTE LN | Offline 0.013 | | |
| NOTE TS | Aug-02-00 11:37 | | |
| OBS F1 0006-0012 | S.Dist 171.285<br>Code 0012 | V.obs 97-03'07" | H.obs 117-34'27" |
| [illegible] LN | Cut 4.611 | ŠNorth -0.052 | ŠEast -0.001 |
| NOTE LN | Offline -0.049 | | |
| TARGET | Target ht 7.920 | | |

| | | | |
|---|---|---|---|
| OBS F1 0006-0013 | S.Dist 178.695<br>Code 0013 | V.obs 95-43'59" | H.obs 122-34'54" |
| NOTE LN | Cut 5.790 | ŠNorth 0.007 | ŠEast 0.014 |
| NOTE LN | Offline 0.003 | | |
| NOTE TS | Aug-02-00 11:48 | | |
| OBS F1 0006-0014 | S.Dist 183.355<br>Code 0014 | V.obs 96-33'56" | H.obs 121-48'22" |
| NOTE LN | Cut 2.675 | ŠNorth 0.014 | ŠEast -0.010 |
| NOTE LN | Offline 0.016 | | |
| TARGET | Target ht 4.920 | | |
| OBS F1 0006-0015 | S.Dist 213.216<br>Code 0015 | V.obs 95-27'35" | H.obs 117-22'57" |
| NOTE LN | Cut 6.354 | ŠNorth 0.022 | ŠEast -0.034 |
| NOTE LN | Offline 0.030 | | |
| OBS F1 0006-0016 | S.Dist 217.586<br>Code 0016 | V.obs 94-49'52" | H.obs 116-50'10" |
| NOTE LN | Cut 8.315 | ŠNorth 0.014 | ŠEast -0.055 |
| NOTE LN | Offline 0.028 | | |
| NOTE TS | Aug-03-00 06:37 | | |
| STN SO 0005 | North 951877.042<br>Theo ht 4.980 | East 755016.827<br>Code SIDEWALK | Elev 1715.898 |
| ATMOS | Press 29.2 | Temp 90.00 | |
| NOTE PT | Atmos crn Applied | | |
| NOTE TL | EDM tol. error: Pt: 0002 0.060 | | |
| BKB TP 0005-0002 | Azimuth 281-32'25" | H.obs 111-37'58" | |
| TARGET | Target ht 6.920 | | |
| OBS F1 0005-0002 | S.Dist 352.253<br>Code 1 | V.obs 87-43'40" | H.obs 111-37'58" |
| POS TP 0017 | North 951947.481<br>Code 0002 | East 754671.905 | Elev 1727.934 |
| NOTE SO | Cut 0.003 | ŠNorth -0.013 | ŠEast 0.003 |
| ROAD | ID FLOOD WALL | | |
| SCALE | S.F. 1.00000000 | | |

| | | | |
|---|---|---|---|
| NOTE OO | Current view | | |
| NOTE TS | Jul-19-00 15:46 | | |
| HORZ ALIGN | Start Sta 3900.000<br>North 951876.590 | End Sta 4250.560<br>East 755136.120 | Azimuth 249-10'23" |
| HORZ STRAIGHT | Sta..ing 3900.000 | Azimuth 249-10'23" | Dist 212.000 |
| HORZ STRAIGHT | Sta..ing 4112.000 | Azimuth 274-17'34" | Dist 138.560 |
| VERT ALIGN | Sta..ing 4000.000 | Elev 1710.420 | |
| PARABOLIC VC | Sta..ing 4112.000 | Elev 1710.420 | Length 0.000 |
| PARABOLIC VC | Sta..ing 4112.010 | Elev 1714.420 | Length 0.000 |
| VERT POINT | Sta..ing 4214.000 | Elev 1714.420 | |
| NOTE RO | Set out Road FLOOD WALL | | |
| NOTE TS | Aug-03-00 06:47 | | |
| TARGET | Target ht 4.920 | | |
| NOTE RO | Horz o/s -8.000 | | |
| ROAD POS RO 0018 | Sta..ing 3999.965<br>North 951833.573<br>Cd Center | Offset -7.997<br>East 755045.530 | Elev 1716.300 |
| NOTE RO | Cut 5.880 | ŠNorth -0.015 | ŠEast -0.031 |
| NOTE RO | Horz o/s -10.000 | | |
| ROAD POS RO 0019 | Sta..ing 4049.980<br>North 951813.946<br>Cd Center | Offset -9.971<br>East 754999.485 | Elev 1716.843 |
| NOTE RO | Cut 6.423 | ŠNorth -0.035 | ŠEast -0.009 |
| NOTE RO | Horz o/s -12.000 | | |
| ROAD POS RO 0020 | Sta..ing 4099.956<br>North 951794.323<br>Cd Center | Offset -11.955<br>East 754953.479 | Elev 1716.817 |
| NOTE RO | Cut 6.397 | ŠNorth -0.058 | ŠEast -0.025 |
| ROAD POS RO 0021 | Sta..ing 4112.008<br>North 951789.961<br>Cd Center | Offset -12.037<br>East 754942.245 | Elev 1717.351 |
| NOTE RO | Cut 6.931 | ŠNorth 0.044 | ŠEast 0.013 |
| NOTE TS | Aug-03-00 06:58 | | |
| ROAD POS RO 0022 | Sta..ing 4106.848<br>North 951789.933<br>Cd Center | Offset -10.926<br>East 754942.292 | Elev 1717.351 |

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|---|---|---|---|
| NOTE RO | Cut 2.931 | ŠNorth -0.685 | ŠEast -5.228 |
| [illegible] RO | Horz o/s 7.500 | | |
| ROAD POS RO 0023 | Sta..ing 4150.006<br>North 951811.563<br>Cd Center | Offset 7.525<br>East 754900.636 | Elev 1720.353 |
| NOTE RO | Cut 5.933 | ŠNorth -0.025 | ŠEast 0.004 |
| TARGET | Target ht 7.920 | | |
| NOTE RO | Horz o/s 10.000 | | |
| ROAD POS RO 0024 | Sta..ing 4200.035<br>North 951817.748<br>Cd Center | Offset 9.972<br>East 754850.931 | Elev 1719.188 |
| NOTE RO | Cut 4.768 | ŠNorth 0.025 | ŠEast 0.037 |
| NOTE TS | Aug-03-00 07:08 | | |
| TARGET | Target ht 4.920 | | |
| NOTE RO | Horz o/s -12.000 | | |
| ROAD POS RO 0025 | Sta..ing 4213.978<br>North 951796.861<br>Cd Center | Offset -12.021<br>East 754835.381 | Elev 1723.725 |
| NOTE RO | Cut 9.305 | ŠNorth 0.022 | ŠEast -0.021 |
| POS TP 0026 | North 952062.647<br>Code END OF WALL | East 754983.628 | Elev 1714.820 |
| POS KI 0034 | North 952144.150<br>Code Center | East 754994.450 | Elev 1715.000 |
| POS KI 0034 | North 952144.150<br>Code PI | East 754994.450 | Elev 1715.000 |
| NOTE TS | Aug-03-00 07:22 | | |
| POS TP 0027 | North 951995.276<br>Code EAST SIDE WALL | East 754973.369 | Elev 1714.834 |
| POS TP 0028 | North 952032.735<br>Code S.WALK | East 755069.315 | Elev 1702.988 |
| POS TP 0029 | North 952060.760<br>Code S.WALK | East 755081.795 | Elev 1703.059 |
| POS TP 0030 | North 952061.913<br>Code S.WALK | East 755079.406 | Elev 1703.168 |
| POS TP 0031 | North 952081.614<br>Code S.WALK | East 755088.754 | Elev 1703.179 |
| POS TP 0032 | North 952083.793 | East 755085.094 | Elev 1703.349 |

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|---|---|---|---|
| | Code S.WALK | | |
| POS TP 0033 | North 952149.857<br>Code S.WALK | East 755122.556 | Elev 1703.161 |
| POS TP 0035 | North 952152.855<br>Code S.WALK | East 755117.378 | Elev 1703.219 |
| POS TP 0036 | North 952160.244<br>Code S.WALK | East 755121.590 | Elev 1703.222 |
| NOTE TS | Aug-14-00 07:41 | | |
| POS KI 0301 | North 952160.240 | East 755121.590 | Elev 1702.520 |
| POS KI 0302 | North 952125.210 | East 755108.580 | Elev 1702.540 |
| POS KI 0303 | North 952109.130 | East 755099.460 | Elev 1702.580 |
| POS KI 0304 | North 952061.910 | East 755079.410 | Elev 1702.470 |
| POS KI 0305 | North 952032.740 | East 7755069.320 | Elev 1702.290 |
| POS KI 0306 | North 952207.537 | East 755037.460 | Elev 1726.500 |
| POS KI 0306 | North 952207.537 | East 755037.460 | Elev 1725.800 |
| POS KI 0310 | North 952062.650 | East 754983.630 | Elev <Null> |
| [illegible] KI 0308 | North 952143.390 | East 754994.030 | Elev <Null> |
| POS KI 0311 | North 952057.600 | East 754998.100 | Elev <Null> |
| POS KI 0314 | North 952138.540 | East 755008.530 | Elev <Null> |
| POS KI 0307 | North 952178.470 | East 755013.997 | Elev <Null> |
| POS KI 0315 | North 952171.050 | East 755027.030 | Elev <Null> |
| POS KI 0309 | North 952123.050 | East 754991.410 | Elev <Null> |
| POS KI 0313 | North 952121.130 | East 755006.290 | Elev <Null> |
| POS KI 0316 | North 952163.630 | East 755040.070 | Elev <Null> |
| NOTE TS | Aug-14-00 07:52 | | |
| POS KI 0312 | North 952088.580 | East 755002.100 | Elev 1712.070 |
| POS KI 0311 | North 952057.600 | East 754998.100 | Elev 1712.560 |
| POS KI 0310 | North 952062.650 | East 754983.630 | Elev 1712.560 |
| POS KI 0309 | North 952123.050 | East 754991.410 | Elev 1711.860 |
| [illegible] KI 0308 | North 952143.390 | East 754994.030 | Elev 1712.160 |
| POS KI 0307 | North 952178.470 | East 755013.997 | Elev 1712.860 |
| POS KI 0316 | North 952163.630 | East 755040.070 | Elev 1710.890 |

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|---|---|---|---|
| POS KI 0315 | North 952171.050 | East 755027.030 | Elev 1712.560 |
| POS KI 0314 | North 952138.540 | East 755008.530 | Elev 1711.860 |
| POS KI 0313 | North 952121.130 | East 755006.290 | Elev 1711.560 |
| POS KI 0312 | North 952088.580 | East 755002.100 | Elev 1712.070 |
| NOTE TS | Aug-14-00 08:47 | | |
| POS KI 0311 | North 952057.600 | East 754998.100 | Elev 1714.560 |
| POS KI 0312 | North 952088.580 | East 755002.100 | Elev 1712.560 |
| POS KI 0314 | North 952138.540 | East 755008.530 | Elev 1711.560 |
| POS KI 0312 | North 952088.580 | East 755002.100 | Elev 1712.560 |
| STN SO 0001 | North 951917.190<br>Theo ht 5.050 | East 754961.434<br>Code 1004 | Elev 1714.760 |
| ATMOS | Press 29.2 | Temp 95.00 | |
| NOTE PT | Atmos crn Applied | | |
| NOTE TL | EDM tol. error: Pt: 0002 0.036 | | |
| BKB TP 0001-0002 | Azimuth 275-58'13" | H.obs 38-09'59" | |
| TARGET | Target ht 4.910 | | |
| OBS F1 0001-0002 | S.Dist 291.432<br>Code 1 | V.obs 87-26'10" | H.obs 38-09'59" |
| POS TP 0037 | North 951947.470<br>Code 0002 | East 754671.888 | Elev 1727.935 |
| NOTE SO | Cut 0.004 | ŠNorth -0.002 | ŠEast 0.020 |
| NOTE TS | Aug-14-00 09:00 | | |
| POS TP 0038 | North 952064.558<br>Code 0311 | East 755000.003 | Elev 1714.061 |
| NOTE SO | Fill 0.499 | ŠNorth -6.958 | ŠEast -1.903 |
| POS TP 0039 | North 952088.573<br>Code 0312 | East 755002.154 | Elev 1715.128 |
| NOTE SO | Cut 2.568 | ŠNorth 0.007 | ŠEast -0.054 |
| POS TP 0040 | North 952138.565<br>Code 0314 | East 755008.549 | Elev 1715.895 |
| NOTE SO | Cut 4.335 | ŠNorth -0.025 | ŠEast -0.019 |
| POS TP 0041 | North 951854.641 | East 755046.277 | Elev 1715.973 |
| NOTE TS | Aug-14-00 09:15 | | |

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|---|---|---|---|
| STN TP 0041 | North 951854.641<br>Theo ht 4.880 | East 755046.277 | Elev 1715.973 |
| BKB TP 0041-0001 | Azimuth 306-23'57" | H.obs 123-49'09" | |
| OBS F1 0041-0001 | S.Dist 105.423<br>Code 1004 | V.obs 90-38'29" | H.obs 123-49'09" |
| POS TP 0042 | North 951917.180<br>Code 0001 | East 754961.453 | Elev 1714.762 |
| NOTE SO | Cut 0.002 | ŠNorth 0.010 | ŠEast -0.019 |
| NOTE RO | Set out Road FLOOD WALL | | |
| ROAD POS RO 0043 | Sta..ing 4000.000<br>North 951841.035<br>Cd Center | Offset 0.000<br>East 755042.654 | Elev 1710.420 |
| ROAD POS RO 0044 | Sta..ing 4010.000<br>North 951837.480<br>Cd Center | Offset 0.000<br>East 755033.308 | Elev 1710.420 |
| NOTE TS | Aug-14-00 09:25 | | |
| NOTE LN | From 0043 | To pt 0044 | |
| TP 0045 | North 951844.583<br>Code 0045 | East 755051.976 | Elev 1715.993 |
| NOTE LN | Cut 5.573 | ŠNorth 0.008 | ŠEast 0.025 |
| NOTE LN | Offline 0.002 | | |
| POS TP 0046 | North 951811.142<br>Code 0046 | East 755054.032 | Elev 1716.681 |
| NOTE LN | Cut 6.261 | ŠNorth -0.016 | ŠEast -0.001 |
| NOTE LN | Offline 0.014 | | |
| NOTE TS | Aug-24-00 07:42 | | |
| STN RS 0050 | North <Null><br>Theo ht 5.680 | East <Null> | Elev <Null> |
| SET SC 0050 | Set # 1 | Point count 2 | |
| TARGET | Target ht 4.910 | | |
| OBS F1 0050-0001 | S.Dist 235.121<br>Code 1004 | V.obs 89-58'52" | H.obs 210-42'11" |
| OBS F1 0050-0002 | S.Dist 363.004<br>Code 1 | V.obs 87-54'34" | H.obs 263-55'56" |
| NOTE RS | The following MCs are derived from set(s) 1. | | |
| OBS MC 0050-0001 | S.Dist 235.122 | V.ang 89-47'36" | Azimuth 182-25'38" |

| | | | |
|---|---|---|---|
| | Code 1004 | | |
| OBS MC 0050-0002 | S.Dist 363.033<br>Code 1 | V.ang 87-47'15" | Azimuth 235-39'23" |
| NOTE RS | 0001 DValues 0.004 | 0-00'02" | 0-00'00" |
| NOTE RS | 0002 DValues 0.046 | 0-00'01" | 0-00'00" |
| NOTE TS | Aug-24-00 07:54 | | |
| STN RS 0050 | North <Null><br>Theo ht 5.680 | East <Null> | Elev <Null> |
| NOTE RS | The following MCs are derived from set(s) 1. | | |
| OBS MC 0050-0001 | S.Dist 235.122<br>Code 1004 | V.ang 89-47'36" | Azimuth 182-25'38" |
| OBS MC 0050-0002 | S.Dist 363.033<br>Code 1 | V.ang 87-47'15" | Azimuth 235-39'23" |
| NOTE RS | 0001 DValues 0.004 | 0-00'02" | 0-00'00" |
| NOTE RS | 0002 DValues 0.046 | 0-00'01" | 0-00'00" |
| STN RS 0050 | North 952152.096<br>Theo ht 5.680 | East 754971.391 | Elev 1713.914 |
| OBS RS 0050-0002 | Azimuth 235-39'23" | H.obs 263-55'56" | |
| ROAD | ID GOLDEN EAGLE DAM | | |
| SCALE | S.F. 1.00000000 | | |
| NOTE OO | Current view | | |
| NOTE TS | Aug-22-00 20:51 | | |
| HORZ ALIGN | Start Sta 0.000<br>North 952874.540 | End Sta 1189.070<br>East 755420.450 | Azimuth 209-40'01" |
| HORZ STRAIGHT | Sta..ing 0.000 | Azimuth 209-40'01" | Dist 868.030 |
| HORZ STRAIGHT | Sta..ing 868.030 | Azimuth 188-40'00" | Dist 321.040 |
| VERT ALIGN | Sta..ing 0.000 | Elev 1726.500 | |
| VERT POINT | Sta..ing 1200.000 | Elev 1726.500 | |
| NOTE RT | Road topo GOLDEN EAGLE DAM | | |
| POS TP 0047 | North 952238.510<br>Code 1 | East 755012.812 | Elev 1713.857 |
| ROAD POS RT 0047 | Sta..ing 754.420<br>North 952238.510<br>Cd 1 | Offset 39.396<br>East 755012.812 | Elev 1713.857 |
| POS TP 0048 | North 952297.521 | East 755044.647 | Elev 1714.669 |

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|---|---|---|---|
| | Code 1 | | |
| D POS RT 0048 | Sta..ing 687.388<br>North 952297.521<br>Cd 1 | Offset 40.942<br>East 755044.647 | Elev 1714.669 |
| NOTE TS | Aug-24-00 08:05 | | |
| POS TP 0049 | North 952361.715<br>Code 1 | East 755077.633 | Elev 1714.497 |
| ROAD POS RT 0049 | Sta..ing 615.282<br>North 952361.715<br>Cd 1 | Offset 44.053<br>East 755077.633 | Elev 1714.497 |
| POS TP 0051 | North 952420.822<br>Code 1 | East 755109.912 | Elev 1714.233 |
| ROAD POS RT 0051 | Sta..ing 547.946<br>North 952420.822<br>Cd 1 | Offset 45.260<br>East 755109.912 | Elev 1714.233 |
| POS TP 0052 | North 952487.690<br>Code 1 | East 755145.972 | Elev 1713.509 |
| ROAD POS RT 0052 | Sta..ing 471.996<br>North 952487.690<br>Cd 1 | Offset 47.024<br>East 755145.972 | Elev 1713.509 |
| TARGET | Target ht 7.910 | | |
| NOTE TS | Aug-24-00 08:16 | | |
| POS TP 0053 | North 952707.020<br>Code 1 | East 755255.186 | Elev 1706.307 |
| ROAD POS RT 0053 | Sta..ing 227.359<br>North 952707.020<br>Cd 1 | Offset 60.685<br>East 755255.186 | Elev 1706.307 |
| NOTE TS | Aug-29-00 19:14 | | |
| NOTE RO | Set out Road GOLDEN EAGLE DAM | | |
| NOTE TS | Aug-30-00 10:03 | | |
| STN SO 0050 | North 952152.096<br>Theo ht 5.070 | East 754971.391 | Elev 1713.914 |
| NOTE TL | EDM tol. error: Pt: 0002 0.044 | | |
| BKB TP 0050-0002 | Azimuth 235-39'23" H.obs 2-03'45" | | |
| RGET | Target ht 5.910 | | |
| OBS F1 0050-0002 | S.Dist 363.064<br>Code 1 | V.obs 87-39'23" | H.obs 2-03'45" |
| NOTE TL | EDM tol. error: Pt: 0001 127.956 | | |

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|---|---|---|---|
| NOTE TL | V.obs tol. error: Pt: 0001 1-56'15" | | |
| TP 0050-0001 | Azimuth 182-25'38" | H.obs 2-03'49" | |
| OBS F1 0050-0001 | S.Dist 363.079<br>Code 1004 | V.obs 87-39'07" | H.obs 2-03'49" |
| NOTE TL | EDM tol. error: Pt: 0002 0.069 | | |
| BKB TP 0050-0002 | Azimuth 235-39'23" | H.obs 2-04'07" | |
| OBS F1 0050-0002 | S.Dist 363.089<br>Code 1 | V.obs 87-39'10" | H.obs 2-04'07" |
| POS TP 0054 | North 951947.448<br>Code 0002 | East 754671.863 | Elev 1727.943 |
| NOTE SO | Cut 0.012 | ŠNorth 0.020 | ŠEast 0.045 |
| ROAD | ID GOLDEN EAGLE DAM | | |
| SCALE | S.F. 1.00000000 | | |
| NOTE OO | Current view | | |
| NOTE TS | Aug-22-00 20:51 | | |
| HORZ ALIGN | Start Sta 0.000<br>North 952874.540 | End Sta 1189.070<br>East 755420.450 | Azimuth 209-40'01" |
| HORZ STRAIGHT | Sta..ing 0.000 | Azimuth 209-40'01" | Dist 868.030 |
| HORZ STRAIGHT | Sta..ing 868.030 | Azimuth 188-40'00" | Dist 321.040 |
| VERT ALIGN | Sta..ing 0.000 | Elev 1726.500 | |
| VERT POINT | Sta..ing 1200.000 | Elev 1726.500 | |
| X SECTION | Sta..ing 0.000<br>Rt Template DAM | Lt. Template <No text> | |
| X SECTION | Sta..ing 1200.000<br>Rt Template DAM | Lt. Template <No text> | |
| TEMPLATE | ID DAM | | |
| NOTE TS | Aug-29-00 19:22 | | |
| NOTE RO | Temp element | Grade Horizontal | H.dist 14.650 |
| NOTE RO | V.Dist 0.000 | Offset 14.650 | |
| NOTE RO | HtDiff 0.000 | Apply super No | Apply widen No |
| TE RO | Cd <No text> | | |
| NOTE RO | Templ-Sideslope | Cut <Null> | Fill %50.000 |
| NOTE RO | Set out Road GOLDEN EAGLE DAM | | |

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|---|---|---|---|
| NOTE TS | Aug-30-00 10:17 | | |
| GET | Target ht 4.910 | | |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 700.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| NOTE RO | Horz o/s 0.000 | | |
| ROAD POS RO 0055 | Sta..ing 700.028<br>North 952285.283<br>Cd R Sideslope | Offset 38.407<br>East 755040.593 | Elev 1714.648 |
| NOTE RO | Cut 0.019 | ŠNorth 0.016 | ŠEast 0.028 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| E RO | Sta..ing 600.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 0056 | Sta..ing 599.983<br>North 952372.029<br>Cd R Sideslope | Offset 38.032<br>East 755090.438 | Elev 1714.823 |
| NOTE RO | Cut 0.019 | ŠNorth -0.010 | ŠEast -0.017 |
| NOTE RO | Design slope Fill | | |
| NOTE TS | Aug-30-00 10:27 | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 500.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| TE RO | Grade Horizontal | | |
| ROAD POS RO 0057 | Sta..ing 500.007<br>North 952458.696<br>Cd R Sideslope | Offset 37.621<br>East 755140.278 | Elev 1714.989 |

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|---|---|---|---|
| NOTE RO | Cut 0.006 | ŠNorth 0.038 | ŠEast -0.052 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 400.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 0058 | Sta..ing 399.903<br>North 952546.335<br>Cd R Sideslope | Offset 38.947<br>East 755188.673 | Elev 1714.403 |
| NOTE RO | Cut 0.027 | ŠNorth -0.110 | ŠEast -0.004 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From Catch Point | To pt <No text> | |
| NOTE RO | Sta..ing 300.000 | | |
| NOTE RO | ŠOffset 26.773 | | |
| NOTE RO | Fill 13.386 | | |
| NOTE RO | Grade %-50.000 | | |
| NOTE RO | Calc Grade %-49.656 | | |
| ROAD POS RO 0059 | Sta..ing 299.947<br>North 952634.436<br>Cd R Sideslope | Offset 41.468<br>East 755235.956 | Elev 1713.221 |
| NOTE RO | Cut 0.089 | ŠNorth -0.087 | ŠEast 0.045 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 250.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 250.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |

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|---|---|---|---|
| NOTE RO | Grade Horizontal | | |
| NOTE TS | Aug-30-00 10:37 | | |
| ROAD POS RO 0060 | Sta..ing 250.027<br>North 952677.707<br>Cd R Sideslope | Offset 41.256<br>East 755260.849 | Elev 1713.171 |
| NOTE RO | Cut 0.012 | ŠNorth 0.061 | ŠEast -0.053 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 200.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 0061 | Sta..ing 199.889<br>North 952715.479<br>Cd R Sideslope | Offset 29.550<br>East 755295.837 | Elev 1718.959 |
| NOTE RO | Fill 0.026 | ŠNorth -0.032 | ŠEast -0.168 |

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|---|---|---|---|
| SDR33 V04-04.26 | (C) Copyright 1999 | Sokkia | Dec-16-00 21:00 |
| | Angle Degrees | Dist Feet | Press Inch Hg |
| | Temp Farenht | Coord N-E-Elev | |
| JOB | GOLDEN EAGLE | Point Id Numeric (4) | |
| | Atmos crn Yes | C and R crn Yes | Refract const 0.14 |
| | Record elev Yes | Sea level crn No | |
| SCALE | S.F. 1.00000000 | | |
| NOTE OO | Current view | | |
| NOTE TS | Oct-25-00 08:23 | | |
| NOTE JS | 11100 | | |
| NOTE TS | Oct-25-00 08:25 | | |
| POS KI 0001 | North 951877.042 | East 755016.827 | Elev 1715.898 |
| POS KI 0002 | North 951947.468 | East 754671.908 | Elev 1727.931 |
| NOTE TS | Oct-25-00 08:45 | | |
| INSTRUMENT | Geod 400/500/600 | EDM <No text> | EDM S/N 000000 |
| | Theo desc <No text> | Theo S/N 000000 | Mount Not applic |
| | V.obs Zenith | EDM o/s <Null> | Refl o/s <Null> |
| | P.C. mm 0.000 | | |
| NOTE PC | P.C. mm Applied | | |
| STN RS 0003 | North <Null> | East <Null> | Elev <Null> |
| | Theo ht 5.030 | | |
| ATMOS | Press 29.2 | Temp 60.00 | |
| NOTE PT | Atmos crn Applied | | |
| SET SC 0003 | Set # 1 | Point count 2 | |
| TARGET | Target ht 4.900 | | |
| OBS F1 0003-0002 | S.Dist 486.764 | V.obs 89-14'44" | H.obs 312-28'30" |
| TARGET | Target ht 5.050 | | |
| OBS F1 0003-0001 | S.Dist 364.548 | V.obs 90-51'38" | H.obs 266-20'03" |
| NOTE RS | The following MCs are derived from set(s) 1. | | |
| OBS MC 0003-0002 | S.Dist 486.765 | V.ang 89-13'47" | Azimuth 233-14'36" |
| OBS MC 0003-0001 | S.Dist 364.548 | V.ang 90-51'48" | Azimuth 187-06'09" |
| NOTE RS | 0002 DValues 0.044 | 0-00'01" | 0-00'00" |
| NOTE RS | 0001 DValues 0.005 | 0-00'01" | 0-00'00" |
| STN RS 0003 | North 952238.756 | East 755061.897 | Elev 1721.389 |

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|---|---|---|---|
| | Theo ht 5.030 | | |
| RS 0003-0001 | Azimuth 187-06'09" | H.obs 266-20'03" | |
| ROAD | ID GOLDEN EAGLE DAM | | |
| SCALE | S.F. 1.00000000 | | |
| NOTE OO | Current view | | |
| NOTE TS | Aug-22-00 20:51 | | |
| HORZ ALIGN | Start Sta 0.000<br>North 952874.540 | End Sta 1189.070<br>East 755420.450 | Azimuth 209-40'01" |
| HORZ STRAIGHT | Sta..ing 0.000 | Azimuth 209-40'01" | Dist 868.030 |
| HORZ STRAIGHT | Sta..ing 868.030 | Azimuth 188-40'00" | Dist 321.040 |
| VERT ALIGN | Sta..ing 0.000 | Elev 1726.500 | |
| VERT POINT | Sta..ing 1200.000 | Elev 1726.500 | |
| X SECTION | Sta..ing 0.000<br>Rt Template DAM | Lt. Template <No text> | |
| X SECTION | Sta..ing 1200.000<br>Rt Template DAM | Lt. Template <No text> | |
| TEMPLATE | ID DAM | | |
| NOTE TS | Oct-24-00 17:20 | | |
| NOTE RO | Temp element | Grade Horizontal | H.dist 14.650 |
| NOTE RO | V.Dist 0.000 | Offset 14.650 | |
| NOTE RO | HtDiff 0.000 | Apply super No | Apply widen No |
| NOTE RO | Cd <No text> | | |
| NOTE RO | Templ-Sideslope | Cut <Null> | Fill %50.000 |
| NOTE RO | Set out Road GOLDEN EAGLE DAM | | |
| TARGET | Target ht 4.900 | | |
| NOTE TS | Oct-25-00 08:55 | | |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 750.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |

| | | | |
|---|---|---|---|
| NOTE RO | Horz o/s 0.000 | | |
| ROAD POS RO 1000 | Sta..ing 750.046<br>North 952241.411<br>Cd R Sideslope | Offset 37.578<br>East 755016.556 | Elev 1715.026 |
| NOTE RO | Fill 0.021 | ŠNorth 0.030 | ŠEast 0.041 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 700.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 1001 | Sta..ing 700.072<br>North 952284.396<br>Cd R Sideslope | Offset 36.691<br>East 755042.063 | Elev 1715.301 |
| NOTE RO | Fill 0.150 | ŠNorth 0.091 | ŠEast -0.014 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 600.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 1002 | Sta..ing 600.138<br>North 952371.426<br>Cd R Sideslope | Offset 37.085<br>East 755091.183 | Elev 1715.179 |
| NOTE RO | Fill 0.087 | ŠNorth 0.136 | ŠEast 0.039 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 500.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| NOTE TS | Oct-25-00 09:05 | | |
| ROAD POS RO 1003 | Sta..ing 499.722 | Offset 35.316 | |

| | | | |
|---|---|---|---|
| | North 952457.803<br>Cd R Sideslope | East 755142.422 | Elev 1716.106 |
| NOTE RO | Fill 0.063 | ŠNorth -0.243 | ŠEast -0.135 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 400.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 400.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 1004 | Sta..ing 400.082<br>North 952545.634<br>Cd R Sideslope | Offset 37.846<br>East 755189.541 | Elev 1714.834 |
| NOTE RO | Fill 0.043 | ŠNorth 0.096 | ŠEast -0.002 |
| NOTE RO | Design slope Fill | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 300.000 | | |
| NOTE RO | ŠOffset 14.650 | | |
| NOTE RO | Cut 0.000 | | |
| NOTE RO | Grade Horizontal | | |
| ROAD POS RO 1005 | Sta..ing 299.928<br>North 952633.139<br>Cd R Sideslope | Offset 38.816<br>East 755238.270 | Elev 1714.413 |
| NOTE RO | Cut 0.014 | ŠNorth -0.044 | ŠEast -0.067 |
| NOTE RO | Design slope Fill | | |
| NOTE TS | Oct-25-00 09:15 | | |
| NOTE RO | From <No text> | To pt Center | |
| NOTE RO | Sta..ing 200.000 | | |
| NOTE RO | ŠOffset 14.650 | | |

| | | | |
|---|---|---|---|
| NOTE RO | Cut 0.000 | | |
| E RO | Grade Horizontal | | |
| ROAD POS RO 1006 | Sta..ing 199.753<br>North 952714.059<br>Cd R Sideslope | Offset 26.442<br>East 755298.605 | Elev 1720.531 |
| NOTE RO | Fill 0.064 | ŠNorth -0.206 | ŠEast -0.138 |
| NOTE TS | Nov-28-00 08:40 | | |
| STN SO 0001 | North 951877.042<br>Theo ht 5.090 | East 755016.827 | Elev 1715.898 |
| ATMOS | Press 29.2 | Temp 50.00 | |
| NOTE PT | Atmos crn Applied | | |
| BKB TP 0001-0002 | Azimuth 281-32'24" | H.obs 166-51'01" | |
| TARGET | Target ht 4.900 | | |
| OBS F1 0001-0002 | S.Dist 352.226 | V.obs 88-04'24" | H.obs 166-51'01" |
| POS TP 1007 | North 951947.462<br>Code 0002 | East 754671.931 | Elev 1727.934 |
| E SO | Cut 0.003 | ŠNorth 0.006 | ŠEast -0.023 |
| NOTE RO | Set out Road GOLDEN EAGLE DAM | | |
| NOTE TS | Nov-28-00 08:55 | | |
| NOTE RO | Horz o/s 13.650 | | |
| ROAD POS RO 1008 | Sta..ing 750.157<br>North 952229.397<br>Cd Center | Offset 13.500<br>East 755037.424 | Elev 1726.516 |
| NOTE RO | Cut 0.016 | ŠNorth 0.211 | ŠEast -0.052 |
| ROAD POS RO 1009 | Sta..ing 699.923<br>North 952273.083<br>Cd Center | Offset 13.574<br>East 755062.223 | Elev 1726.507 |
| NOTE RO | Cut 0.007 | ŠNorth -0.029 | ŠEast -0.104 |
| ROAD POS RO 1010 | Sta..ing 649.805<br>North 952316.686<br>Cd Center | Offset 13.683<br>East 755086.935 | Elev 1726.521 |
| NOTE RO | Cut 0.021 | ŠNorth -0.186 | ŠEast -0.068 |
| AD POS RO 1011 | Sta..ing 599.971<br>North 952360.024<br>Cd Center | Offset 13.757<br>East 755111.537 | Elev 1726.532 |
| NOTE RO | Cut 0.032 | ŠNorth -0.078 | ŠEast 0.078 |

| | | | |
|---|---|---|---|
| ROAD POS RO 1012 | Sta..ing 549.939<br>North 952403.460<br>Cd Center | Offset 13.681<br>East 755136.366 | Elev 1726.525 |
| NOTE RO | Cut 0.025 | ŠNorth -0.069 | ŠEast -0.003 |
| ROAD POS RO 1013 | Sta..ing 499.888<br>North 952446.919<br>Cd Center | Offset 13.618<br>East 755161.194 | Elev 1726.479 |
| NOTE RO | Fill 0.021 | ŠNorth -0.082 | ŠEast -0.083 |
| NOTE TS | Nov-28-00 09:05 | | |
| ROAD POS RO 1014 | Sta..ing 450.226<br>North 952490.177<br>Cd Center | Offset 13.831<br>East 755185.589 | Elev 1726.475 |
| NOTE RO | Fill 0.025 | ŠNorth 0.106 | ŠEast 0.269 |
| ROAD POS RO 1015 | Sta..ing 399.819<br>North 952533.918<br>Cd Center | Offset 13.712<br>East 755210.642 | Elev 1726.491 |
| NOTE RO | Fill 0.009 | ŠNorth -0.189 | ŠEast -0.036 |
| ROAD POS RO 1016 | Sta..ing 350.186<br>North 952577.049<br>Cd Center | Offset 13.723<br>East 755235.199 | Elev 1726.484 |
| NOTE RO | Fill 0.016 | ŠNorth 0.126 | ŠEast 0.155 |
| ROAD POS RO 1017 | Sta..ing 300.192<br>North 952620.447<br>Cd Center | Offset 13.637<br>East 755260.018 | Elev 1726.488 |
| NOTE RO | Fill 0.012 | ŠNorth 0.174 | ŠEast 0.084 |
| ROAD POS RO 1018 | Sta..ing 250.183<br>North 952663.910<br>Cd Center | Offset 13.654<br>East 755284.756 | Elev 1726.020 |
| NOTE RO | Fill 0.480 | ŠNorth 0.157 | ŠEast 0.094 |
| ROAD POS RO 1019 | Sta..ing 156.997<br>North 952754.963<br>Cd Center | Offset 34.025<br>East 755313.178 | Elev 1725.850 |
| NOTE RO | Fill 0.650 | ŠNorth -47.451 | ŠEast -3.580 |

# DEWATERING

GOLDEN EAGLE PARK DAM
*DEWATERING LOG*

| DATE | METER READING | GALLONS PUMPED |
|---|---|---|
| 6/15/00 | 135932 | |
| 6/16/00 | 153267 | 17335 |
| 6/17/00 | 174152 | 20885 |
| 6/18/00 | 196177 | 22026 |
| 6/19/00 | 216718 | 20541 |
| 6/20/00 | 233851 | 17133 |
| 6/21/00 | 248699 | 14849 |
| 6/22/00 | 260387 | 11687 |
| 6/23/00 | 269541 | 9154 |
| 6/24/00 | 277545 | 8004 |
| 6/25/00 | 284648 | 7104 |
| 6/26/00 | 290612 | 5964 |
| 6/27/00 | 295766 | 5154 |
| 6/28/00 | 299830 | 4064 |
| 6/29/00 | 302379 | 2548 |
| 6/30/00 | 304431 | 2053 |
| 7/1/00 | 306142 | 1711 |
| 7/2/00 | 307825 | 1683 |
| 7/3/00 | 308977 | 1152 |
| 7/4/00 | 310032 | 1054 |
| 7/5/00 | 311650 | 1618 |
| 7/6/00 | 313133 | 1483 |
| 7/7/00 | 314563 | 1430 |
| 7/8/00 | 315823 | 1260 |
| 7/9/00 | 316993 | 1169 |
| 7/10/00 | 318047 | 1054 |
| 7/11/00 | 319075 | 1028 |
| 7/12/00 | 320072 | 997 |
| 7/13/00 | 320990 | 917 |
| 7/14/00 | 321861 | 872 |
| | TOTAL | 185929 |

# CONSTRUCTION MEETINGS

*FLOOD CONTROL DISTRICT of Maricopa County*
*2801 West Durango Street*
*Phoenix, Arizona 85009*
*(602) 506-1501 (Office)*
*(602) 506-4601 (Fax)*

TO: Chuck Copperton, Stantec Consulting

FROM: Fred Fuller, Construction Branch Manager

DATE: May 18, 2000

SUBJECT: Golden Eagle Dam Modifications, FCD 1999C071

The partnering conference and the preconstruction meeting for the Golden Eagle Dam Modifications, project is scheduled for May 30, 2000 at the Comfort Inn, 17105 E. Shea Blvd., Fountain Hills.

The schedule is as follows:

| | |
|---|---|
| 7:30 – 8:00 | Continental Breakfast |
| 8:00 - 2:00 | Partnering Conference |
| 12:00 – 1:00 | Lunch |
| 2:00 – 4:00 | Preconstruction Conference |

Your presence at this meeting is requested. If you are unable to attend, we recommend that you send a representative. If you need further information please contact, Shewa Shivaswamy, Resident Engineer at 602-506-4726 or 602-980-6063.

# Pre-Construction Conference Agenda

**GOLDEN EAGE PARK DAM MODIFICATIONS**
**FCD Project No. 1999071**

**Project**: Golden Eagle Park Dam Modifications

**Contract Number:** FCD 1999C071

**Owner:** Town of Fountain Hills, Fountain Hills School District

**Engineer:** Thomas D. Johnson, P.E., R.L.S., Deputy Chief Engineer

**Contractor:** Hunter Contracting

## Purpose of the Pre-Construction Conference

The Pre-Construction Conference is held primarily for the purpose of key personnel of the contractor, the owner, and all other concerned entities to get acquainted, review the administrative procedures, and to inform other interested parties of the nature and scope of the project for the efficient execution of the contract.

## 1.0 Introductions

**1.1 Owner Personnel**
Thomas D. Johnson P.E., R.L.S., Deputy Chief Engineer
Tom Renckly, P.E., Project Manager
Barbara Hummel, Contracting Branch Manager
Fred B. Fuller, Construction Branch Manager
Shewa Shivaswamy, P.E., Resident Engineer
Art Dubois, Construction Manager

**1.2 Engineering Personnel**
Edward A. Raleigh, P.E., Manager Engineering Division

**1.3 Contractor Personnel**
Contractor will furnish a list of key personnel, phone numbers, addresses and a 24-hour emergency contact number.

**1.4 Concerned Entities Personnel**

The following telephone numbers should put the contractor in contact with the proper personnel:

| Name of Utility Company | Contact Person | Phone # |
|---|---|---|
| Cox Communication | | 602-462-9844 |
| Salt River Project-Electric Irrigation | Greg James | 602-236-8143 |
| Southwest Gas | | 602-462-5343 |
| U. S. West Communications | John Aker | 602-630-0496 |
| City of Mesa-Water, Sewer, Gas | Burt Williams | 480-644-2784 |
| Central Arizona Project (CAP) | Abe Sahli | 623-869-2126 |
| FOUNTAIN HILLS SAN. DISTRICT | | 480-837-9444 |

**1.5 Subletting of Contracts.**

A list of subcontractors will be submitted with the bid. No change of the subcontractors named therein will be allowed unless first approved in writing by the owner. Reference specification SGC 102.6 and subsection 108.2 of MAG.

## 2.0 Administration

**2.1 Notice to Proceed** June 5th

The notice to proceed is scheduled to be issued today, May 30, 2000, by Barbara Hummel, Contracting Branch Manager, Flood Control District. Day 1 of the Contract is one day after issuance of the N.T.P. The last day of the contract will be Monday, November 27, 2000.

CONTINGENT ON CIP BOX SUBMITTAL

**2.3 Description Of Work**

The project is jointly sponsored by the Flood Control District, the Town of Fountain Hills and the Fountain Hills Unified School District. The work involves raising of the dam by five feet, modifying the principal outlet and widening the emergency spillway by 90 LF, constructing a reinforced concrete box culvert auxiliary spillway, a masonry flood wall adjacent to the school gymnasium and appurtenant works.

1st Wed. of each month
partnering mtg 11:30

**2.4 Contract Time**

The contractor shall commence work within seven days of issuance of Notice to Proceed and the project shall be completed within 180 calendar days from the issuance of the Notice to Proceed. Refer to Supplementary General Conditions (SGC) 108.9 and to Subsection 108.9 of MAG for further information. However, the auxiliary outlet works box culvert, reconstruction of the dam to El.1721.50 and construction of the flood wall adjacent to the high school gym be completed within 60 days after NTP Ref to SGC 108.4, SGC 108.9.

**2.5 Progress (Construction) Schedule**

The Contractor's construction schedule shall meet the requirements of Subsection 108.4. The Contractor shall submit a proposed work progress schedule to the Engineer for review prior to starting work. Weekly updates shall be submitted to the Owner at the weekly coordination meeting. These meetings are mandatory per SGC 105.5.3 and will be scheduled for 9:00 am ~~Thursday~~ Wednesday of each week

**2.6 Permits**

The Contractor is referred to SGC 107.2.1 (Page 17 of 62 of the SGC) where requirements for NPDES, SWPPP, NOI, NOT, etc are outlined. There are also other permits required, such as dust control permit from the County and hauling permits from the Town and County, etc. The Contractor shall obtain all permits and licenses, pay all charges, fees, taxes and provide all notices necessary and incidental to the due and lawful prosecution of the work.

401 permit (water quality certification), 404 permit per US Army Corps, ADWR dewatering permit and ADWR dam construction permit have been obtained by the District.

**2.7 Project Documents**

**2.7.1 Change Orders**

The Contractor is referred to Subsection 109.4 of MAG. No additional or new work can be carried out without a change order approval by the Engineer in writing.

**2.7.2 Time Extensions**

Time extensions to the contract period shall be in accordance with Subsection 108.7 of MAG.

**2.7.3 Progress Payments**

Progress payments will be made in accordance with Subsection 109.1 of MAG. The Contractor and the Districts Construction Manager shall agree on the quantity and description of work

completed before submitting the pay estimate to the District for payment. Each pay estimate submitted must include the required Maricopa County Minority/Women owned business enterprise program participation report, NPDES reports, and invoices for those bid items that are paid by invoice.

**2.7.4 Bonds And Insurance**

The contract bonds and insurance are in order per Ms. Hummel. It is permissible to post securities in lieu of retention monies withheld from the pay estimates.

**2.7.5 Overtime Work**

The Contractor is referred to SGC 108.5 of the Construction Specifications. In general, any costs incurred by the owner for inspection of the work, surveys, or materials testing outside of normal working hours will be deducted from monies due to the Contractor.

## 3.0 Control Of Work

**3.1 Correspondence**

All project correspondence from the contractor shall be submitted to the Flood Control District of Maricopa County, addressed to: Thomas D. Johnson, P.E., R.L.S., Deputy Chief Engineer. To expedite action, all correspondence should be hand-delivered to Shewa Shivaswamy, the District's representative on the project.

**3.2 Submittals/ Shop Drawings**

All submittals, shop drawings, and correspondence shall be submitted by the Contractor to the District as described above and in SGC 105.2 of MAG. The District requires six copies of each submittal. After review, two copies will be returned to the Contractor with appropriate notations such as:

i) Approved as submitted, ii) Approved as noted or iii) Resubmit

**3.2.1 Required Submittals**

1. Subcontractor's list with qualifications and work history.
2. Outline of construction survey procedures.
3. Preliminary copies of N0I and SWPPP.
4. Construction schedule incorporating the mandatory milestone completion of items stated in SGC 108.4.
5. Estimated billing schedule.
6. Site plan for temporary construction facilities, staging area, etc. (Sec112, page 47 of 61)

7. Quality control plan.
   A. contractor's test results, calibration curves to be submitted within 3 days. (Sec 113, page 53 of 61)
8. Public information and notification plan.
9. Mix designs for concrete.
10. Mix designs for asphalt concrete.
11. Traffic control plan.
12. Emergency telephone numbers for key personnel.
13. Letter authorizing persons to sign documents such as pay estimates, change orders, etc.
14. Name and telephone numbers of certified safety officer.
15. Manufacturer's certs on all materials delivered to site.
16. Location for disposal of unused materials.
17. Source of borrow materials.
18. Shop drawings for all reinforced concrete structures.
19. Shop drawings for gabions.
20. Alternate fasteners for gabions, steel posts.
21. Manufacturers certs/affidavits for all gabion materials (SP 38 of 66).
22. Certified test results on wire material used for gabions.
23. Gradaton of rock proposed to be used in the gabions.
24. Filler fabric for gabions.
25. Geocomposite wall drain including certifications and samples. (SP 46 of 146)

The above is not a complete list. Other submittals such as shop drawings for structures, rebar placement etc. have to be submitted as and when required.

## 3.3 Safety and Sanitary Requirements

Contractor is referred to SGC 107.5 of MAG. The entire project site shall be considered a hard-hat area.

### 3.3.1 Accident Reports

The Contractor shall submit copies of all accident reports to the District Construction Manager, preferably on the same day of the accident.

### 3.4 Traffic Control

Traffic control plan showing haul routes, barricades, warning signs etc. to be submitted for review by the District and the Town of Fountain Hills.

### 3.5 Alcohol and Drug Use

The Contractor shall make every effort to prevent any person under his direct or indirect control who is under the influence of alcohol or drugs from entering or working in the project area.

### 3.6 Guarantee of Work

The guarantee of work for all project components shall be as required in Subsection 108.8 of MAG.

## 4.0 Technical

### 4.1 Testing

The Contractor is referred to Subsection 106.2 of MAG. The Contractor shall give a minimum of 24-hour notice to the District to schedule any necessary tests.

### 4.2 Inspections

The Construction Manager is responsible for; monitoring the Contractor's construction activities for compliance with approved plans and specifications, assisting in evaluating the need for changes in the work or additions to the work not identified in the plans and specifications, verifying in-place quantities for progress payment, preparing daily inspection logs both written and photographic, etc. Inspection of the work will be as specified in Subsection 105.9 of MAG.

### 4.3 Additional and/or Corrective Work and Acceptance

Corrective work and acceptance of the project is described in Subsections 105.11 through 105.15 of MAG.

## 5.0 Public

### 5.1 Protection and Restoration of Property and Landscape

The Contractor is referred to 107.9 of MAG.

### 5.2 Safety

The Contractor is referred to 107. of MAG.
(Public Convenience and Safety)

107.7 MAG (Barricades and Warning Signs)
The contractor is expected to drive the job early morning and late afternoon to insure that all barricades and signs are in place.

104.1.3 MAG (Cleanup and Dust Control)
Due to the close proximity of both residential and school property, dust control is a very sensitive issue. Particular attention to this asphalt is called for.

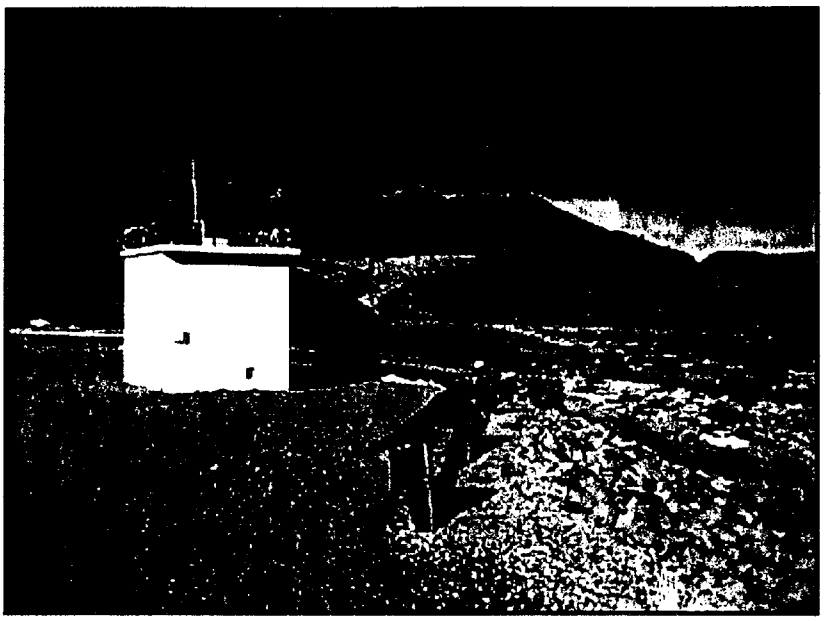
**5.3 Work Hours**

The working hours for this project will be 5:30 - 2:30
The Contractor is referred to SGC 108.5.

**5. 4 Complaints**

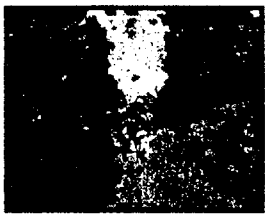
The Contractor is referred to SGC 107.6. The Contractor will make every effort to maintain good public relations and attempt to resolve complaints to the satisfaction of all concerned. The District's Construction Manager will be kept informed of all complaints.

**ALERT Gage of the Month:**



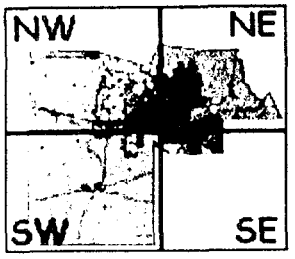
# Welcome to the FCDMC ALERT Home Page

**This web site makes Flood Control District (of Maricopa County, Arizona) rainfall and weather data available to the public. Please send any suggestions or report any problems to: *ALERT Program Coordinator.***



## What is ALERT?

## ALERT at the Flood Control District

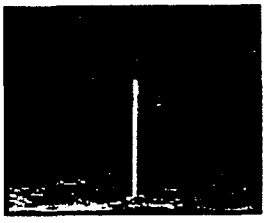


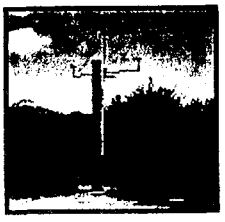

## ALERT Station Locator Maps

**Choose a Map from the Pulldown Box, then place your cursor on a gage location the see its name and number:**

Southwest County Get Map

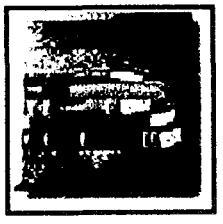
## Real-time and Historic Precipitation Data

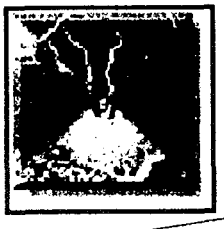




## Real-time and Historic Weather Sensor Data

## Downloadable Publications -- Annual Reports, Reference Materials, etc.

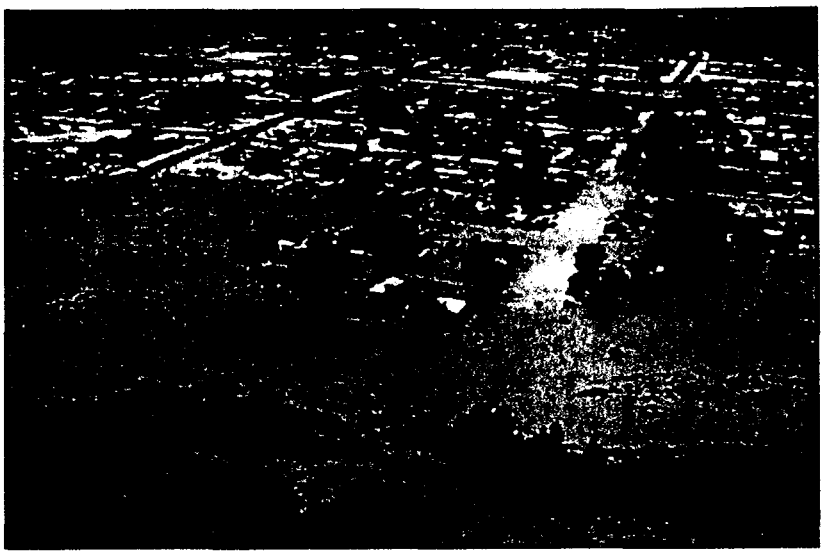




## Links to Related Sites

## Custom ALERT Products for Agency Users

## Flood Warning / Water Quality Branch



# Welcome to the Custom ALERT Products Page

**Please send any comments or questions to: *Steve Waters, Branch Manager***

## Text Products

- **Daily Precipitation Report - generated at 07:05 each day, sorted by amount**
- **Daily Surface Water Report - generated at 07:15 each day, sorted by gage name**
- **Lake Pleasant Weather Station Report - generated every 15 minutes**
- **Daily Rainfall Forecast - generated at approximately 1:00 PM each day**

## Graphical Products

- **Click Here to Generate Real-time and Historic Graphic Maps**

## On-line Flood Response Plans

- Wickenburg Interactive Flood Response Map
- Fountain Hills Interactive Flood Response Map
- Glendale Interactive Flood Response Plan

## Additional Pages

- MCDOT Barricade Section Page, includes Real-time Data at all FCD Stream Gages
- Sky Harbor Airport Temperature Statistics (static table and graph)

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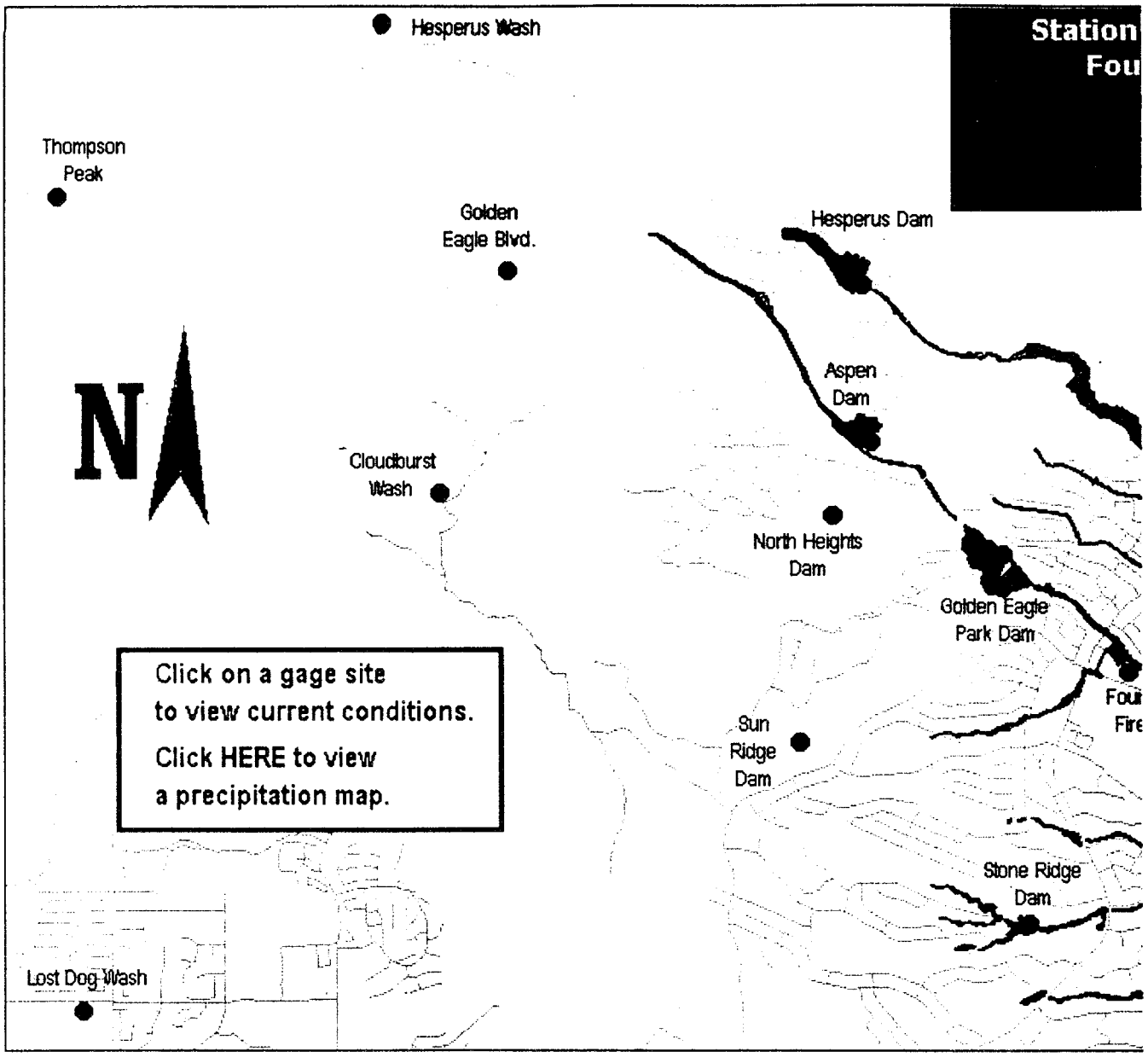
Back to the ALERT Home Page


Hesperus Wash
Station
Fou
Thompson
Peak
Golden
Eagle Blvd.
Hesperus Dam
N
Aspen
Dam
Cloudburst
Wash
North Heights
Dam
Golden Eagle
Park Dam
Click on a gage site
to view current conditions.
Click HERE to view
a precipitation map.
Sun
Ridge
Dam
Stone Ridge
Dam
Lost Dog Wash

Date/Time: May 26 2000 5:51

Hit Return to View Warning Plan for Downstream Area ⟶ +

**Current Conditions**

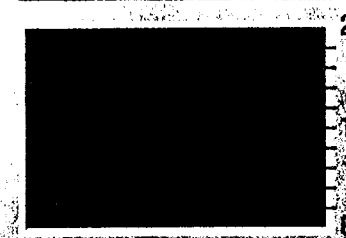
| | |
|---|---|
| Stage (ft): | 0.2 |
| Discharge (cfs): | 0 |
| Volume (ac-ft): | 0.0 |
| Percent Full: | 0 |
| Drawdown (hrs): | 0.0 |

**Watershed Rainfall**

| | | | |
|---|---|---|---|
| N Heights Dam (70%) | 0.00 | 0.00 | 0.00 |
| SunRidge Dam (30%) | 0.00 | 0.00 | 0.00 |
| Cloudburst Wash | 0.00 | 0.00 | 0.00 |
| Golden Eagle Blvd | 0.00 | 0.00 | 0.00 |

Discharge from Upstream Dam

| | |
|---|---|
| Aspen | 0 cfs |
| N Heights | 0 cfs |
| SunRidge | 0 cfs |

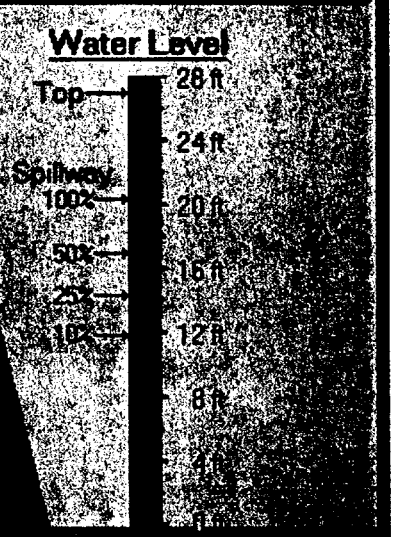


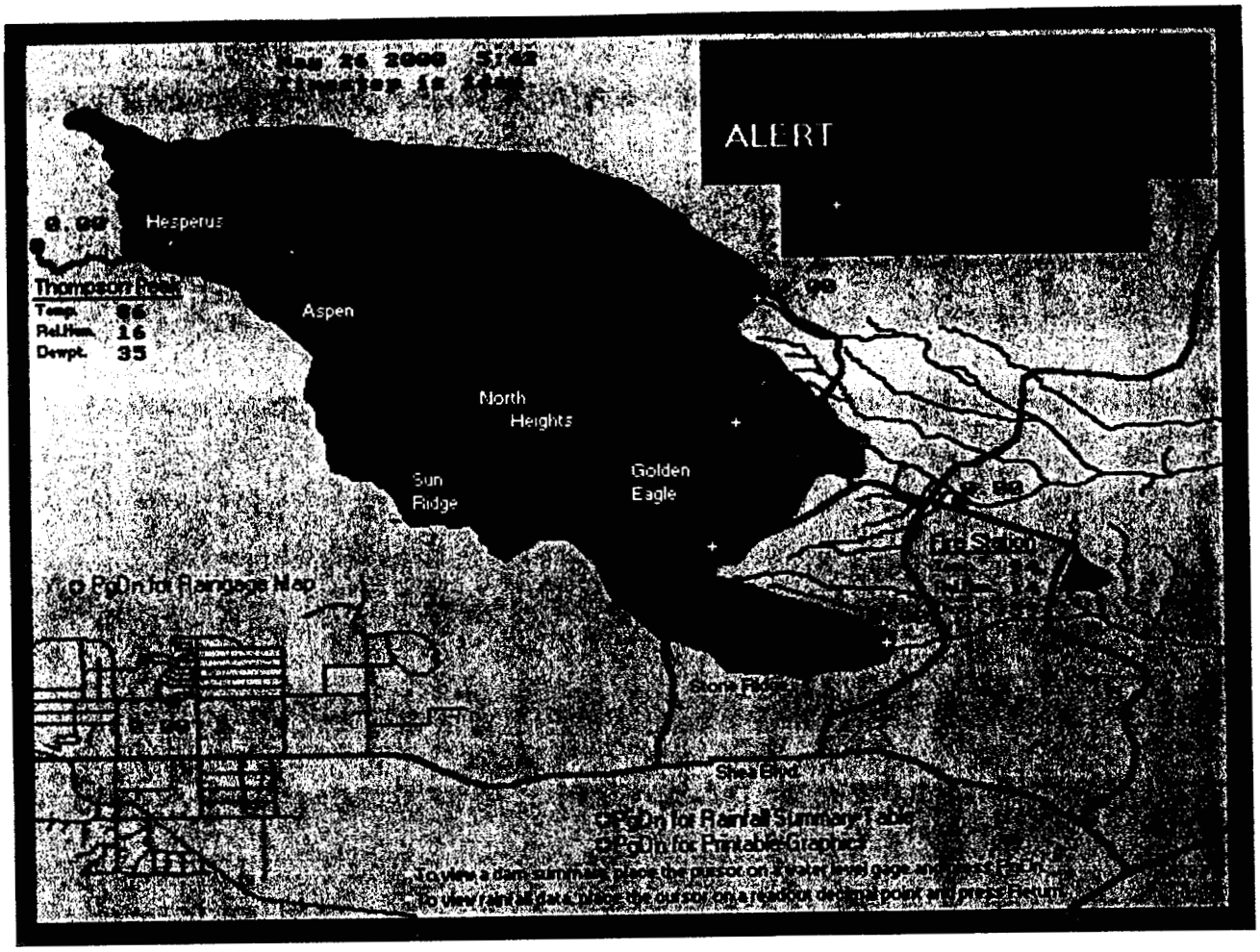

Water Level - Past Hour

Water Level - Past 6 Hours

Top of Dam: 27.0 ft
Spillway Elev: 20.4 ft
Outlet Diameter: 60 in
Spillway Capacity: 95.0 ac-ft
Sensor Offset: 0.22 ft
Storage at 0.22 ft: None

+ PgDn for Rating Curves
+ 'Return' for Sensor Data Table




ALERT
Hesperus
Aspen
North Heights
Sun Ridge
Golden Eagle
Thompson Rock
Temp. 86
Rel.Hum. 16
Dewpt. 35
Click for Raingage Map
Click for Rainfall Summary Table
Click for Printable Graphics

**Memo**

Stantec

To: File

File: 82000157

From: Chuck Gopperton

Date: 16 May, 2000

**Re: Golden Eagle Park Dam**

---

The following are requirements of the Owners Engineer (Stantec) during construction (as required by ADWR in AAC R12-15-1212):

- Oversee construction
- Submit summary reports of construction activities and test results according to a schedule approved by the Department

Additional requirements of either the Owners Engineer or the Owner (as required by ADWR):

- Immediately report to the Department any condition encountered during construction which requires a deviation from the approved plans and specifications.
- Submit written request for approval of any necessary change and sufficient information to justify the proposed change.

Requirements of the Owners Engineer as required by the owner:

- Attend pre-construction partnering meeting
- Attend other periodic meetings at project site
- Assist with evaluation of proposed changes to the construction or changed conditions at site
- Make periodic inspections of the site
- evaluate contractors submittals
- Prepare construction completion report

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

Project: Name:Golden Eagle ParkDam FCD # 1999C071

Date: June 7, 2000 Time: 9:00 a.m.

1. Attendance

2. Work done during the week:

3. Construction Schedule (biweekly):

4. Submittals:

5. Surveys:

6. Change Orders:

7. Licenses/Permits:

8. Miscellaneous:
   1. Conflict of wall with electric line

9. Safety and Traffic Control:

# HUNTER CONTRACTING COMPANY

Hunter CONTRACTING CO.

## FACSIMILE TRANSMITTAL SHEET

| | |
|---|---|
| TO: Chuck Gappeton | FROM: Jeff Brown |
| COMPANY: Stantec | DATE: 6/12/00 |
| FAX NUMBER: (602) 431-9562 | TOTAL NO. OF PAGES INCLUDING COVER: 4 |
| PHONE NUMBER: (602) 707-4637 | FAX NUMBER: (480) 892-4932 |
| RE: | PHONE NUMBER: (480) 892-0521 EXT: |

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

701 NORTH COOPER ROAD
P.O. BOX 900
GILBERT, ARIZONA 85299-0900

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 7, 2000 Meeting # 1

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Tom Renckly | Flood Control District | (602) 506-8610 | (602) 506-8561 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Lynn Mattson | Flood Control District | (602) 506-0562 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. 2-Week construction schedule was handed out and reviewed.
3. Project superintendent, Larry Samples stated that the vegetation has been stripped, concrete removals are in progress. The excavation for the box culvert will begin on June 8th. Three potholes were dug on the upstream side, one in the gabion area, and one on the downstream side, material will be tested for embankment.
4. Shewa and Larry discussed a conflict between the electrical work and the floodwall on June 6th. It was looked at today by Chuck Gopperton. It appears the electrical line will need to be relocated prior to wall construction.
5. It was decided that there would be no need for Stantec to re-stake the TCE as originally thought.
6. It was stated that the filter sand needs to be pre-qualified.
7. Water at the inlet is most likely for irrigation run off and not ground water.
8. Staging area should be re-photographed to determine the damage by the well drillers.
9. It will be ok to backfill after concrete reaches 70% of design strength.
10. It was decided that the chain link fence will be moved East of the Ramada. This will enable Parks and Recreation to maintain that area of the park, and will prevent Hunter from disturbing the riprap area near the Ramada.
11. There is a conduit containing a fire alarm line and also a 2" water line running from the main building of the school to a small building next to the bleachers. These lines will be further investigated.
12. Although the plans do not show it, there is a retention wall next to the bleachers that needs to be removed. This maybe included in the removal quantity.
13. On the inlet side of the 60" pipe, there is a wing wall that will need to be removed.
14. Initial response from the town on truck traffic crossing the median was no. Although the majority of the attendees agreed that this was by far the safest option, The town of Fountain Hills was more concerned with the aesthetic appearance of the median. This option will be revisited again. Another possibility was to exit the job north through the property owned by the church. Hunter proposed that the median crossing be made into a permanent fixture.
15. The initial public information newsletter has been distributed.
16. Town of Fountain Hills and the school district will provide logos for the project signs within the next two weeks.

17. Turned in the concrete mix design, the construction schedule, the NPDES form, the cash flow, the site plan, and the public information plan submittals to Shewa on June 6th and 7th. Shewa approved the proposal for the project sign. Shewa stated that he needs a copy of the dust control permit. Also, he needs a copy of the construction survey notes each week, and to send the originals after the completion of the job.
18. Received a copy of the concrete placement card. This card is to be used on all concrete placements.
19. Meeting adjourned at 9:45.
20. Following the meeting attendees reviewed the electrical conflict at the school.
21. Tom Leggat will be acting superintendent while Larry Samples is on vacation from June 10th to June 25th. Tom's Mobile # (602) 757-5499 and Home # (480) 833-4853.
22. Next meeting will be 06/14/00.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 7, 2000 Meeting # 1

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

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|---|---|---|---|
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| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
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| Tom Renckly | Flood Control District | (602) 506-8610 | (602) 506-8561 |
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| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
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ITEMS DISCUSSED:

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6. It was stated that the filter sand needs to be pre-qualified.
7. Water at the inlet is most likely for irrigation run off and not ground water.
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9. It will be ok to backfill after concrete reaches 70% of design strength.
10. It was decided that the chain link fence will be moved East of the Ramada. This will enable Parks and Recreation to maintain that area of the park, and will prevent Hunter from disturbing the riprap area near the Ramada.
11. There is a conduit containing a fire alarm line and also a 2" water line running from the main building of the school to a small building next to the bleachers. These lines will be further investigated.
12. Although the plans do not show it, there is a retention wall next to the bleachers that needs to be removed. This maybe included in the removal quantity.
13. On the inlet side of the 60" pipe, there is a wing wall that will need to be removed.
14. Initial response from the town on truck traffic crossing the median was no. Although the majority of the attendees agreed that this was by far the safest option, The town of Fountain Hills was more concerned with the aesthetic appearance of the median. This option will be revisited again. Another possibility was to exit the job north through the property owned by the church. Hunter proposed that the median crossing be made into a permanent fixture.
15. The initial public information newsletter has been distributed.
16. Town of Fountain Hills and the school district will provide logos for the project signs within the next two weeks.

# MEETING ATTENDANCE ROSTER

Meeting: _____ Location: Durango

Date: JUNE 7, 2000

| Name | Title | Organization | Phone |
|---|---|---|---|
| SHEWA SHIVAKUMAR | RES. ENG | FCD | 506-4726 |
| Gerald Cox | Eng. Geologist | ADWR | 417-2445 |
| Larry Lambert | Proj. Mgr. - Dam Safety | FCD | 372-6110 |
| STEPHEN OSTWINKLE | SUPERINTENDENT | HUNTER CONTRACTING | 480892-0521 |
| Andy DiLeo | Str. Eng. | DiLeo Eng. | 602-395-0750 |
| CHUCK GOPPERTON | ENGINEER | STANTEC | 602 707 4637 |
| TOM RENCKLY | PROJECT MANAGER | FCDMC | 602506-8610 |
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# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** June 14, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Work done during the week:

3. Construction Schedule (biweekly):

4. Submittals:
   (a) Status of Cast In Place Box Submittal
   (b) Filter Sand – Pre-qualification Tests

5. Surveys:

6. Change Orders:

7. Licenses/Permits:

8. Miscellaneous:
   (a) Conflict of wall with electric line
   (b) Conflict of alarm line with gabions
   (c) Conflict of water line with gabions
   (d) Discussion about existing materials in dam
   (e) Ground Water
   (f) Diversion Plan

9. Safety and Traffic Control:

10. Public Information Matters:

    (a) Sign Boards
    (b) Traffic Concerns if any

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 14, 2000 Meeting # 2

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-7758 | (480) 837-8082 |
| Gerald Cox | ADWR | (602) 417-2445 | (602) 417-2423 |
| Don Bain | Maricopa Ready Mix | (480) 797-1829 | (480) 607-3335 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Warren Rosebraugh | Flood Control District | (602) 506-4720 | (602) 506-4601 |
| Mike Thompson | Fountain Hills Sanitary Dist. | (480) 837-9444 | (480) 837-0819 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Bob Bann | Hunter Contracting Co. | (602) 757-8733 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. 2-Week construction schedule was handed out and reviewed.
3. Project superintendent, Tom Leggat stated that they have hit ground water on the upstream side. Dewatering has begun and will continue until the box is done. The trailer should have power by the end of this week. The excavation for the box should be done by June 21st at which time the excavation for the diaphragm should begin and last about two days. The work for the sand filter should also be on June 21st and 22nd.
4. Hunter Contracting is waiting approval for the cast-in-place box from ADWR. ADWR needs submittals on the expansion joint and the concrete mix designs. Maricopa Ready Mix will submit gradations for the aggregate with a new mix design. Stantec will submit design drawings to ADWR.
5. It was stated that concrete structures exposed to high velocity flows need to have air entrainment in the mix design. Maricopa Ready Mix will resubmit with that change. Maricopa Ready Mix stated that because there is so little use of air entrainment in the valley there is no history available. Maricopa Ready Mix will have to do their own tests and should be completed by June 16th.
6. Shewa stated that he needs to have copies of the survey notes given to him on a weekly basis, and the originals submitted at the completion of the job.
7. SRP will visit the job today to investigate the conflict between the electric and the floodwall.
8. The school district is having their own people look into the underground fire alarm. They also stated that the waterline could be relocated if it needs to be.
9. After the meeting attendees looked at the core material of the dam, where the box is being excavated. It appears to be no difference in the material between zone 1 and zone 2. This will be looked into further.
10. There is concern about the summer school kids climbing the fence and entering the job site. This situation is even worse after work hours. The representative from the school district stated that

they are aware of the problem and are trying to correct it. They have sent home newsletters to the parents of the school kids. They recommended that Hunter Contracting call the Marshals Dept. They can set up no trespassing signs, and also reprimand and issue citations to the kids climbing the fence and entering the job site.

11. Traffic control is ok at this time. The Town of Fountain Hills is revisiting the issue of crossing the median.
12. A representative for the Fountain Hills Sanitary Dept. stated that they would be testing the water from the well the last week of June. They will need access to the well, and will pump the water across Golden Eagle Blvd. into the lake. The testing will take about a week.
13. No word from the church on the use of their land.
14. The next meeting will be June 21, 2000.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 14, 2000 Meeting # 2

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

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|---|---|---|---|
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| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
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| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
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| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Bob Bann | Hunter Contracting Co. | (602) 757-8733 | (480) 892-4932 |
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7. SRP will visit the job today to investigate the conflict between the electric and the floodwall.
8. The school district is having their own people look into the underground fire alarm. They also stated that the waterline could be relocated if it needs to be.
9. After the meeting attendees looked at the core material of the dam, where the box is being excavated. It appears to be no difference in the material between zone 1 and zone 2. This will be looked into further.
10. There is concern about the summer school kids climbing the fence and entering the job site. This situation is even worse after work hours. The representative from the school district stated that

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13. No word from the church on the use of their land.
14. The next meeting will be June 21, 2000.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** June 21, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes for the meeting of June 14th, 2000

3. Work done during the week: ex complete, dewatering cont. not much water being pumped digging pits for wall relocated 2" w/L need to dig turn downs

4. Construction Schedule (biweekly): diaphragm next week working on wall

5. Submittals:
   (a) Cast In Place Box Revised Plans
   (b) Filter Sand – Pre-qualification Tests

   • obtained mix design
   • rel. density of sand filter mtl.

6. Surveys:

7. Change Orders: Box culvert – No cost c.o.

8. Licenses/Permits:

9. Miscellaneous:
   (a) Conflict of flood wall with electric line
   (b) Ground Water
   (c) Cleaning Service for the trailer

   max height of dike ? check it

10. Safety and Traffic Control:

11. Public Information Matters:

    (a) Sign Boards
    (b) Traffic Concerns if any

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 21, 2000 Meeting # 3

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
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| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Tom Renckly | Flood Control District | (602) 506-8610 | (602) 506-8561 |
| Fred Fuller | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Bob Bann | Hunter Contracting Co. | (602) 757-8733 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed, and all attendees concurred and signed off on hard copy.
3. 2-Week construction schedule was handed out and reviewed.
4. Project superintendent, Tom Leggat stated that box excavation is complete and are now starting the fine grading, along with the excavation for the diaphragm. The 2" water line has been relocated, it will now run underneath the gabions. Dewatering has been successful and will continue to dewater until they secure stability for the box. The excavation for the retaining walls will begin on June 21st and will continue for the next two weeks. The retaining wall removals are now complete.
5. The 1st filter sand sample did not pass. The results from the 2nd test should be available by June 23rd.
6. The revised concrete mix design has been submitted. It contains air entrainment, but no fly ash. It also contains type I and type III cement, not type II cement that has a 14-day cure time.
7. Construction survey is proceeding o.k.
8. There have been no change orders as of yet, although the box is considered a change order, it is a no cost/no time change order.
9. SRP was at the job last week to address the floodwall/electric line conflict. They will come up with a design to relocate the line, and will have an estimate within a few days.
10. Tom Leggat requested that someone that lives in Fountain Hills could call his home phone in the event of a hard rain in the evening. Jim Leubner will provide a contact person for Tom.
11. The elevation of the water diversion dike is o.k.
12. The situation with the school children climbing the project fence has improved since the last meeting.
13. Traffic control is o.k. although there has been no heavy trucking as of yet.
14. There was a complaint regarding the location of one of the project signs. Apparently a resident on Golden Eagle Blvd. does not want to see the sign everyday as she drive home. The sign will be moved approximately 50 ft. to accommodate this resident.
15. The school fire alarm will be repaired on June 21st.
16. It was stated that the office trailer should be cleaned once per week.
17. The next meeting will be June 28th at 9:00am in the office trailer.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 21, 2000 Meeting # 3

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
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| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
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| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Tom Renckly | Flood Control District | (602) 506-8610 | (602) 506-8561 |
| Fred Fuller | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Bob Bann | Hunter Contracting Co. | (602) 757-8733 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed, and all attendees concurred and signed off on hard copy.
3. 2-Week construction schedule was handed out and reviewed.
4. Project superintendent, Tom Leggat stated that box excavation is complete and are now starting the fine grading, along with the excavation for the diaphragm. The 2" water line has been relocated, it will now run underneath the gabions. Dewatering has been successful and will continue to dewater until they secure stability for the box. The excavation for the retaining walls will begin on June 21st and will continue for the next two weeks. The retaining wall removals are now complete.
5. The 1st filter sand sample did not pass. The results from the 2nd test should be available by June 23rd.
6. The revised concrete mix design has been submitted. It contains air entrainment, but no fly ash. It also contains type I and type III cement, not type II cement that has a 14-day cure time.
7. Construction survey is proceeding o.k.
8. There have been no change orders as of yet, although the box is considered a change order, it is a no cost/no time change order.
9. SRP was at the job last week to address the floodwall/electric line conflict. They will come up with a design to relocate the line, and will have an estimate within a few days.
10. Tom Leggat requested that someone that lives in Fountain Hills could call his home phone in the event of a hard rain in the evening. Jim Leubner will provide a contact person for Tom.
11. The elevation of the water diversion dike is o.k.
12. The situation with the school children climbing the project fence has improved since the last meeting.
13. Traffic control is o.k. although there has been no heavy trucking as of yet.
14. There was a complaint regarding the location of one of the project signs. Apparently a resident on Golden Eagle Blvd. does not want to see the sign everyday as she drive home. The sign will be moved approximately 50 ft. to accommodate this resident.
15. The school fire alarm will be repaired on June 21st.
16. It was stated that the office trailer should be cleaned once per week.
17. The next meeting will be June 28th at 9:00am in the office trailer.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 21, 2000 Meeting # 3

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
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| Fred Fuller | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Bob Bann | Hunter Contracting Co. | (602) 757-8733 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed, and all attendees concurred and signed off on hard copy.
3. 2-Week construction schedule was handed out and reviewed.
4. Project superintendent, Tom Leggat stated that box excavation is complete and are now starting the fine grading, along with the excavation for the diaphragm. The 2" water line has been relocated, it will now run underneath the gabions. Dewatering has been successful and will continue to dewater until they secure stability for the box. The excavation for the retaining walls will begin on June 21st and will continue for the next two weeks. The retaining wall removals are now complete.
5. The 1st filter sand sample did not pass. The results from the 2nd test should be available by June 23rd.
6. The revised concrete mix design has been submitted. It contains air entrainment, but no fly ash. It also contains type I and type III cement, not type II cement that has a 14-day cure time.
7. Construction survey is proceeding o.k.
8. There have been no change orders as of yet, although the box is considered a change order, it is a no cost/no time change order.
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11. The elevation of the water diversion dike is o.k.
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13. Traffic control is o.k. although there has been no heavy trucking as of yet.
14. There was a complaint regarding the location of one of the project signs. Apparently a resident on Golden Eagle Blvd. does not want to see the sign everyday as she drive home. The sign will be moved approximately 50 ft. to accommodate this resident.
15. The school fire alarm will be repaired on June 21st.
16. It was stated that the office trailer should be cleaned once per week.
17. The next meeting will be June 28th at 9:00am in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** June 28, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on June 21st, 2000

3. Work done during the week: DUG FTG FOR WALL
   pump water

4. Construction Schedule (biweekly):

   ADWR inspection
   wed & thursday?
   Talk to Jerry

5. Submittals:
   (a) Approval of concrete mixes
   (b) Filter sand pre-qualification

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   (a) Conflict of flood wall with electric line
   (b) Ground Water
   (c) Cleaning Service for the trailer

10. Safety and Traffic Control: Weather/Betty

11. Public Information Matters:

12. Monthly Partnering Meeting: July 5th, 2000

    11:00 AM

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: June 28, 2000 Meeting # 4

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Tom Ward | Town of Fountain Hills | (480) 816-5129 | (480) 837-3145 |
| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Mike Thompson | Fountain Hills Sanitary Dist. | (480) 837-9444 | (480) 837-0819 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed, and all attendees concurred and signed off on hard copy.
3. 2-Week construction schedule was handed out and reviewed.
4. Dewatering is continuing at 1400 to 1500 gallon per day.
5. The test results for the diaphragm should be received today. Excavation and material placement will begin tomorrow.
6. Sand samples for permeability testing will be taken every 2 feet; the results do not have to be in to continue.
7. Hunter must send a request letter to the Town of Fountain Hills for any work to be started before 5:30 am.
8. Concrete Temp. must be kept no higher than 90 degrees, methods include ice and/or chilled water.
9. ADWR inspector needs at least a 1-day notice before Hunter pours the box.
10. Concrete submittal was approved subject to more information of aggregate quality; these certifications should be standard.
11. Filter sand has been approved, relative density test will continue.
12. Chuck Gopperton will submit a letter to ADWR stating the existing dam material is acceptable, and the filter will work as designed.
13. SRP has submitted a design to Shewa on relocation of the electric line in conflict with the floodwall. SRP will not do the trenching and conduit work, Hunter will provide a quote for this work when the plans are received.
14. Cleaning service for the office trailer has been set up for once per week.
15. Traffic control is not an issue, however the heavy trucking has yet to begin.
16. Hunter did not use the orange construction fence on the vertical slopes as previously requested. The chain link fence was used as per the plans.

17. Town of Fountain Hills provided a contact person for national and local weather updates. However, this person is only available during normal business hours.
18. Project sign has been relocated per request of local resident.
19. Fountain Hills Sanitary District representative, Mike Thompson, made a request to add a gravity feed sewer line to the box culvert. He stated the sanitary district would pay for the cost of the change order. Chuck Gopperton stated that there would have to be a meeting set up as soon as possible between Stantec, ADWR, and Fountain Hill Sanitary District to discuss a change order of that magnitude. It was the overall feeling of the attendees that such a change order would delay the job significantly. With the monsoon seasons beginning, this would not be a prudent change.
20. The monthly partnering meeting will be July 5th at 11:00 am in the office trailer. The job progress meeting will be in the office trailer at 11:00 also, but will only be a few minutes.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

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**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY**
Planning and Project Management Division
Construction Branch

**Project Name**: Golden Eagle Park Dam

FCD# 1999C071

**Date:** July 5th 00

Time: ~~9:00~~ 11:00

- Attendance:
- Review of Minutes for the meeting of June 28th, 2000 accepted
- Work done during the week: sand installed set forms, setting rebar pour on FRIDAY
- Construction Schedule (Biweekly):
- Submittals:
- Survesys:
- Change Orders: 1. 2. 3.
- License / Permits

Aug 9-10 new teachers
& 11-18th
Aug 21st School starts
Busy day 7AM 2-3 PM

- Miscellanceous:
  1. Conflict of flood wall with electric line – no design from SRP yet
  2. Ground Water
  3. Day 60 of contract is Aug 5th, 00. Dead line date for Construction of box and back fill.
- Safety and Traffic Control:
- Public information matters:

Sewerline is not being constructed.

ARIZONA RAIN sprinkling
# to BOB CARLSON

Stain the block

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 5, 2000 Meeting # 5

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Gerald Cox | ADWR | (602) 417-2425 | (602) 417-2423 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |

ITEMS DISCUSSED:

1. Meeting began at 11:00 at the job site.
2. Previous meeting minutes were reviewed, and all attendees concurred and signed off on hard copy.
3. 2-Week construction schedule was handed out and reviewed.
4. Dewatering is continuing.
5. Hunter should receive the approved submittal for the 24" pipe with in a day or two
6. Hunter has had to replace the original masonry subcontractor. The replacement subcontractor has been to the job site.
7. Hunter will be staining the masonry block to match existing as close as possible. The school district has some stain available for Hunter to get the color from to aid in the matching.
8. SRP has not submitted a design to Shewa for the relocation of the underground electric in conflict with the floodwall.
9. There have been no problems with the ground water, despite the recent rain.
10. It is believed that Hunter will meet the 60-day milestone. To date, four days have been lost due to the first filter sand material sample failing the pre-qualification. Hunter Contracting is reviewing the box placement sequence to see if it will affect the project schedule.
11. The school district had some concern with the block wall work that is to be done on school property on the outside of the construction fence. This work will be completed before the start of school.
12. Summer school ends Friday, July 7th and the fall semester will begin on August 21st.
13. The sanitary district's request to run a gravity fed storm drain threw the proposed box culvert is not possible with such short notice.
14. Traffic control is not an issue, however the heavy trucking has yet to begin.
15. Hunter or public relations have received no complaints this week.
16. Next meeting will be July 12th at 9:00am in the office trailer.
17. The monthly partnering meeting was held following this meeting.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 5, 2000 Partnering Meeting # 2

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
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| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
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| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

Meeting Recap:

1. Meeting began at approximately 11:10 with sign in and opening remarks by Shewa. Shewa stated that this job was a good example of why partnering works. He continued by stating that when a change is made, like the one with the box culvert, it can take up to 6 weeks to work through all the channels. In this case, it only took 2 weeks.
2. The project is now at day 30, and is approximately 15 % complete. Overall, the project is on schedule, but is slightly behind the work required to meet the 60-day milestone.
3. Shewa opened the floor for additional comments. It was the general consensus of the representing agencies that partnering does work. Mutual appreciation was exchanged by all agencies for their cooperation in allowing this project to run as smoothly as it has.
4. All attendees then participated in a partnering rating summary. The partnering goals that were set at the 1st partnering meeting were evaluated and scored as follows.
   - Schedule – 2.5 Slightly behind to right on schedule
   - Safety – 3 Very proactive
   - Quality – 3 Meeting standards
   - Communication – 4 I know exactly what is going on
   - Timely Decisions – 4 Great effort, timely decision making
   - Public – 4 Great proactive approach
   - Profitable – 2.5 May be close to within budget
   - Maintaining Partnering Attitude – 4 We are great partners
   - Have Fun – 3 Most of the time we enjoy it
5. Meeting adjourned at 11:40, all attendees gathered for lunch at the ramada.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 5, 2000 Meeting # 5

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

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ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |

ITEMS DISCUSSED:

1. Meeting began at 11:00 at the job site.
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14. Traffic control is not an issue, however the heavy trucking has yet to begin.
15. Hunter or public relations have received no complaints this week.
16. Next meeting will be July 12th at 9:00am in the office trailer.
17. The monthly partnering meeting was held following this meeting.

work done – poured conc. on monday
no other work

# Golden Eagle Park Dam

## Weekly Meeting – July 12, 00' 9 AM

### AGENDA

- Attendance
- Review of Meeting Minutes of July 5, 00
- Work done during the week
- Next two weeks const. Schedule
- Submittals –
- Construction Survey
- Change orders
- Licenses / permits
- Miscelaneous
  - i) Conflict of SPP Elec. line with floodwal
  - ii) Concrete temperatures / slumps —
  - iii) Curing of Concrete
  - iv) Invoice for repair of fire alarm
  - v) Invoice for temp. elec. connection –
- Safety / Traffic Control
- Monthly Partnering Meeting

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 12, 2000 Meeting # 6

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
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| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Don Bain | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Sherri Creager | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
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|---|---|---|---|
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. Hunter submitted a mix design for a grout mix to be used in place of the MAG C for the pipe encasement. Hunter is awaiting the approval for the wall drain submittal.
5. Still a few minor change orders that need to be taken care of.
6. Town of Fountain Hills approved a request for an early start of 3:00am of Friday July 14th.
7. Flood Control District requested that hydrostatic testing be done on the joints of the storm drain pipe. These tests are typically done on pressure pipe, not on storm drain pipe. Hunter stated that there are no requirements in the contract on what test need to be performed. FCD will review the contract and will advise on how to proceed.
8. SRP has submitted a design for the relocation of the underground electric line that is in conflict with the floodwall. SRP will not do the trenching or the conduit work. Hunter will submit a quote to Shewa for this work.
9. There is concern with the concrete regarding both the temperature and the age, which can not exceed 90 degrees and 90 minutes. Maricopa Ready Mix has explained the strategies they will use to rectify this problem. The delivery ticket will be time stamped at the time the truck is batched. The drivers will take the Beeline HWY to the project. Maricopa Ready Mix will also use chilled water and ice in the mix design.
10. It was discussed that water can only be added to concrete one time, prior to placement with the approval of the inspector and the engineer.
11. The inspector will reject any load over a 4" slump.
12. Spraying cure on the concrete is very important. This should be done immediately after finishing and when the forms are stripped off.

13. Hunter has received a bill from the Fountain Hills School District for a damaged fire alarm unit at the school. Further investigation will be required.
14. There have been no traffic problems this week.
15. There have been no complaints to public relations this week.
16. No word from the church on the use of their property.
17. Weber Group has moved in to begin the testing on the well. They will be placing a 6" pipe across the project access to pump water. Hunter will try to accommodate as much as possible.
18. Hunter appreciates everybody's efforts on wearing hardhats and vests while on the job.
19. The next partnering meeting will be August 9th at 11:00 in the office trailer, the job meeting will also be at 11:00 on this date. Lunch will follow the meeting.
20. The next job meeting will be July 19th at 9:00 in the office trailer.

RECEIVED
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PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 12, 2000 Meeting # 6

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Lynn Mattson | Flood Control District | (602) 506-0562 | (602) 506-8561 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Larry Lambert | Flood Control District | (602) 372-6110 | (602) 506-8561 |
| Don Bain | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Sherri Creager | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. Hunter submitted a mix design for a grout mix to be used in place of the MAG C for the pipe encasement. Hunter is awaiting the approval for the wall drain submittal.
5. Still a few minor change orders that need to be taken care of.
6. Town of Fountain Hills approved a request for an early start of 3:00am of Friday July 14th.
7. Flood Control District requested that hydrostatic testing be done on the joints of the storm drain pipe. These tests are typically done on pressure pipe, not on storm drain pipe. Hunter stated that there are no requirements in the contract on what test need to be performed. FCD will review the contract and will advise on how to proceed.
8. SRP has submitted a design for the relocation of the underground electric line that is in conflict with the floodwall. SRP will not do the trenching or the conduit work. Hunter will submit a quote to Shewa for this work.
9. There is concern with the concrete regarding both the temperature and the age, which can not exceed 90 degrees and 90 minutes. Maricopa Ready Mix has explained the strategies they will use to rectify this problem. The delivery ticket will be time stamped at the time the truck is batched. The drivers will take the Beeline HWY to the project. Maricopa Ready Mix will also use chilled water and ice in the mix design.
10. It was discussed that water can only be added to concrete one time, prior to placement with the approval of the inspector and the engineer.
11. The inspector will reject any load over a 4" slump.
12. Spraying cure on the concrete is very important. This should be done immediately after finishing and when the forms are stripped off.

13. Hunter has received a bill from the Fountain Hills School District for a damaged fire alarm unit at the school. Further investigation will be required.
14. There have been no traffic problems this week.
15. There have been no complaints to public relations this week.
16. No word from the church on the use of their property.
17. Weber Group has moved in to begin the testing on the well. They will be placing a 6" pipe across the project access to pump water. Hunter will try to accommodate as much as possible.
18. Hunter appreciates everybody's efforts on wearing hardhats and vests while on the job.
19. The next partnering meeting will be August 9th at 11:00 in the office trailer, the job meeting will also be at 11:00 on this date. Lunch will follow the meeting.
20. The next job meeting will be July 19th at 9:00 in the office trailer.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 19, 2000 Meeting # 7

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Don Bain | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Mike Thompson | Fountain Hills Sanitary Dist. | (480) 836-9444 | (480) 837-0819 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. Hunter Contracting submitted a letter to the Flood Control District requesting a 10-day extension on the 60-day milestone due to the extra time involved in designing and constructing the box culvert. Shewa will review the request.
6. Hunter Contracting needs to submit actual test result numbers for the wall drain; not advertised numbers that were provided by the supplier.
7. The designer for SRP visited the site on 7/18/00 to address the location change of the underground electric line that is in conflict with the floodwall. The plan is being modified in order to eliminate having to go out into the fire lane. The school informed Larry Samples that they would need power to the football field by 8/6/00 to accommodate night practices.
8. Fountain Hills Sanitary District has placed an 8" waterline across the main job site entrance. They have encased the waterline in schedule 40 pipe and placed a cold patch ramp over it to provide uninterrupted testing of the well and full time access to the job site. Mike Thompson of the sanitary district stated that testing of the well is not going as well as planned. They may have to remove the waterline and begin again in a couple of months.
9. Maricopa Ready Mix gave their thoughts on some of the problems that accrued on the concrete pour of 7/14/00. Don Bain stated that there was only a 22-gallon difference in water between the 6" slump and the 1.5" slump. He felt that it was the 1oz difference in air entrainment that made the slump higher. Maricopa Ready Mix will calibrate the plant and have a qualified quality control person slump the trucks before they leave the plant to rectify the problem.

10. The next partnering meeting will be on 8/9/00. The job meeting and the partnering meeting will both be at 11:00 in the office trailer.
11. Next weeks job meeting will be at 9:00 on 7/26/00 in the office trailer.

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PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: July 26, 2000 Meeting # 8

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Don Bain | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Fred Fuller | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time.
6. There have been no public relation problems this week.
7. It was stated that the monthly pay estimate was below the cash flow estimate.
8. Shewa needs the submittal for the 60" pipe. The test should be completed by 7/31/00.
9. Hunter Contracting has prepared a price to lower the 2" waterline.
10. Hunter Contracting's request for a 10-day extension to the 60-day milestone has been approved. Flood Control will issue a letter of approval.
11. Rich Dobson of the Fountain Hills School District has requested that an additional three steps be added at the east end of the amphitheater. The engineers estimate for this work is $1500.00.
12. During the relocation of the underground SRP electric line in conflict with the floodwall a 12" waterline and an electric line were discovered to be in conflict with the SRP line. The electric line belongs to the school and will be relocated. The 12" waterline is unknown if it is live or abandoned. The Sanitary District will test the line; if live, it will need to be relocated.
13. The August 9th job meeting will be held at 11:00 in the office trailer, with the partnering meeting to follow. A catered lunch will follow the partnering meeting.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Aug 2nd, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on July 26th , 2000

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ 12" Waterline with Flood Wall
   - ✓ Request of School Dist. For additional steps

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting: next wed. 8/10/00

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: August 2, 2000 Meeting # 9

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time. The Town of Fountain Hills requested that there should be a meeting set up to resolve any potential truck haul problems before the heavy trucking begins.
6. There have been no public relation problems this week.
7. Shewa stated that he needs the leakage test results for the 60" pipe.
8. Because of the problems that Hunter Contracting has had with excavating unknown underground utilities, it was stated that the Town of Fountain Hills and the Fountain Hills School District both need to blue stake their property before anymore structure excavation is done.
9. Shewa stated his appreciation for Hunter Contracting's efforts in making sure that the concrete structures receive both spray cure and 7-day water cure, and to please continue to do so.
10. The school district's request to add an additional 3 steps to the amphitheater has been put on hold while Shewa investigates the possibility of moving the gate to the south and exposing the existing steps.
11. Shewa stated that it would be a good idea to have the school district approve a sample of the stain color for the block wall before it is applied.
12. During the excavation of the riprap a 2.5" and a 4" underground line was discovered, they both need to be relocated and this will be looked at after the meeting.
13. A change order for the force account work for the SRP line and the school electric line needs to be completed.
14. Town of Fountain Hills Parks Dept. requested that Hunter Contracting dig a hole at the East End of the parking lot so that they can cap off the water line. The Parks Dept. needs to begin to water the trees in that area before they die.

15. Jim Leubner of the Town of Fountain Hills stated that he would be on vacation from Aug. 11th to the 21st. There will be someone filling in for him while he is gone.
16. The August 9th job meeting will be held at 11:00 in the office trailer, with the partnering meeting to follow. A catered lunch will follow the partnering meeting.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Aug 9th, 2000 **Time:** 11:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Aug 2nd, 2000

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Request of School Dist. For additional steps

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    E-Mail Addresses

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: August 9, 2000 Meeting # 10

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Don Bain | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Gerald Cox | ADWR | (602) 417-2425 | (602) 417-2423 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 11:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed. The box culvert is substantially complete. The SRP Powerline relocations are complete.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time.
6. There have been no public relation problems this week.
7. The gabion submittal has not been approved; it will be reviewed with the T-Post.
8. The excavation limits for the gabion has been resolved.
9. The school is now back in service for electric power.
10. The subcontractor that will be doing the block wall painting will be getting a wet sample of the paint color from the school. This will ensure the closest match possible. They will also paint a sample for approval prior to painting the wall. The current schedule is to have the walls painted prior to the start of school.
11. The issue with the schools request to add an additional three steps to the amphitheater is still unresolved. It has been proposed that the gate be moved to allow access to the existing steps. The existing steps do not allow access to the top of the amphitheater. This is still under review.
12. Don Clark from the Town of Fountain Hills has concerns about the sidewalk along the north side of the dam washing out. Shewa will take a look at it.
13. Chuck Gopperton looked over the riprap at the outlet end and made some suggestions to field personnel.
14. Hunter Contracting will look at the fence at the bleachers to see if it can be moved to allow access for school events.
15. Larry Samples requested that the school assist with keeping people out of the job site when school starts.

16. The monthly partnering meeting immediately followed this meeting.
17. The next weekly meeting will be Aug. 16th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Aug 16th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on August 9th, 2000.

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals:

6. Construction Survey:
   - ~~Force account work~~

7. Change Orders:
   - FORCE A/C WORK

8. Licenses/Permits:

9. Miscellaneous:

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    - Wednesday, September 6, 2000

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: August 16, 2000 Meeting # 11

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Don Clark | Town of Fountain Hills | (480) 816-5149 | (480) 837-3145 |
| Chuck Lumer | Lumer Construction | (602) 321-6844 | (480) 497-3698 |
| Jim Long | Lumer Construction | (602) 321-6844 | (480) 497-3698 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. Hunter Contracting is in the process of moving the fence at the bleachers so the students will have better access for sporting events.
5. There are no permit issues outstanding or pending.
6. There are no safety or traffic control problems at this time.
7. There have been no public relation problems this week.
8. Representatives from Lumer Construction, the contractor that will be placing the gabions, presented a value-engineering proposal as an alternative to the galvanized 8 FT T-Posts specified. The Proposal consisted of installing 5 ft painted post. Flood Control said this was a substitution of a lesser quality product and would not be considered as a value-engineering proposal. Flood Control would consider this alternative if the contractor provides full credit for the 5-ft painted post. Lumer stated they would provide the post specified galvanized 8ft. but were uncertain of the delivery status.
9. Shewa should have an answer on the gabion submittal by the end of today.
10. Hunter Contracting should receive the concrete mix designs from Maricopa Ready Mix today for the MAG AA Concrete at the Floodwall.
11. Shewa stated that either he or Matt Manthey need to initial the T&M sheets for the force account work everyday at the close of business.
12. Bill Pageau will look at the paint samples on the block wall today for approval.
13. The next weekly meeting will be Aug. 23rd at 9:00 in the office trailer
14. The next partnering meeting has been set for Sept. 6th at 11:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Aug 23rd, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on August 16th, 2000.

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - Concrete mix design for flood wall

10. Safety and Traffic Control:
    - First home game is on September 8th – potential for trespassing on construction area.

11. Public Information Matters:

12. Monthly Partnering Meeting:
    - Wednesday, September 6, 2000

FAX AASHTO SPECS TO LUMER (480) 497 3698

MTG Wed, @ 8:30 regarding re-vegetation

7:30 PM

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: August 23, 2000 Meeting # 12

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time.
6. There have been no public relation problems this week.
7. The concrete mix design for the floodwall must be resubmitted with 3-6 % air. The fly ash is ok, but would need to have a cure time of 14-days.
8. A 3-day spacing between pours has been accepted for the floodwall.
9. The desert varnish stain for the exposed structures needs to be approved by the school district.
10. Hunter would like to realign the 2" water line to prevent possible damage by the gabion post. Flood Control District will not pay for it; it would be for Hunter's convenience only.
11. Hunter requested that the number of new trees to be planted be reevaluated. There was not as many existing trees cut down as initial thought.
12. The first home game is scheduled for the night of Sept. 8th. Additional security may be needed for the job site.
13. The next weekly meeting will be Aug. 30 at 9:00 in the office trailer
14. The next partnering meeting has been set for Sept. 6th at 11:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
## Planning and Project Management Division
### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Aug 30th 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on August 23rd, 2000.

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    - Wednesday, September 6, 2000

FRITZ Huber -
TAKE OVER FOR
FRED FULLER

7 OAKS
DAM

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

SEP 06 2000

MEETING DATE: August 30, 2000 Meeting # 13

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Onca | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Lambert | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ADDITIONAL COPIES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Steve Ostwinkle | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time.
6. There have been no public relation problems this week.
7. A submittal is needed for the desert varnish stain for the exposed concrete structures. The certifications for the T-Posts are being worked on.
8. Shewa needs copies of the construction survey notes to date.
9. The paperwork for the change orders needs to be turned in by next week, if they are to be included in the next pay estimate.
10. Many children have been walking through the job site since the school year has begun. They are climbing over the fence to gain access. Hunter Contracting suggests that the school post monitors to watch and prevent the kids from cutting through the job site during school hours.
11. Rich Dobson from the Fountain Hills School District would like to set up a time to talk with Shewa on the location of the fence.
12. The school district needs to submit what their contractor did on the fire alarm line so that Hunter Contracting can review it.
13. The next weekly meeting will be Sept. 6th at 11:00 in the office trailer.
14. The next partnering meeting has been set for Sept. 6th immediately following the weekly meeting.

Public MTG 11th
OCT ~~4th~~ Group Photo

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: September 6, 2000 Meeting # 14

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Gerald Cox | ADWR | (602) 417-2445 | (602) 417-2423 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Lambert | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Fred Fuller | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 11:00 at the job site.
2. Previous meeting minutes were reviewed.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time. There will be a night game at the football field Friday, Sept. 8th from 7:00 to 10:00pm. Hunter Contracting will check and tighten all job site fences at the end of the workday on Friday. Hunter Contracting is also considering posting a security officer on the job site for Friday night. The school district stated that they would post extra city marshals and school staff between the football field and the job site. Rich Dobson requested that Hunter Contracting set up lights to illuminate the access road that runs between the school building and the job office trailer. Hunter Contracting will check the availability of equipment.
6. Hunter Contracting will submit a traffic control plan and haul route for the heavy trucking to the Flood Control District. The Flood Control District stated that they would give a copy to the Town of Fountain Hills.
7. There have been no public relation problems this week. The next monthly newsletter will be skipped, and they will resume for the month of October.
8. A submittal is needed for the desert varnish stain for the exposed concrete structures and the gravel mulch. The school will provide Hunter Contracting with the name of their supplier of gravel mulch. The certifications for the T-Posts are being worked on and will be submitted.
9. The paperwork for the change orders needs to be turned in by next week, if they are to be included in the next pay estimate.
10. The next weekly meeting will be Sept. 13th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Planning and Project Management Division

### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** September 13,2000 **Time:** 9:00 A.M.

1. Attendance:

2. Review of Minutes of the meeting held on September 6,2000

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals: 1.T posts for gabions
   2.Gravel mulch
   3.Desert varnish
6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    Oct.4, 2000 ,11:00 A.M.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: September 13, 2000 Meeting # 15

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Gerald Cox | ADWR | (602) 417-2445 | (602) 417-2423 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Lambert | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Mike Thompson | Fountain Hills Sanitary Dist. | (480) 837-9444 | (480) 837-0819 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time.
6. Hunter Contracting will submit a traffic control plan and haul route for the heavy trucking to the Flood Control District, T Post Certification for Gabions, provide a sample for the desert varnish, provide a sample of gravel mulch, and submit trash rack detailed drawings.
7. The paperwork for the change orders needs to be submitted for review and payment.
8. The installation of new trees for this project will be limited to areas disturbed by construction inside the fenced perimeter of the site. As we get closer to the landscaping work, the Parks Department will mark the location for the new trees.
9. The Parks Department will repair the fence that was taken down for their work.
10. The Sanitary District of Fountain Hills needs to verify that the sanitary sewer manholes upstream of the dam are watertight. If they are not watertight they need to be made watertight. This is the responsibility of the Sanitary District of fountain Hills. A copy of the minutes will be sent to Mike Thompson of the Sanitary District.
11. The next partnering meeting will be October 11, 2000, at 11:00 AM at the project site. Pictures will be taken so everyone is requested to attend.
12. The next weekly meeting will be Sept. 20th at 9:00 in the office trailer.

Attachments:

1. Attendance List
2. Two week Schedule

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: September 13, 2000 Meeting # 15

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Gerald Cox | ADWR | (602) 417-2445 | (602) 417-2423 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Lambert | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Mike Thompson | Fountain Hills Sanitary Dist. | (480) 837-9444 | (480) 837-0819 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time.
6. Hunter Contracting will submit a traffic control plan and haul route for the heavy trucking to the Flood Control District, T Post Certification for Gabions, provide a sample for the desert varnish, provide a sample of gravel mulch, and submit trash rack detailed drawings.
7. The paperwork for the change orders needs to be submitted for review and payment.
8. The installation of new trees for this project will be limited to areas disturbed by construction inside the fenced perimeter of the site. As we get closer to the landscaping work, the Parks Department will mark the location for the new trees.
9. The Parks Department will repair the fence that was taken down for their work.
10. The Sanitary District of Fountain Hills needs to verify that the sanitary sewer manholes upstream of the dam are watertight. If they are not watertight they need to be made watertight. This is the responsibility of the Sanitary District of fountain Hills. A copy of the minutes will be sent to Mike Thompson of the Sanitary District.
11. The next partnering meeting will be October 11, 2000, at 11:00 AM at the project site. Pictures will be taken so everyone is requested to attend.
12. The next weekly meeting will be Sept. 20th at 9:00 in the office trailer.

Attachments:

1. Attendance List
2. Two week Schedule

Mtg # 15

# MEETING ATTENDANCE ROSTER

Meeting: Weekly Const. Location: FCD Site Office

Date: Sept. 13, '00

| Name | Title | Organization | ~~FAX~~ Tel |
|---|---|---|---|
| SHEWA SHIVASWAMY | R.E. | FCD | (602) 980-6063 |
| LARRY SAMPLES | Super | HCC | 602-257-1835 |
| MATT MANTHEY | INSPECTOR | AMEC | 602-272-7239 |
| Bill Pageau | Dist. Maint. Super. | F.H.U.S.D. | 480-832-0690 |
| Chuck Goppert | ENGINEER | STANTEC | |
| ROB CARLSON | P.M. | HCC | ~~480-892~~-4932 |
| Don Clark | Parks Supervisor | TOFH | 480-816-5178 |
| [illegible] | Const Mgr | FCD | 602-390-1741 |
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# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Planning and Project Management Division

### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Sept.20, 2000

1. Attendance:
2. Construction Schedule (biweekly):

Gabions start on 27th?

Finish in early November?

3. Submittals: 1.T posts for gabions
   2.Contractor Quality Control Reports
   3.Daily Labor/Equipment Reports
4. Construction Survey:
5. Change Orders:
6. Licenses/Permits:
7. Miscellaneous:
8. Safety and Traffic Control:
9. Public Information Matters:
10. Monthly Partnering Meeting:
    October 11,2000, 11:00 A.M.

PHOTOS

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: September 20, 2000 Meeting # 16

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Mike Thompson | Fountain Hills Sanitary Dist. | (480) 837-9444 | (480) 837-0819 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no safety or traffic control problems at this time. Hunter Contracting submitted a haul route plan.
6. There are no public information matters at this time.
7. Mike Thompson of the Fountain Hills Sanitary District verified that the sanitary sewer manholes upstream of the dam are watertight.
8. The floodwall is complete and a sample of the desert varnish stain has been applied, need to wait 8 more days to judge the darkness.
9. The project may go into early November because of delays with the gabion subcontractor. The certifications for the T-posts still have not been received. Subcontractor is having problems attaining them.
10. Shewa stated that he would like to have copies of all the contractor quality control reports. He would also like copies sent to Chuck Gopperton.
11. Shewa needs to receive the daily equipment and labor reports.
12. Shewa requested a shop drawing for the hand rail and inlet grates.
13. The next partnering meeting will be October 11, 2000, at 11:00 AM at the project site. Pictures will be taken so everyone is requested to attend.
14. The next weekly meeting will be Sept. 27th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Sep. 27th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Sep. 20th, 2000

3. Work done during the week:

4. Construction Schedule:

5. Submittals: 1) T posts for gabions
   2) Contractor quality control reports
   3) Daily labor/equipment reports
   4) Gradations on imported fill material
   5) Field adjustments to trashracks - shop drawings

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    Changed: October 18, 2000, 11:00 A.M.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: September 27, 2000 Meeting # 17

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. Jim Leubner approved the submitted truck haul route plan for the Town of Fountain Hills.
6. There are no public information matters at this time.
7. Last week Hunter Contracting was locked out of the job site by Baja Communications. They are doing work on the job site and put their own lock on the front gate. Hunter Contracting was forced to cut the chain to get into the job site in the morning. Do to the fact that the chain was cut both Shewa and Art have cut their hands while trying to enter the job site. Hunter Contracting stated that there would be a new chain put on the front gate. Hunter Contracting has also spoken with Baja Communications to make sure that this does not happen again.
8. Shewa stated that he would like to have copies of all the contractor quality control reports. He would also like copies sent to Chuck Gopperton.
9. The paperwork for the change orders has been submitted. Shewa and Bob will get together to go over it.
10. Hunter Contracting needs to submit shop drawings for the trash rack.
11. Shewa stated that he was disappointed with the results of the desert varnish sample applied to the floodwall, and all other agencies concurred. The subcontractor believes that the discoloration is caused by the cure that was on the structure. He will be coming out again to apply a new sample.
12. Shewa stated that he was very pleased with the outcome of the concrete structures.
13. The gabions were started today, and the subcontractor still has not received the certifications for the T-Posts from the manufacturer. The rock from Shea Blvd has been approved for use in the gabions.
14. Hunter Contracting is up to date on labor and equipment reports.
15. The partnering meeting has been changed from October 11, 2000, at 11:00 AM to October 18, 2000, at 11:00 AM at the project site. Pictures will be taken so everyone is requested to attend.
16. The next weekly meeting will be Oct. 4th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Planning and Project Management Division

### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Oct. 4th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Sep. 27th, 2000

3. Work done during the week:

4. Construction Schedule (biweekly):

5. Submittals:
   1) Contractor quality control reports
   2) Gradations on imported fill material from Shea

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   ✓ Desert varnish stain – possible alternatives

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    Changed: Oct. 17th, 2000 @ 11:00 A.M.

Tuesday

also weekly mtg

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: October 4, 2000 Meeting # 18

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. Shewa stated that he would like to have copies of all the contractor quality control reports. He would also like copies sent to Chuck Gopperton.
8. The paperwork for the change orders was submitted. Shewa felt that there should be some adjustments made to the equipment rates. The paperwork should be turned in by next week to make the next pay estimate. Bob is working on the revisions.
9. The gradation of the fill material for the dam has been approved. The delay in processing the material should not cause a delay in the overall completion of the job.
10. Jim Leubner requested that Hunter Contracting inform him when the truck hauling will begin.
11. The subcontractor reapplied the desert varnish stain to the floodwall with no improvement in the results. Shewa recommended that the floodwall remain a natural concrete color. The school district concurred and the Town of Fountain Hills will give their response early next week.
12. The partnering meeting has been changed from October 18, 2000, at 11:00 AM to October 17, 2000, at 11:00 AM at the project site. Pictures will be taken so everyone is requested to attend. The weekly meeting will also be held on this date at 11:00 AM.
13. The next weekly meeting will be Oct. 11th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Planning and Project Management Division

### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Oct. 11th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Oct. 4th, 2000

3. Work done during the week:

4. Construction Schedule:

5. Submittals:
   1) Contractor quality control reports
   2) Quality Control concrete test results on floodwall for 8/31/00

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Desert varnish stain – possible alternatives
   - ✓ Trash rack on principal outlet – repairs/adjustments

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    Changed: Oct. 17th, 2000 @ 11:00 A.M.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: October 11, 2000 Meeting # 19

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837 3145 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. Shewa stated that Hunter Contracting needs to document the rain days. This will be helpful if they are needed at a future date.
8. With the exception of one cylinder break from a sample taken from the floodwall on 8/31/00, all quality assurance reports were within spec. The low-test break was 32 psi below spec. However, the quality control testing from the same batch of concrete was within acceptable range. The concrete test results were therefore accepted by Chuck Gopperton of Stantec and Flood Control District.
9. The Town of Fountain Hills stated that they do not want the concrete structures left a natural concrete color. They would like us to consider painting the structures. The desert varnish stain has been canceled and a final decision will be made by next week.
10. There are a few bent fins on the newly installed trash racks. Shewa stated that these need to be replaced.
11. Decisions should be made soon on what needs to be done for landscaping. This will allow for accurate pre-planning and the setting up of a subcontractor.
12. The next weekly job meeting will be held just before the monthly partnering meeting on Oct. 17th at 11:00am in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
## Planning and Project Management Division
### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Oct. 17th, 2000 **Time:** 11:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Oct. 11th, 2000

3. Work done during the week:

4. Construction Schedule: gabions - 2 weeks+ process mtl next week Haul - 2 weeks Dec 9th plus rain days for end of contract

5. Submittals:

6. Construction Survey: Jim Covey - covering for Larry G. (Hunter)

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Desert varnish stain - deleted replace w/paint
   - ✓ Trash rack on principal outlet – repairs/adjustments not repaired yet
   - ✓ Site Office Maintenance

10. Safety and Traffic Control:

11. Public Information Matters:

12. Monthly Partnering Meeting:
    Today: Oct. 17th, 2000 @ 11:00 A.M.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: October 17, 2000 Meeting # 20

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Chuck Lumer | Lumer Construction | (602) 321-6844 | (480) 497-3698 |
| John Linkswiler | ADWR | (602) 417-2445 | (602) 417-2423 |
| Gerald Cox | ADWR | (602) 417-2445 | (602) 417-2423 |
| Mark Reiner | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Don Bain | Maricopa Ready Mix | (480) 607-3999 | (480) 607-3335 |
| Don Clark | Town of Fountain Hills | (480) 816-5178 | (480) 837-6362 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 11:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. A 5-Day time extension has been granted due to the T&M for the underground utilities. The new contract completion date is Dec. 9th.
8. The submittals are up to date, and Shewa will review the revised change orders for the utility relocations.
9. There has still been no resolution made for the desert varnish stain, the town needs to let Shewa know their decision ASAP so that the arrangements can be made.
10. The bent fins on the trash racks need to be repaired.
11. Matt Manthey presented the school district with new evidence that the underground fire alarm wiring and conduit had pre-existing damage. A bill to the school district is pending.
12. The location for the trees will be resolved after the meeting.
13. Shewa will be on vacation the last week of October, Art Dubois will be filling in.
14. Jim Covey is filling in for Larry Samples while Larry is out for his knee operation.
15. The next weekly meeting will be Oct. 25th at 9:00 in the office trailer.

Paint Spec

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
## Planning and Project Management Division
### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Oct. 25th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Oct. 17th, 2000

3. Work done during the week:

4. Construction Schedule:

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Desert varnish stain/ paint for concrete
   - ✓ Trash rack on principal outlet – repairs/adjustments
   - ✓ Landscaping

10. Safety and Traffic Control:

11. Public Information Matters:

Paint Specs

gabion inspection

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: October 25, 2000 Meeting # 21

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Don Clark | Town of Fountain Hills | (480) 816-5178 | (480) 837-6362 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-1404 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. The bent fins on the trash racks need to be repaired.
8. The church should be updated on the schedule for truck hauling. A stop sign needs to be posted at the parking lot exit so that the trucks will stop before entering the intersection.
9. Shewa needs to know if there are any change orders left by next week so that they can be included in the pay estimate.
10. The Town of Fountain Hills has elected to go with paint instead of the stain for the concrete structures. The Town will choose a color and Chuck Gopperton will provide Hunter Contracting Co. with the specs for the application. Hunter Contracting Co. will provide Shewa a quote to do this work. It should be noted that the surface area that needs to be painted has not changed.
11. The Town of Fountain Hills has requested that seven trees be planted in front of the new floodwall at their expense. They will need a letter from the school granting the town permission to do this work. Shewa is requesting that Hunter Contracting Co. landscaping subcontractor install the extra irrigation line at no cost. If there is a cost, than Shewa will deny the request.
12. ADWR requested that they be present to inspect the gabions before the baskets are closed. They did not show up at the scheduled time. Shewa and Chuck Gopperton will inspect them.
13. The next weekly meeting will be Nov. 1st at 9:00 in the office trailer.

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: November 1, 2000 Meeting # 22

MEETING CONDUCTED BY: Art Dubois C.M., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-1404 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. Hunter Contracting needs to submit a letter stating the number of rain days that have been used to this point in of the project.
8. The subcontractor that was going to apply the desert stain varnish will still be used to apply the paint that is being substituted for the stain. The subcontractor will be doing the work for the original submitted price. TOO COSTLY?
9. Hunter Contracting is waiting for the ground to dry before they can replace the damaged fins on the trash racks.
10. The imported silt has been shown to support growth of vegetation. A sample was taken by contractor Q.C. to be tested as topsoil, waiting for results.
11. The next weekly meeting will be Nov. 8th at 9:00 in the office trailer.

- Haul tomorrow
- RAIN DELAY
- re-sched. completion date (mid december?)

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Planning and Project Management Division

### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Nov. 8th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Nov. 1st, 2000

3. Work done during the week:

4. Construction Schedule:

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Desert varnish stain/ paint for concrete
   - ✓ Trash rack on principal outlet – repairs/adjustments
   - ✓ Problems with Baja Communications regarding job site access

10. Safety and Traffic Control:

11. Public Information Matters:

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: November 8, 2000 Meeting # 23

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 980-6063 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-1404 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. The topsoil test results were 0.1% out of spec on the pH. The results were accepted as is by Chuck Gopperton and Shewa.
8. The change order for lowering the fire line was submitted today. This is the last outstanding item at this time.
9. Hauling will resume on the 9th. and the church will be notified.
10. Shewa feels that the cost for the application of the paint to the concrete structures should be less than it was for the stain. The subcontractor stated that he would do it at the original submitted price. Shewa will respond in the next day or two.
11. Hunter Contracting Co. needs to submit a new projected completion date for the project.
12. There have been some problems on the job site regarding another contractor for the school district. Baja Communications has repeatedly cut Hunter Contracting's chain/lock, and re-locked the gate with their own lock. This has caused a great inconvenience to Hunter Contracting along with extra, unnecessary, and avoidable costs. Despite Hunter Contracting's attempts at trying to establish communication and coordinating schedules these unfortunate and deliberate acts continue, even at their management level. Hunter Contracting Co. will contact Bill Pageau of the Fountain Hills School District to get assistance on dealing with this matter.
13. The next weekly meeting will be Nov. 15th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
## Planning and Project Management Division
### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Nov. 15th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Nov. 8th, 2000

3. Work done during the week:

4. Construction Schedule:

5. Submittals:

6. Construction Survey:

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Paint for concrete
   - ✓ Trash rack on principal outlet – repairs/adjustments

10. Safety and Traffic Control:

11. Public Information Matters:

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: November 15, 2000 Meeting # 24

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 980-6063 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| George Sabol | Stantec | (602) 707-4635 | (602) 431-4635 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-1404 |
| Tom Ward | Town of Fountain Hills | (480) 816-5129 | (480) 837-1404 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. The projected completion date for the project has been set for Dec. 22nd with the pre-final on Dec. 7th and the final on Dec. 19th. The final partnering meeting has been scheduled for Dec. 20th.
8. There is a submittal for a change in trees for the landscaping. This change is due to the unavailability of the original submitted trees.
9. Hunter Contracting Co. is up to date on the change orders.
10. The damaged trash rack will be repaired when access is available.
11. The Town of Fountain Hills is requesting a letter from Tom Renckly from the Flood Control District stating why there was no surveying done. According to the town there are 14 homes that fall within the flood plane.
12. The attendees will look at the paint sample on the floodwall when the meeting is adjourned.
13. The final partnering meeting has been set for Dec. 20th. The time and location will be announced at a later date.
14. The next weekly meeting will be Nov. 22nd at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Planning and Project Management Division

### Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Nov. 22nd, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Nov. 15th, 2000

3. Work done during the week:

4. Construction Schedule:

5. Submittals:

6. Construction Survey: / AS BUILTS

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Trash rack on principal outlet – repairs/adjustments
   - ✓ Landscaping – schedule

10. Safety and Traffic Control:

11. Public Information Matters:

12. Final Partnering Meeting: Dec. 20th , 2000
    - ✓ Pre-Final Walkthrough Dec. 7th , 2000
    - ✓ Final Walkthrough Dec. 19th , 2000

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: November 22, 2000 Meeting # 25

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 980-6063 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. The last day of the contract is Dec. 22nd with the pre-final on Dec. 7th and the final on Dec. 19th. The final partnering meeting has been scheduled for Dec. 20th.
8. The paint sample was approved.
9. The trees for the landscaping have been approved.
10. Shewa requested from Hunter Contracting Co. a project schedule for the work to be done between now and Dec. 22nd.
11. Tom Renckly from Flood Control District followed up on the Town of Fountain Hills request for a letter regarding the survey for the 14 homes near a flood plain.
12. Bob Carlson submitted a letter regarding the painting for the floodwall.
13. Shewa needs to approve the red lines before the as-built can be done.
14. The final partnering meeting has been set for Dec. 20th from 11:00 to 2:00. It will be held at Monti's Restaurant, which is on the South/West corner of Mill Ave. and Rio Salado Parkway, just South of the Mill Ave. bridge. The address is 1 West Rio Salado Parkway, Tempe. All attendees should park in the parking lot on the South side of the restaurant. We will have our own private entrance off the parking lot into the banquet room. Look for the signs.
15. The next weekly meeting will be Nov. 29th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Nov. 29th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Nov. 22nd, 2000

3. Work done during the week: Finished hauling, GRADING Fencing

4. Construction Schedule:

5. Submittals: Lumer missed Tuesday 28th Finish Gabions by next Tuesday or wednesday Painting done

6. Construction Survey:
   - ✓ Top of dam and embankment

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Trash rack on principal outlet – repairs/adjustments
   - ✓ School's water valve on south side of floodwall – protection
   - ✓ Repair of concrete sidewalk near bleachers – how should it be done

10. Safety and Traffic Control:

11. Public Information Matters:

12. Final Partnering Meeting: Dec. 20th, 2000 11 AM
    - ✓ Pre-Final Walkthrough Dec. 7th, 2000
    - ✓ Final Walkthrough Dec. 19th, 2000

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: November 29, 2000 Meeting # 26

MEETING CONDUCTED BY: Art Dubois C.M., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Chuck Gopperton | Stantec | (602) 390-1741 | (602) 506-8561 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time. The church has informed Hunter Contracting Co. that the haul road can be left the way it is.
7. The last day of the contract is Dec. 22nd with the pre-final on Dec. 7th and the final on Dec. 19th. The final partnering meeting has been scheduled for Dec. 20th.
8. Flood Control needs to approve the red lines before the as-built can be done.
9. Flood Control needs the updated survey notes.
10. Hunter Contracting Co. needs to know the limits of the handrail at the sidewalk area. The sidewalk area was looked at after the meeting and the limits were established.
11. The repair of the sidewalk at the school was also looked at after the meeting with the school district.
12. Hunter Contracting Co. was reminded that the trash rack is in need of repair at the principal outlet works.
13. The final partnering meeting has been set for Dec. 20th from 11:00 to 2:00. It will be held at Monti's Restaurant, which is on the South/West corner of Mill Ave. and Rio Salado Parkway, just South of the Mill Ave. bridge. The address is 1 West Rio Salado Parkway, Tempe. All attendees should park in the parking lot on the South side of the restaurant. We will have our own private entrance off the parking lot into the banquet room. Look for the signs.
14. The next weekly meeting will be Dec. 6th at 9:00 in the office trailer.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Dec. 6th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Nov. 29th, 2000

3. Work done during the week:
   - redlines being done
   - repair trashrack
   - constructing gabions dam abutment prot.
   - constructed part of sidewalk & steps
   - slopes trimmed
   - fiseplay placed
   - removing sidewalk & replace
   - Fine grading & cleanup
   - Fence being installed
   - landscaping & seeding scheduled

4. Construction Schedule:

5. Submittals:

6. Construction Survey:
   - ✓ Top of dam and embankment

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Trash rack on principal outlet – repairs/adjustments
   - ✓ Repair of concrete sidewalk near bleachers
   - ✓ Landscaping – schedule
   - ✓ As-builts - progress

10. Safety and Traffic Control:

11. Public Information Matters:

LESSONS LEARNED

12. Final Partnering Meeting: Dec. 20th, 2000 @ 11:00am – MONTI'S
    - ✓ Pre-Final Walkthrough Dec. 7th, 2000 @ 9:00am
    - ✓ Final Walkthrough Dec. 19th, 2000 @ ~~9:00~~ 8 am

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: December 6, 2000 Meeting # 27

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

TO:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 980-6063 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Chuck Gopperton | Stantec | (602) 390-1741 | (602) 506-8561 |
| Jim Leubner | Town of Fountain Hills | (480) 838-5681 | (480) 837-1404 |
| Jim Covey | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

ITEMS DISCUSSED:

1. Meeting began at 9:00 at the job site.
2. Previous meeting minutes were reviewed and accepted as written.
3. 2-Week construction schedule was handed out and reviewed.
4. There are no permit issues outstanding or pending.
5. There are no public information matters at this time.
6. There are no safety or traffic control issues at this time.
7. The last day of the contract is Dec. 22nd. The final is scheduled for Dec. 19th at 8:00am.
8. Flood Control needs the original survey notes by the end of the project.
9. Larry and Matt met this morning and reviewed the as-builts. Hunter Contracting Co. will produce the final drawings.
10. The change orders are complete and are being processed by Flood Control. They will be included in the next pay estimate.
11. The landscaping and the repairs to the trash rack need to be completed before the final on Dec. 19th.
12. Flood Control was pleased with the recent results of the completed sidewalk work.
13. The parking lot utilized by Hunter Contracting Co. and The Flood Control District for parking and storage was not damaged during the project. Hunter Contracting Co. will clean the parking lot upon completion of the project.
14. The final partnering meeting has been set for Dec. 20th from 11:00 to 2:00. It will be held at Monti's Restaurant, which is on the South/West corner of Mill Ave. and Rio Salado Parkway, just South of the Mill Ave. bridge. The address is 1 West Rio Salado Parkway, Tempe. All attendees should park in the parking lot on the South side of the restaurant. We will have our own private entrance off the parking lot into the banquet room. Look for the signs.
15. The next weekly meeting will be Dec. 13th at 9:00 in the office trailer.

# GOLDEN EAGLE PARK DAM

## Pre-Final Walkthrough
## Minutes and Punch List

**December 7, 2000 - 9:00 AM** **On - Site**

Present:
Shewa Shivaswamy - FCD
Art Dubois - FCD
Chuck Gopperton - Stantec
Jim Leubner - Town of Fountain Hills
Chance Butterfield - Town of Fountain Hills - Parks Dept.
John Linkswiler - ADWR
Brett Howey - ADWR
Bob Carlson - Hunter
Jim covey - Hunter
Bill Pageau - Fountain hills Unified School District
Jim Long - Lumer
Matt Manthey - AMEC Earth & Environmental

Pre-Final walkthrough was held to have all parties take a look at the job and voice their opinions as to issues that need work. A short punch list was made following the meeting. It consists of the following items:

## Punch List

- Zinc oxide needs to be placed along welds for fence running along football field and amphitheater.
- Masonry wall along the gabions and as well as by the school's bleachers needs to be repaired and stained to match existing block.
- Trash rack needs to be fixed, all agree that the 5 fins from left to right facing the rack are acceptable. The other fins, however, need to be repaired.
- Need to build slope up around entrance to park to maintain better run off from rain. Plans call to put back to original, the Parks Dept. requests Hunter change this to allow proper drainage.
- Asphalt parking lot needs to be repaired at edge of sidewalk at access road entrance, as well as marked parking bay to the south. It also needs to be cleaned and swept of all debris.
- The school district requests all debris along bleachers be cleaned and removed.
- In general all areas need to be cleaned and graded.

This wraps up the punch list for the Pre-Final walkthrough. The following is list of items that were discussed and also need to be addressed in and around the completion of construction.

- Jim Leubner still requests a letter from Tom Rinckley with FCD in regards to survey of the downstream homes.
- The question arose as to what should be done with the operation and maintenance plan for the dam as well as the emergency action plan. This will be resolved upon completion of the project.
- The Parks Dept. expressed their need to have a representative on site when landscaping begin as to ensure proper placement of items and tying in of irrigation lines. They will be notified prior to work beginning next week.
- The town would like to reserve some comments for Don Clark as well as Brian Hughes with the Parks Dept., for possible input on items missed, as they could not attend the walkthrough. This was welcomed and appreciated by all parties.
- John Linkswiler of ADWR commented that he is very pleased with the quality of construction that has taken place on this project.
- Meeting was than adjourned around 10:00 am.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Planning and Project Management Division

Construction Management Branch

**Project Name:** Golden Eagle Park Dam **FCD #** 1999C071

**Date:** Dec. 13th, 2000 **Time:** 9:00 a.m.

1. Attendance:

2. Review of Minutes of the meeting held on Dec. 6th, 2000

3. Work done during the week:

WORK DONE
- Hydroseed dam
- sidewalk
- FENCING
- RAILING
- GRAVEL MULCH
- LANDSCAPING
- REMOVE TEMP FENCE
- CLEANUP
- TRASHRACK

4. Construction Schedule:

5. Submittals:

6. Construction Survey:
   - ✓ Top of dam and embankment

7. Change Orders:

8. Licenses/Permits:

9. Miscellaneous:
   - ✓ Landscaping – schedule
   - ✓ As-builts - progress

SET OF PLANS TO HUNTER FOR AS-BUILTS MARKUP

10. Safety and Traffic Control:

11. Public Information Matters:

12. Final Partnering Meeting: Dec. 20th , 2000 @ 11:00am
    - ✓ Final Walkthrough Dec. 19th , 2000 @ 9:00am

# GOLDEN EAGLE PARK DAM
## Final Walkthrough

**December 19, 2000 - 8:00 AM** **On - Site**

Present:
Shewa Shivaswamy - FCD
Tom Rinckley - FCD
Chuck Gopperton - Stantec
Jim Leubner - Town of Fountain Hills
Bob Carlson - Hunter
Jim Covey - Hunter
Matt Manthey - AMEC Earth & Environmental

### Minutes

The final walkthrough for the Golden Eagle Park Dam project was held on December 19, 2000. Overall all parties agreed that the project is accepted as substantially complete. However, a few items remain to be performed. The stain for the repaired masonry wall needs to be done. Also, The breakaway fences on the outlet structures need completion. The final item to be worked on is the repairs to the AC parking lot. These areas were agreed to be all parties and marked for removal and replacement. In addition to this, the trash rack repairs done from the previous punch list was accepted as repaired. Jim Leubner from the Town of Fountain Hills commented on what a great job was done on this project and the level of communication by all involved parties was commendable. All parties concurred with his evaluation.

# PARTNERING MEETINGS

# Golden Eagle Park Dam Modifications
## Preliminary Agenda Items – Partnering Meeting

**AGENDA ITEMS**

**Flood Control District / Stantec**
- Flood Control District Contact
- Permit Requirements: 401, 404, Dewatering, Dust Control, NPDES/SWPPP, Other
—Diversion Plan - Area Subject to Flooding: Ashbrook wash, Cloudburst wash, Golden Eagle Park,
- —FCD Alert Information, historical rainfall/inflow info. in specs (limited data), District to relocate ALERT gauge
- 60 Day Milestone for 10'x 4' outlet and reconstruction of dam
- 60 Day milestone for masonry wall, construction access
- ADWR Stamped set of plans and specs
- Submittals: Early submittals needed to meet 60 day milestone, submittal distribution/approvals
- Site Access
- Staging Areas
- CQA Testing/Approval process

**Contractor**

**Agenda Items to be provided by Hunter Contracting**
- anticipated mobilization date, preliminary schedule
- VECP's and other changes

**ADWR**
- ADWR's overall role
- CQA Plan
- ADWR Inspections
- ADWR approvals

**Town of Fountain Hills**
- Safety Concerns
- Traffic Control Plan
- Dust Control
- Alternate Access Road/Parking Lot at Ballfield
- Protection of Park Facilities
- Town Ordinances: Working days/times, noise control
- Construction Fencing

**Fountain Hills School District**
- Safety Concerns
- School Session and Events
- Completion of masonry wall by gymnasium within 60 days from NTP

**Other**
- Contract must keep as-builts current

DRAFT: May 17, 2000

- District needs estimated billing schedule
- Is overtime work anticipated? Must get written approval
- Submittals needed soon: prequalify the borrow source and filter sand, shop drawings for box culvert and masonry wall at gym, traffic control plan, diversion plan, quality control plan, site plan, staking outline
- Discuss public info and project signing
- Condition survey of pavement
- Need names and phone numbers of all involved in project, with description of their involvement

*FLOOD CONTROL DISTRICT of Maricopa County*
*2801 West Durango Street*
*Phoenix, Arizona 85009*
*(602) 506-1501 (Office)*
*(602) 506-4601 (Fax)*

TO: Chuck Copperton, Stantec Consulting

FROM: Fred Fuller, Construction Branch Manager

DATE: May 18, 2000

SUBJECT: Golden Eagle Dam Modifications, FCD 1999C071

The partnering conference and the preconstruction meeting for the Golden Eagle Dam Modifications, project is scheduled for May 30, 2000 at the Comfort Inn, 17105 E. Shea Blvd., Fountain Hills.

The schedule is as follows:

| | |
|---|---|
| 7:30 – 8:00 | Continental Breakfast |
| 8:00 - 2:00 | Partnering Conference |
| 12:00 – 1:00 | Lunch |
| 2:00 – 4:00 | Preconstruction Conference |

Your presence at this meeting is requested. If you are unable to attend, we recommend that you send a representative. If you need further information please contact, Shewa Shivaswamy, Resident Engineer at 602-506-4726 or 602-980-6063.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Partnering Meeting

### Golden Eagle Park Dam Modifications

### AGENDA

**Date: July 5, 2000**

1. Sign In:

2. Introductory Remarks: Shewa

3. General Comments

   - Bob Carlson of Hunter
   - Jim Leubner – Town of Fountain Hills
   - Jerry Cox – ADWR
   - Rich Dobson – Fountain Hills School District
   - Chuck Copperton – Stantec
   - Open Floor

4. Evaluation of Partnering Goals:

5. Lunch

# Partnering Rating Summary
## Southeast Phoenix Regional Basin

July 5th

Month Being Evaluated: JUNE

| Evaluation Elements | Evaluation Criteria and Scores | | | | | |
|---|---|---|---|---|---|---|
| **Schedule -** (Complete on time) | Extremely Behind 1 | Slightly Behind 2 | Right on Schedule 3 | Ahead of Schedule 4 | N/A | 2.5 |
| **Safety** - no accidents | Accident Occurred 1 | Minor Accidents 2 | Very Proactive 3 | Exceptional Program with No Accidents 4 | N/A | 3.0 |
| **Quality -** (Meet or exceed plans & specs) | Unsatisfactory 1 | Meets Standards, after Corrected 2 | Meeting Standards 3 | No Deficiencies, Workmanship Exceeding High Standards 4 | N/A | 3.0 |
| **Communication** (Good; ask questions, good problem solving) | I Have no Idea What is Going On 1 | I Sometimes Get Information (After the Fact) 2 | I Usually Know What's Happening (Ahead of Time) 3 | I Know Exactly What is Going On 4 | N/A | 4.0 |
| **Timely Decisions** | Decisions Not Getting Made 1 | Decisions Getting Made, Not Timely 2 | Decisions Getting Made, Mostly on Time 3 | Great Effort; Timely Decision Making 4 | N/A | 4.0 |

FLOOD CONTROL DISTRICT
RECEIVED
JUN 20 '00
CH & G.M.
PIO
ADMIN
REG
ENG
CONTRACTS
ROUTING
LAWS
O&M
P & PM
FILE
MLT

| Evaluation Elements | Evaluation Criteria and Scores | | | | | |
|---|---|---|---|---|---|---|
| **Public;** (Honest & reliable information) | No Effort Provided, Lots of Complaints<br>1 | Making a Minimal Effort, Not Getting Information Out Timely<br>2 | Making a Good Effort, Still Not Timely<br>3 | Great Proactive Approach<br>4 | N/A | 4.0 |
| **Profitable** (Within budgets) | Over Budget, Never Going to Happen<br>1 | May be Close<br>2 | Within Budget<br>3 | Under Budget, Better, Than Expected<br>4 | N/A | 2.5 |
| **Maintaining Partnering Attitude** | We're talking it not walking it<br>1 | We use it only when we think it benefits us<br>2 | We partner most of the time<br>3 | We are great partners<br>4 | N/A | 4.0 |
| **Have Fun** | Not a Chance, I Dread Going to Work<br>1 | We're Having to Work Way Too Hard At It<br>2 | Most of the Time We Enjoy It<br>3 | Having a Great Time, Enjoy the Project<br>4 | N/A | 3.0 |

Comments: (Please provide comments if the rating is a (1) or a (4), tell us what needs work and what has been going well)_____

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Partnering Meeting

### Golden Eagle Park Dam Modifications

### AGENDA

**Date: Aug 9th, 2000 at 11:00am**

1. Sign In:

2. Introductory Remarks: Shewa

3. General Comments

   - Tom Johnson – FCD / Fred Fuller - FCD
   - Bob Carlson of Hunter
   - Jim Leubner – Town of Fountain Hills
   - Jerry Cox – ADWR
   - Rich Dobson – Fountain Hills School District
   - Chuck Gopperton – Stantec
   - Open Floor

4. Evaluation of Partnering Goals:

5. Lunch

# Partnering Rating Summary

~~Southeast Phoenix Regional Basin~~
Golden Eagle Park Dam

Month Being Evaluated: July, 2000

| Evaluation Elements | Evaluation Criteria and Scores | | | | |
|---|---|---|---|---|---|
| **Schedule -** (Complete on time) | Extremely Behind 1 | Slightly Behind 2 | Right on Schedule 3 | Ahead of Schedule 4 | N/A |
| **Safety** - no accidents | Accident Occurred 1 | Minor Accidents 2 | Very Proactive 3 | Exceptional Program with No Accidents 4 | N/A |
| **Quality -** (Meet or exceed plans & specs) | Unsatisfactory 1 | Meets Standards, after Corrected 2 | Meeting Standards 3 | No Deficiencies, Workmanship Exceeding High Standards 4 | N/A |
| **Communication** (Good; ask questions, good problem solving) | I Have no Idea What is Going On 1 | I Sometimes Get Information (After the Fact) 2 | I Usually Know What's Happening (Ahead of Time) 3 | I Know Exactly What is Going On 4 | N/A |
| **Timely Decisions** | Decisions Not Getting Made 1 | Decisions Getting Made, Not Timely 2 | Decisions Getting Made, Mostly on Time 3 | Great Effort; Timely Decision Making 4 | N/A |

FLOOD CONTROL DISTRICT
RECEIVED
JUN 20 '00
CH & GM
PIO
ADMIN
REG
ENG
CONTRACTS
LANDS
O&M
P & PM
FILE
ROUTING MLT

| **Evaluation Elements** | **Evaluation Criteria and Scores** | | | | |
|---|---|---|---|---|---|
| **Public;** (Honest & reliable information) | No Effort Provided, Lots of Complaints<br>1 | Making a Minimal Effort, Not Getting Information Out Timely<br>2 | Making a Good Effort, Still Not Timely<br>3 | Great Proactive Approach<br>4 | N/A |
| **Profitable** (Within budgets) | Over Budget, Never Going to Happen<br>1 | May be Close<br>2 2.5 | Within Budget<br>3 | Under Budget, Better, Than Expected<br>4 | N/A |
| **Maintaining Partnering Attitude** | We're talking it not walking it<br>1 | We use it only when we think it benefits us<br>2 | We partner most of the time<br>3 | We are great partners<br>4 | N/A |
| **Have Fun** | Not a Chance, I Dread Going to Work<br>1 | We're Having to Work Way Too Hard At It<br>2 | Most of the Time We Enjoy It<br>3 | Having a Great Time, Enjoy the Project<br>4 4 PLUS | N/A |

Comments: (Please provide comments if the rating is a (1) or a (4), tell us what needs work and what has been going well)_____

# Flood Control District of Maricopa County
## Monthly Partnering Meeting Agenda
## Golden Eagle Park Dam
## FCD 1999C071

**Date:** **September 6,2000** **Time: 11:00** **Location: Job site trailer**

1. Sign In:

2. Introductory Remarks and Project Status Report: **Shewa**

3. General Comments:

- Bob Carlson Hunter Const.
- Tom Johnson FCD
- Jim Leubner Town of Fountain Hills
- Fred Fuller FCD
- Jerry Cox ADWR
- Tom Renckly FCD
- Rich Dobson Fountain Hills School District
- Fritz Huber FCD
- Chuck Gopperton Stantec
- Open Floor

4. Evaluation of Partnering Goals:

5. Lunch:

PROJECT: Golden Eagle Park Dam Modifications Contract FCD 1999C071

MEETING DATE: September 6, 2000 Partnering Meeting # 4

MEETING CONDUCTED BY: Shewa Shivaswamy, P.E., Flood Control District of Maricopa County

ATTENDEES:

| NAME | ORGANIZATION | PHONE | FAX |
|---|---|---|---|
| Shewa Shivaswamy | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Art Dubois | Flood Control District | (602) 390-1741 | (602) 506-8561 |
| Chuck Gopperton | Stantec | (602) 707-4637 | (602) 431-9562 |
| Matt Manthey | AGRA E & E | (602) 721-3563 | (602) 272-7239 |
| Rich Dobson | Fountain Hills School Dist. | (480) 837-1524 | (480) 837-8082 |
| Gerald Cox | ADWR | (602) 417-2425 | (602) 417-2423 |
| Fred Fuller | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Fritz Huber | Flood Control District | (602) 506-4728 | (602) 506-8561 |
| Bill Pageau | Fountain Hills School Dist. | (480) 837-0690 | (480) 837-7603 |
| Bill Onea | Arizona Construction Services | (602) 264-4611 | (602) 264-4936 |
| Larry Lambert | Flood Control District | (602) 506-4726 | (602) 506-8561 |
| Jim Leubner | Town of Fountain Hills | (480) 816-5141 | (480) 837-3145 |
| Bob Carlson | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |
| Larry Samples | Hunter Contracting Co. | (602) 757-1835 | (480) 892-4932 |
| Tom Leggat | Hunter Contracting Co. | (602) 757-5499 | (480) 892-4932 |
| Jeff Brown | Hunter Contracting Co. | (480) 892-0521 | (480) 892-4932 |

Meeting Recap:

1. Meeting began at approximately 11:15 with sign in and opening remarks by Shewa, Shewa updated everyone on the progress of the job. We are currently on day 93 of construction, and are 60% complete. This is to say that we are on schedule at this time. Remaining large items to complete are the impervious fill, gabions, and landscaping.
2. Both the Town of Fountain Hills and the Fountain Hills School District expressed their appreciation for the good communication and the shared information. They also stated that there have been no complaints from the residents of Fountain Hills.
3. Shewa opened the floor for additional comments. It was the general consensus of the representing agencies that partnering does work. Mutual appreciation was exchanged by all agencies for their cooperation in allowing this project to run as smoothly as it has.
4. All attendees then participated in a partnering rating summary. The partnering goals that were set at the 1st partnering meeting were evaluated and scored as follows.
   - Schedule – 3 On schedule
   - Safety – 4 Very proactive, no accidents
   - Quality 4 No deficiencies, workmanship exceeding high standards
   - Communication – 3 Know what's going on
   - Traffic Control – 3 Has very few problems
   - Public – 4 No complaints
   - Maintaining Partnering Attitude – 4 We are great partners
   - Have Fun – 3 Most of the time we smile
5. Meeting adjourned at 11:40, all attendees gathered for lunch in the office trailer.

# Golden Eagle Park Dam
# FCD 1999C071
# Partnering Rating Form

Month: AUGUST Name: GODDERTON Organization: _____

## Evaluation Elements and Rating

| | | | | | |
|---|---|---|---|---|---|
| Safety Zero Accidents | Accident occurred Lost time<br>1 | Accident Occurred No lost time<br>2 | No Accident No lost time<br>3 | No Accident Proactive<br>4 | N/A |
| Safe Continuous Traffic flow | Traffic control Problems daily<br>1 | Had a few too many problems<br>2 | Has very few problems<br>3 | No Traffic Problems<br>4 | N/A |
| Sensitive to the Public | Not Sensitive Constant complaints<br>1 | Have to keep reminding each other<br>2 | Proactive with the public<br>3 | Few Complaints<br>4 | N/A |
| Quality of Work | Not Meeting Requirement<br>1 | Some work not acceptable<br>2 | Meets Standards<br>3 | Exceeding Standards<br>4 | N/A |
| Realistic Schedule | Behind Extremely<br>1 | Behind Slightly<br>2 | ON Schedule<br>3 | Ahead of Schedule<br>4 | N/A |
| Communications | Have no idea what's going on<br>1 | After the fact Information<br>2 | Know what's going on<br>3 | Know exactly what's going On<br>4 | N/A |
| Partnering Attitude | We're Talking<br>1 | We use it only if it benefits us<br>2 | We partner most of the time<br>3 | We are great partners<br>4 | N/A |
| Having fun Yet | Not a Chance<br>1 | We're having to work too hard<br>2 | Most of the time we smile<br>3 | I love you man!<br>4 | N/A |
| | | | | | |

***FLOOD CONTROL DISTRICT of Maricopa County***
***2801 West Durango Street***
***Phoenix, Arizona 85009***
***(602) 506-1501 (Office)***
***(602) 506-4601 (Fax)***

TO: Chuck Copperton, Stantec Consulting

FROM: Fritz Huber, Construction Branch Manager

DATE: October 11, 2000

SUBJECT: Golden Eagle Dam Modifications, FCD 1999C071

The monthly partnering meeting for the Golden Eagle Dam Modification project is scheduled for 11:30 a.m. October 17th at the project site. The weekly meeting will be held at 11:00 a..m. Lunch will be provided.

If you need further information please contact, Shewa Shivaswamy, Resident Engineer at 602-506-4726 or 602-980-6063.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## Partnering Meeting

### Golden Eagle Park Dam Modifications

### AGENDA

**Date: Oct. 17th, 2000 at 11:00am**

DAY 134 OF contract
72% complete
4 wks behind
$27 K± CHANGE ORDER

1. Sign In:

2. Introductory Remarks: Shewa

3. General Comments

   - Bob Carlson of Hunter
   - Tom Johnson – FCD
   - Jim Leubner – Town of Fountain Hills
   - Fritz Huber - FCD
   - Jerry Cox – ADWR
   - Tom Renckly - FCD
   - Rich Dobson – Fountain Hills School District
   - Chuck Gopperton – Stantec
   - Open Floor

4. Evaluation of Partnering Goals:

5. Lunch

# Golden Eagle Park Dam
# FCD 1999C071
# Partnering Rating Form

Month: 10/17/00 Name: GOPPERTON Organization: STANTEC

## Evaluation Elements and Rating

| | | | | | |
|---|---|---|---|---|---|
| Safety Zero Accidents | Accident occurred Lost time<br>1 | Accident Occurred No lost time<br>2 | No Accident No lost time<br>3 | No Accident Proactive<br>4 | N/A |
| Safe Continuous Traffic flow | Traffic control Problems daily<br>1 | Had a few too many problems<br>2 | Has very few problems<br>3 | No Traffic Problems<br>4 | N/A |
| Sensitive to the Public | Not Sensitive Constant complaints<br>1 | Have to keep reminding each other<br>2 | Proactive with the public<br>3 | Few Complaints<br>4 | N/A |
| Quality of Work | Not Meeting Requirement<br>1 | Some work not acceptable<br>2 | Meets Standards<br>3 | Exceeding Standards<br>4 | N/A |
| Realistic Schedule | Behind Extremely<br>1 | Behind Slightly<br>2 | ON Schedule<br>3 | Ahead of Schedule<br>4 | N/A |
| Communications | Have no idea what's going on<br>1 | After the fact Information<br>2 | Know what's going on<br>3 3.5 | Know exactly what's going On<br>4 | N/A |
| Partnering Attitude | We're Talking<br>1 | We use it only if it benefits us<br>2 | We partner most of the time<br>3 3.5 | We are great partners<br>4 | N/A |
| Having fun Yet | Not a Chance<br>1 | We're having to work too hard<br>2 | Most of the time we smile<br>3 3.5 | I love you man!<br>4 | N/A |
| | | | | | |

**PARTNERING**

JIM EISENHART

# A Better Way to Survive

What do construction projects have in common with *Survivor*? Like the hit TV show, they can result in self-serving game-playing that results in just one victor, if that.

What's a "game" on a construction project? I've asked this in the more than 500 partnering workshops that I've facilitated in the past 10 years. And I've usually elicited a definition along these lines: "A game is any form of communication on a project in which a stakeholder is not being completely honest or truthful."

Owners, designers and contractors have come up with numerous examples. The classic "change-order/high-low" negotiating game. The "flood-them-with-RFIs" game, for requests for information. The "I didn't-bid-it-that-way" game. The "blame" game. The "just build it per the plans and specs" (and I'll tell you after it's built whether it was done correctly) game. The "case-building" game, usually played by both parties writing numerous letters building their respective legal cases. The "shopping-for-answers" game. The ever-popular "sneak-in-a-substitution" game. And so forth. The record number brainstormed in one of my partnering workshops was 74.

**WASTED TIME** What's the cost of game-playing? It's not just wasted time and energy. Game-playing draws all its participants into an adversarial relationship. If the owner on your project is cutting your change-order estimates in half, then you, the contractor, get smart real fast and inflate your estimate by 50%. How much time is lost to game-playing? I've heard that, on a "game-playing" project, more than half of everyone's time is spent doing something patently unproductive.

But let's face it, we all play games some of the time, if only to get along. As an ostensibly "neutral" partnering facilitator, I sometimes suppress my true feelings for the sake of being "objective." And yes, I may not be above exaggerating my need for receipt of a long-overdue invoice. But what I'm arguing against is "dysfunctional" game-playing.

On construction projects, why do people play games? Most likely, to protect themselves against perceived threats. Once started, game-playing usually becomes transparent. As I heard from Perry H. Petersen, a senior construction manager in the Walnut Creek, Calif., office of Sverdrup Civil Inc., "I usually can tell when someone is playing a game, maybe not always the first time, but certainly by the second or third."

And when you become aware that someone's playing a game with you, you're usually resourceful enough to come up with a reciprocal game to protect yourself. So why even start one? Not infrequently, I run into individuals, and some entire organizations, who steadfastly believe that working on the basis of honesty, openness and mutual respect is unrealistic.

My response? That behaving any other way is naive, as if you can get away with or even win with game-playing. Now don't get me wrong. If your counterpart on a project insists on game-playing, you may have no choice but to come up with a counter ploy, to defend yourself.

How do you stop game-playing on a project? Start by acknowledging that it can and does occur even among good people with good intentions. Once acknowledged, they can agree on its futility, then put their energy into a new "game"—developing specific plans to achieve common goals collaboratively, with open, honest communication.

Take a recent workshop that I facilitated in northern California concerning a new $70-million state facility. The state asked for some change-order work. The contractor responded with a request to charge for extended overhead, and argued that the local labor pool was virtually depleted. The contractor warned that current work on the facility could not be slipped to accommodate the change orders, while still completing the project on time.

Was this a game? It could have been that the contractor was playing a "sand-bagging" game, in which case the owner might have felt obligated to have denied it with predictable consequences. As it was, the issue was raised openly and directly. The owner requested additional information about the affected construction trades, and agreed to consider the contractor's requests for overtime and extended overhead on a case-by-case method. Does open, honest communication always solve the problem? No. But at least it makes the best of the situation and keeps the problem from poisoning the rest of the relationship.

**LOSE-LOSE** About a third of my partnering workshops concern "problem projects" where game-playing is rampant. I simply give the participants a choice: Either continue with the status quo, or everybody "drops their swords" at once and creates a common set of goals. My assumption is that most participants are not only smart enough to recognize that game-playing is a lose-lose proposition but that, even more importantly, very few if any of them enjoy it. Paradoxically, I've learned that the worse the game-playing, the easier it is to create a positive breakthrough. Why? Because it is blatantly obvious to everyone involved that the outcome of the status quo would be a mutual disaster.

So how would I "partner" on *Survivor*? Give everyone a choice: Either play by the show's rules or agree up front as a team to divide the $1 million 16 ways. Then they could avoid all the grief, stress and rat-eating. Of course, partnering would make for pretty boring TV. Maybe that's why I haven't received any calls to facilitate the sequel. But if I could only interest the networks in sponsoring *Survivor* on a construction project.

*Jim Eisenhart is the president of Ventura Consulting Group, a partnering facilitator in Ventura, Calif. He may be e-mailed at jim@venturaconsulting.com.*

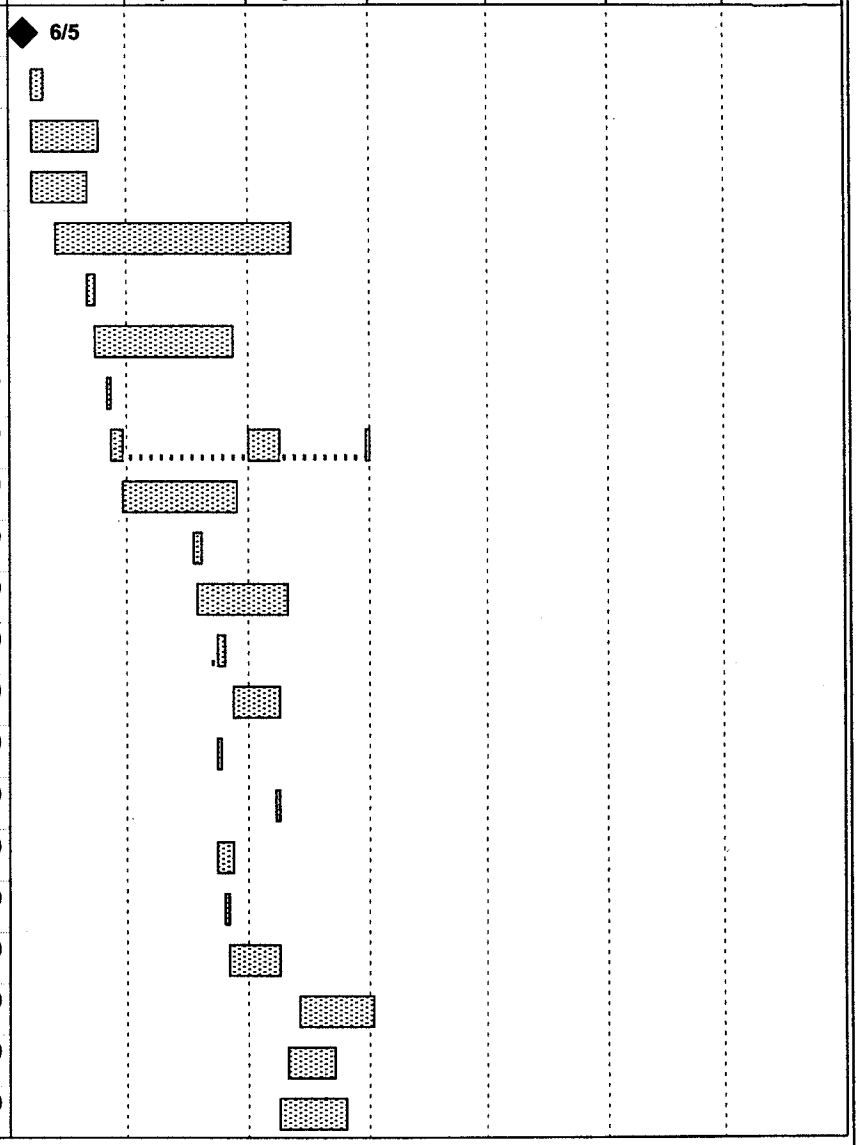
**If you have an idea for a column, please contact Viewpoint editor David B. Rosenbaum at david_rosenbaum@mcgraw-hill.com**

ILLUSTRATION BY NANCY SOULLIARD FOR ENR

Interested in other views? Read other VIEWPOINT columns by clicking opinion at www.enr.com

# CONSTRUCTION SCHEDULES

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | Notice to proceed | 0 days | 6/5/00 | 6/5/00 |
| 2 | Clear, grub and remove existing improvements | 3 days | 6/7/00 | 6/9/00 |
| 3 | Test and approve filter sand | 13 days | 6/7/00 | 6/23/00 |
| 4 | Excavate trench for auxiliary outlet works box culvert | 10 days | 6/7/00 | 6/20/00 |
| 5 | Dewatering | 42 days | 6/13/00 | 8/11/00 |
| 6 | Remove retaining walls in emergency spillway | 2 days | 6/21/00 | 6/22/00 |
| 7 | Construct masonry retaining wall | 23 days | 6/23/00 | 7/27/00 |
| 8 | Inspect subgrade | 1 day | 6/26/00 | 6/26/00 |
| 9 | Construct sand diaphragm | 46 days | 6/27/00 | 8/31/00 |
| 10 | Construct auxiliary outlet works box culvert | 19 days | 6/30/00 | 7/28/00 |
| 11 | Construct dam embankment | 2 days | 7/18/00 | 7/19/00 |
| 12 | Place riprap on upstream toe of dam | 17 days | 7/19/00 | 8/10/00 |
| 13 | Relocate SRP electrical conduits | 2 days | 7/22/00 | 7/25/00 |
| 14 | Construct auxiliary outlet structure | 8 days | 7/28/00 | 8/8/00 |
| 15 | Install 24" casing | 1 day | 7/24/00 | 7/24/00 |
| 16 | Grout 24" casing | 1 day | 8/8/00 | 8/8/00 |
| 17 | Relocate school electrical conduits | 4 days | 7/24/00 | 7/27/00 |
| 18 | Relocate reclaimed waterline | 1 day | 7/26/00 | 7/26/00 |
| 19 | Construct auxiliary inlet structure | 9 days | 7/27/00 | 8/8/00 |
| 20 | Backfill box culvert, construct dam embankment | 15 days | 8/14/00 | 9/1/00 |
| 21 | Install 24" & 60" pipe | 8 days | 8/11/00 | 8/22/00 |
| 22 | Construct principal inlet structure | 13 days | 8/9/00 | 8/25/00 |

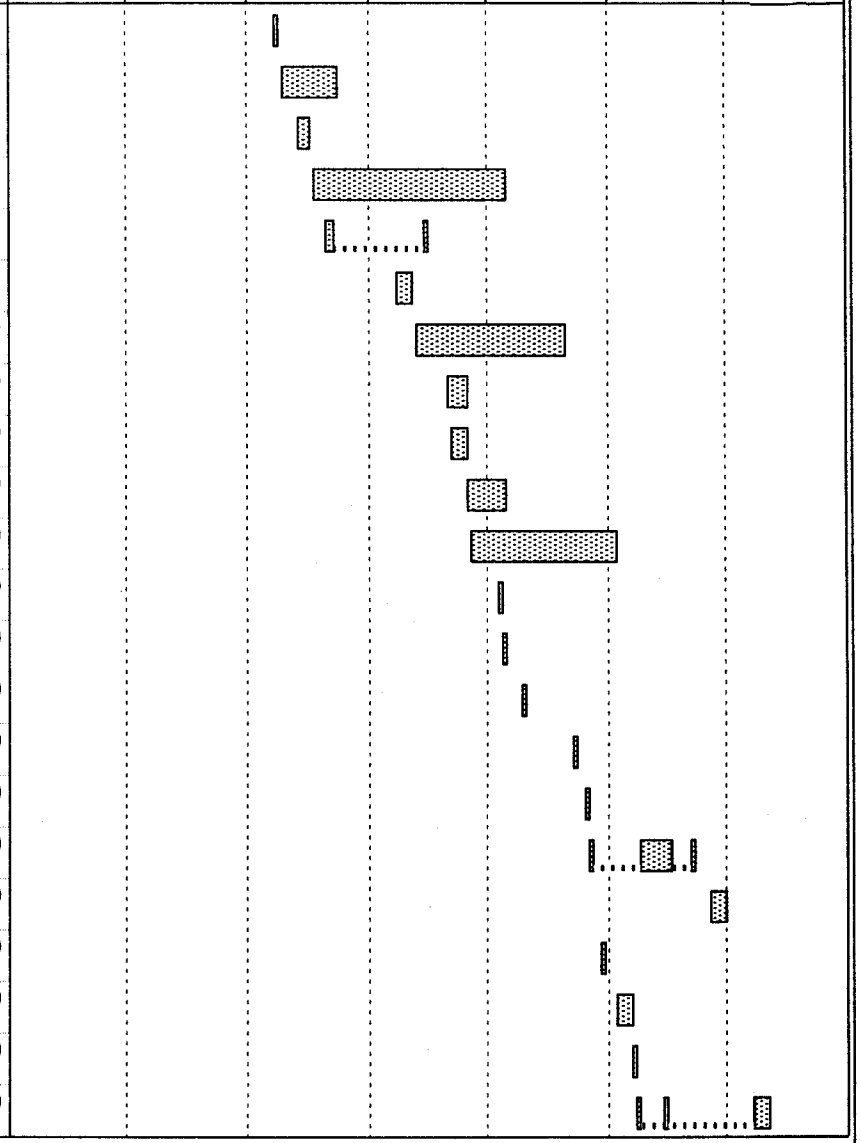



ACTUAL

Project: gep dam const
Date: 1/10/01

| | | | | | |
|---|---|---|---|---|---|
| Task | | Summary | | Rolled Up Progress | |
| Split | | Rolled Up Task | | External Tasks | |
| Progress | | Rolled Up Split | | Project Summary | |
| Milestone | | Rolled Up Milestone | | | |

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 23 | Rain | 1 day | 8/8/00 | 8/8/00 |
| 24 | Place riprap at auxiliary outlet | 10 days | 8/10/00 | 8/23/00 |
| 25 | Excavate for spillway floodwall | 3 days | 8/14/00 | 8/16/00 |
| 26 | Construct spillway floodwall | 34 days | 8/18/00 | 10/5/00 |
| 27 | Excavate spillway | 19 days | 8/21/00 | 9/15/00 |
| 28 | Construct concrete spillway cutoff wall | 2 days | 9/8/00 | 9/11/00 |
| 29 | Test and approve borrow material for dam embankment | 28 days | 9/13/00 | 10/20/00 |
| 30 | Trim dam embankment slopes | 3 days | 9/21/00 | 9/25/00 |
| 31 | Install trashracks | 2 days | 9/22/00 | 9/25/00 |
| 32 | Backfill floodwall | 8 days | 9/26/00 | 10/5/00 |
| 33 | Install gabions on spillway | 27 days | 9/27/00 | 11/2/00 |
| 34 | Rain | 1 day | 10/4/00 | 10/4/00 |
| 35 | Place riprap at toe of spillway | 1 day | 10/5/00 | 10/5/00 |
| 36 | Rain | 1 day | 10/10/00 | 10/10/00 |
| 37 | Rain | 1 day | 10/23/00 | 10/23/00 |
| 38 | Inspect borrow site | 1 day | 10/26/00 | 10/26/00 |
| 39 | Construct dam embankment (import) | 19 days | 10/27/00 | 11/22/00 |
| 40 | Trim dam embankment slopes | 4 days | 11/27/00 | 11/30/00 |
| 41 | Rain | 1 day | 10/30/00 | 10/30/00 |
| 42 | Backfill gabions | 2 days | 11/3/00 | 11/6/00 |
| 43 | Rain | 1 day | 11/7/00 | 11/7/00 |
| 44 | Place gravel mulch | 22 days | 11/8/00 | 12/11/00 |

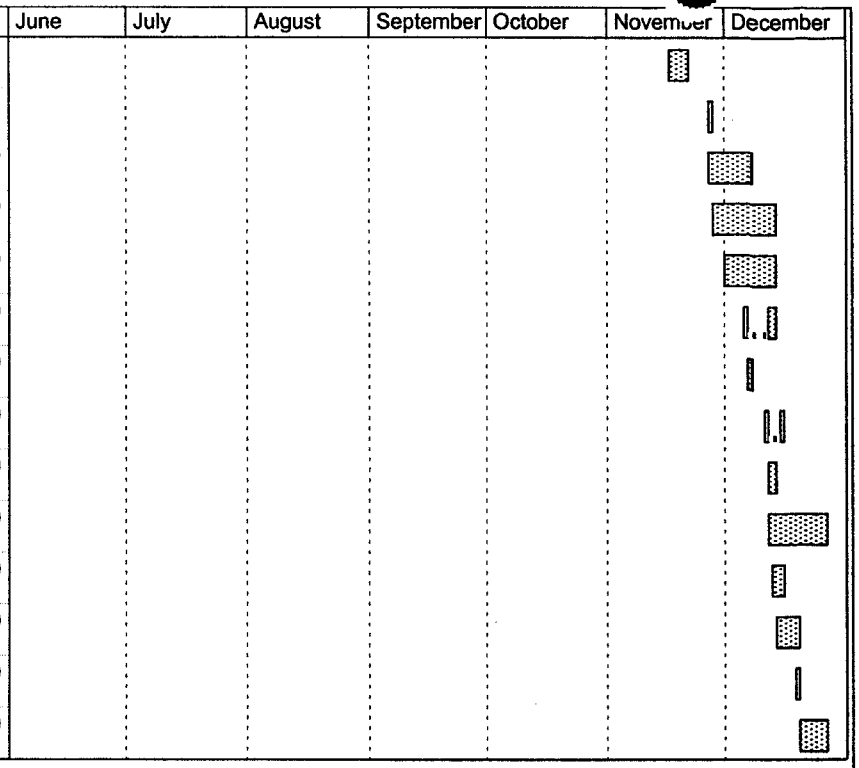



ACTUAL

Project: gep dam const
Date: 1/10/01

| | | | | | |
|---|---|---|---|---|---|
| Task | | Summary | | Rolled Up Progress | |
| Split | | Rolled Up Task | | External Tasks | |
| Progress | | Rolled Up Split | | Project Summary | |
| Milestone | | Rolled Up Milestone | | | |

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 45 | Construct concrete spillway cutoff wall | 3 days | 11/17/00 | 11/21/00 |
| 46 | Construct fuseplug | 1 day | 11/27/00 | 11/27/00 |
| 47 | Install gabions on dam embankment | 9 days | 11/27/00 | 12/7/00 |
| 48 | Install fence | 12 days | 11/28/00 | 12/13/00 |
| 49 | Construct sidewalk | 9 days | 12/1/00 | 12/13/00 |
| 50 | Repair trashrack | 6 days | 12/6/00 | 12/13/00 |
| 51 | Pre-final walkthrough | 1 day | 12/7/00 | 12/7/00 |
| 52 | Hydroseed | 5 days | 12/11/00 | 12/15/00 |
| 53 | Safety railing on sidewalk | 2 days | 12/12/00 | 12/13/00 |
| 54 | Cleanup | 9 days | 12/12/00 | 12/26/00 |
| 55 | Landscaping | 3 days | 12/13/00 | 12/15/00 |
| 56 | Install breakaway fence on outlet structures | 4 days | 12/14/00 | 12/19/00 |
| 57 | Final walkthrough | 1 day | 12/19/00 | 12/19/00 |
| 58 | Remove and replace pavement | 3 days | 12/20/00 | 12/26/00 |




Project: gep dam const
Date: 1/10/01

| | | | | | |
|---|---|---|---|---|---|
| Task | | Summary | | Rolled Up Progress | |
| Split | | Rolled Up Task | | External Tasks | |
| Progress | | Rolled Up Split | | Project Summary | |
| Milestone | | Rolled Up Milestone | | | |

# HUNTER CONTRACTING CO., INC.
## TWO WEEK SCHEDULE

JOB NO.:

See revised schedule

SCHEDULE: #1
FROM: June 5
TO: June 16

PROJECT NAME: Golden Eagle Dam
PROJECT NO.: 00-10

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | June | | | | | | | | | | | | | | |
| | | CAL | | 5 | 6 | 7 | 8 | 9 | | | 12 | 13 | 14 | 15 | 16 | |
| | | WKG | | | | | | | | | | | | | | |
| Clear & Grub | 2-Days upstream 1-Day Downstream | | | | X | X | X | X | | | | | | | | |
| Remove Gunite - Cutoff Wall | To build ramp | | | | X | | | | | | | | | | | |
| Build Diversion Dam | Push off slope with dozer | | | | | X | | | | | | | | | | |
| Load out Brush | | | | | | X | X | X | | | | | | | | |
| Ex to Stockpile | | | | | | | | X | | | X | X | X | X | | |
| Install sand under box | Just send under Box | | | | | | | | | | | | | | X | |
| Install fence | Around Project | | | | | | X | X | | | X | | | | | |
| Set up trailer | Electric & Phone | | | | | | | X | | | X | X | | | | |

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HUNTER CONTRACTING CO., INC.

JOB #: _____

TWO WEEK SCHEDULE

Revised

SCHEDULE: #1
FROM: June 5
TO: June 16

PROJECT NAME: Golden Eagle Dam
PROJECT NO.: 00-10

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | June | | | | | | | | | | | | | |
| | | CAL | | 5 | 6 | 7 | 8 | 9 | | | 12 | 13 | 14 | 15 | 16 | |
| | | WKG | | | | | | | | | | | | | | |
| Clear & Grub | 2-days upstream 1-day Downstream | | | | X | X | X | X | | | | | | | | |
| Remove Granite - Cutoff Wall | To build ramp | | | | X | | | | | | | | | | | |
| Build Diversion Dam | Push off slope with dozer | | | | | X | | | | | | | | | | |
| Load out Brush | | | | | | X | X | X | | | | | | | | |
| Eq to Stockpile | | | | | | | | X | | | | | | | | |
| Install sand under box | Just sand under box | | | | | | | | | | X | X | X | X | | |
| Install fence | Around Project | | | | | | X | X | | | | | | | X | |
| Set up trailer | Electric & Phone | | | | | | | X | | | X | | | | | |
| | | | | | | | | X | | | X | X | | | | |
| Well Drillers | | | X | X | X | X | X | | | | | | | | | |

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June 14 - July 2



**HUNTER CONTRACTING COMPANY**
**GOLDEN EAGLE PARK DAM**

JUNE

| DESCRIPTION | W 14 | T 15 | F 16 | S 17 | S 18 | M 19 | T 20 | W 21 | T 22 | F 23 | S 24 | S 25 | M 26 | T 27 | W 28 | T 29 | F 30 | S 1 | S 2 | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TRAILER ELECTRICAL | | XX | XX | | | XX | | | | | | | | | | | | | | |
| EXCAVATE FOR BOX | XX | XX | XX | | | XX | XX | XX | | | | | | | | | | | | |
| DEWATER | XX | XX | XX | | | XX | XX | XX | XX | XX | | | XX | XX | XX | XX | XX | | | |
| EXCAVATE DIAPHRAM | | | | | | | | XX | XX | | | | | | | | | | | |
| PLACE SAND FILTER | | | | | | | | XX | XX | | | | | | | | | | | |
| FORM/POUR/STRIP BOX | | | | | | | | | | XX | | | XX | XX | XX | XX | XX | | | |
| REMOVE RETAINING WALLS | | | | | | | | | | XX | | | XX | | | | | | | |

**HUNTER CONTRACTING COMPANY**
**GOLDEN EAGLE PARK DAM**

June 19 - July 12

JUNE

| DESCRIPTION | M 19 | T 20 | W 21 | T 22 | F 23 | S 24 | S 25 | M 26 | T 27 | W 28 | T 29 | F 30 | S 1 | S 2 | M 3 | T 4 | W 5 | T 14 | F 15 | S 16 | S 12 | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXCAVATE FOR BOX | XX | XX | XX | XX | | | | | | | | | | | | | | | | | | |
| DEWATER | XX | XX | XX | XX | XX | | | XX | XX | XX | XX | XX | | | | | | | | | | |
| EXCAVATE DIAPHRAM | | | | XX | XX | | | | | | | | | | | | | | | | | |
| PLACE SAND FILTER | | | | XX | XX | | | | | | | | | | | | | | | | | |
| FORM/POUR/STRIP BOX | | | | | | | | XX | XX | XX | XX | XX | | | XX | | XX | XX | XX | | | |
| REMOVE RETAINING WALLS | | XX | | | | | | | | | | | | | | | | | | | | |
| MASONRY RETAINING WALL FTG | | | XX | XX | XX | | | XX | XX | XX | XX | XX | | | XX | | XX | XX | XX | | | |

# HUNTER CONTRACTING CO., INC.
## TWO WEEK SCHEDULE

JOB NO.: 00-10

SCHEDULE: #3
FROM: 6-26-00
TO: 7-8-00

PROJECT NAME: Golden Eagle Park Dam
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | | 26 | 27 | 28 | 29 | 30 | | | 3 | 4th | 5 | 6 | 7 | |
| | | WKG | | | | | | | | | | | | | | |
| Place Steel for Retaining Wall | | | | X | | | | | | | | | | | | |
| Pour Retaining Wall Footing | | | | | | | X | | | | | | | | | |
| Ex Diaphram | If Test Passed | | | | | X | | | | | | | | | | |
| Place Sand Filter | If Test Passed | | | | | | X | X | | | | | | | | |
| Form Box Footing | If Sand is Placed | | | | | | | X | | | X | | | | | |
| Place Box Steel | If Footing is Form | | | | | | | | | | | | X | X | | |
| Pour Box | | | | | | | | | | | | | | | X | |

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Sent By: HUNTER CONTRACTING; 4808924932; Jun-29-00 12:31; Page 3/3

JOB NO.: 00-10

# TWO WEEK SCHEDULE

SCHEDULE: # 4
FROM: July 5-00
TO: July 14-00

PROJECT NAME: Golden Eagle Dam
PROJECT NO.: FCD-1999C071

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | | July - | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
| | | WKG | | | | | | | | | | | | | | |
| Place Rebar / Form Box | | | | | | | | | | | | | | | | |
| Pour Box Slab | | | | | | | | | | | | | | | | |
| Install 24" Pipe | | | | | | | | | | | | | | | | |
| Grout 24" Pipe | | | | | | | | | | | | | | | | |
| Embankment (westside) | | | | | | | | | | | | | | | | |

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JOB NO.: 00-10

# TWO WEEK SCHEDULE

SCHEDULE: # 3
FROM: 7-10-00
TO: 7-21-00

PROJECT NAME: Golden Eagle Park Dam
PROJECT NO.: 1999C071

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | July | CAL | | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | |
| | | WKG | | | | | | | | | | | | | | |
| Form & Grade & Turndown on Outlet Str | | | | | | | | | | | | | | | | |
| Place Re Bar in Outlet | | | | | | | | | | | | | | | | |
| Pour East one-third of Box Floor | | | | | | | | | | | | | | | | |
| Pre fab Box Forms | | | | | | | | | | | | | | | | |
| Pour Outlet Floor and Last Pour on Box Floor | Set up as 2 Pours Outlet & Center floor | | | | | | | | | | | | | | | |
| Start Forms For Box (East end West end) | | | | | | | | | | | | | | | | |
| Place Rebar | | | | | | | | | | | | | | | | |
| Start Embankment | | | | | | | | | | | | | | | | |
| Start Masonary Wall | | | | | | | | | | | | | | | | |

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCEDULE: 1
FROM: 7-17
TO: 7-28

ROJECT NAME: Golden Eagle Dam
ROJECT NO:
DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | | |
| Form Walls / Starting From West | | | | | | | | | | | | | | | | | | | | | |
| Place Rebar Wall + Deck. | | | | | | | | | | | | | | | | | | | | | |
| Pour West end Eastend | | | | | | | | | | | | | | | | | | | | | |
| Form Wing Walls | | | | | | | | | | | | | | | | | | | | | |
| Pour Middle Section + Wing Walls | | | | | | | | | | | | | | | | | | | | | |
| Strip Forms | | | | | | | | | | | | | | | | | | | | | |
| Cure Time Before Backfill | | | | | | | | | | | | | | | | | | | | | |
| Start Backfill / westend | | | | | | | | | | | | | | | | | | | | | |
| Ex Box Inlet Structure | | | | | | | | | | | | | | | | | | | | | |
| Pour Inlet footing | | | | | | | | | | | | | | | | | | | | | |
| Form Inlet | | | | | | | | | | | | | | | | | | | | | |
| Install 24" Pipe + Plugs | | | | | | | | | | | | | | | | | | | | | |
| Grout 24" | | | | | | | | | | | | | | | | | | | | | |
| Embankment west side | | | | | | | | | | | | | | | | | | | | | |
| Masonary Walls | | | | | | | | | | | | | | | | | | | | | |
| Pour Inlet | | | | | | | | | | | | | | | | | | | | | |

Hunter Contracting Co. A CORPORATION

CONTRACTOR'S LICENSE NO.
A-070961
B-067542
B-4-023057

July 19, 2000

Mr. H.N. "Shewa" Shivaswamy, P.E.
Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009

RE: Golden Eagle Park Dam Modification
Flood Control District of Maricopa county 1999C071
**Request For Time Extension to 60 Day Milestone**

Hunter Contracting Co. is concerned that we will not be able to meet the 60 day Contract Milestone. This is largely due to the time involved in the design approval process for the cast in place box, concrete mix designs, control joint design and resulting construction requirements.

The time allowed for the above items could not have been fully anticipated at the preconstruction/partnering meeting when the decision was made to start contract time.

We are requesting a 10 day time extension to the 60 day milestone allow for the additional time associated with the box culvert design approval and added construction requirements. We are not requesting additional compensation for this time extension.

Thank you for your consideration in this matter. Should you have any questions please contact me at (602)-757-1835.

Sincerely,
HUNTER CONTRACTING CO.

Bob Carlson
Project Manager

701 North Cooper Road • Gilbert, Arizona 85233 • (480) 892-0521 • Fax (480) 892-4932
6930 North Camino Martin • Tucson, Arizona 85741 • (520) 744-0722 • Fax (520) 744-0847

*Flood Control District of Maricopa County*
*2801 West Durango Street*
*Phoenix, Arizona 85009-6399*
*(602) 506-1501*
*FAX: (602) 506-4601*
TT: (602) 506-5897

July 21, 2000

**MEMO TO:** Shewa Shivaswamy

**FROM:** Tom Renckly

**SUBJECT:** Golden Eagle Park Dam Modification , Construction Contract FCD 1999C071 – Response to Request from Contractor for Milestone Extension by Letter Dated July 19, 2000

I recommend the following response to the subject letter:

The District has reviewed your request for extension of the 60 day milestone for completing the Auxiliary Outlet Works and box culvert and reconstructing the dam embankment to elevation 1721.5.

For the record in our opinion, the approval process for your request to revise the contract requirements to allow for construction of the outlet works as cast in place was accomplished expeditiously without causing undue delay to your construction operations. We note however that as of this date you have put forth all reasonable efforts in accomplishing this required contract milestone.

The District therefore approves your request to extend the 60 day milestone for constructing the Auxilary Outlet Works box culvert and reconstructing the dam embankment to elevation 1721.5 subject to the following conditions:

1. Revised contract wording in subsection 108.4 (see attached). ***SHEWA I RECOMMEND THAT THIS BE DONE AS A NO COST CHANGE ORDER***

2. The Contractor shall take all reasonable measures to apply resources to complete the work in advance of the extended milestone date.

3. There is no added cost of the contract to the District due to this approval. The District recognizes however it may incur added costs in the event of an inflow "occurrence" (as defined by contract subsections 108.4 and 107.16) during the 10 calendar day time extension.

4. No additional time extension to the milestone shall be allowed.

5. The required completion date for the contract work remains unchanged.

**Contract FCD 1999C071**
**Revision to Supplementary General Conditions:**

Replace Subsection 108.4 with the following:

Subsection 108.4 - Contractor's Construction Schedule: **Replace with the following:**

FCDMC and the Contractor will plan and coordinate the construction activities with the Town and School District to minimize the impact on town and School District activities.

The Contractor shall arrange and schedule all of his work activities in order to accomplish the following:

- Eliminate any delays or hazardous conditions to the public.
- Minimize the amount of interference among the various Subcontractors.
- Perform the work in an orderly manner.
- Complete the work within the specified project duration.

Contractor shall complete the following work within the specified time period as follows:

1. **Construct the Auxiliary Outlet Works box culvert (not inclusive of the inlet and outlet headwalls, aprons and wingwalls)** no later than <u>seventy</u> **(70) calendar days** after the Contract Notice To Proceed date.

2. **Reconstruct the dam embankment to elevation 1721.5** no later than <u>seventy</u> **(70) calendar days** after the Contract Notice To Proceed date.

3. **Complete the masonry wall adjacent to the high school gymnasium** no later than <u>sixty</u> **(60) calendar days** after the Contract Notice To Proceed date.

Completion of Items #1 and #2 within the specified time period is required to reduce the risk of flood damage. Completion of Item #3 within the specified period time is required to avoid interference with high school activities in this area. ***If there are any delays in the completion of Items #1, #2, and #3, or any damages caused by the Contractor's failure to complete Items #1, #2, and #3 within the required time period that result in additional costs to the District, those additional costs will be assessed to the Contractor.***

***In addition,*** the definition for "occurrence" as stated on page 28, number A.2. does not apply if the work items #1 and #2 above are not completed by the Contractor within the required time period. Once the work items #1 and #2 are completed, an "occurrence" as indicated by page 28, number A.2., will apply for the duration of the project.

**Contractor shall submit a proposed work progress schedule to the Engineer for review before starting work. Weekly updates shall be submitted to the Engineer at the weekly coordination meeting.**

Stantech Consulting

Project: _____ Project Number: _____

Notes: _____ Scale: _____

_____ Page ___ of ___ Page(s)

Computed By: _____ Date: _____ Checked By: _____ Date: _____

Delay IN CONSTRUCTION WAS DUE TO:

2 DAYS DUE TO POOR CONCRETE

2 DAYS DUE TO FORMING AND PLACING STEEL FOR WALLS AND DECK

2+ DAYS DUE TO FILTER SAND NOT MEETING SPEC

PER THE CONTRACTOR - PRECAST BOX WOULD HAVE DELAYED THE PROJECT. BOX JOINT DESIGN WOULD HAVE ALSO REQUIRED SUBMITTAL AND APPROVAL

AT LEAST 6+ DAYS DUE TO CONTRACTOR

CONTRACTORS ORIGINAL SCHEDULE CALLED FOR BEGINNING THE BOX ON JUNE 23.

CONTRACTOR DID NOT WORK WEEKENDS - BUT COULD HAVE TO STAY ON TRACK - THIS SHOULD HAVE BEEN ANTICIPATED.

RECOMMEND STRIPPING THE WALL FORMS AND BACKFILLING AT LEAST UP TO THE TOP OF THE BOX ASAP. THIS WOULD ALLOW QUITE A BIT OF FLOW THROUGH THE BOX WITHOUT DAMAGING THE EMBANKMENT. ANYTHING BEYOND THAT IS ~~AND~~ AN INCREMENTAL RISK ANALYSIS BASED ON THE RETURN INTERVAL VS THE POSSIBLE DAMAGE.

ARIZONA

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Voice (602) 438-2200
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NEVADA

1100 Grier Drive
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(702) 361-9050
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950 Industrial Way
Sparks, NV 89431
(702) 358-6931
Fax (702) 358-6954

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCHEDULE:
FROM: July 24
TO: Aug 11

PROJECT NAME: Golden Eagle Dam
PROJECT NO:
DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | |
| Form Wing Walls | | | | | | | | | | | | | | | | | | | | | |
| Pour Center of Box + Wing Walls | | | | | | | | | | | | | | | | | | | | | |
| Cure Time on Box + Wing walls | | | | | | | | | | | | | | | | | | | | | |
| Relocate SRP + School Eletric | | | | | | | | | | | | | | | | | | | | | |
| Reinstall School Eletric | | | | | | | | | | | | | | | | | | | | | |
| Dig Turn Down Footing | | | | | | | | | | | | | | | | | | | | | |
| Pour Turn Down Footing | | | | | | | | | | | | | | | | | | | | | |
| Grade Slope For Rip Rap | | | | | | | | | | | | | | | | | | | | | |
| Place Rip Rap | | | | | | | | | | | | | | | | | | | | | |
| Form Inlet Turn Down Wall | | | | | | | | | | | | | | | | | | | | | |
| Pour Turn Down Wall | | | | | | | | | | | | | | | | | | | | | |
| Backfill Inlet Structure Floor | | | | | | | | | | | | | | | | | | | | | |
| Place Inlet Structure Steel | | | | | | | | | | | | | | | | | | | | | |
| Form Inlet structure | | | | | | | | | | | | | | | | | | | | | |
| Pour Inlet Structure | | | | | | | | | | | | | | | | | | | | | |
| Ex Footing For Flood Wall | | | | | | | | | | | | | | | | | | | | | |

PARTNERING MTG 11 AM

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCEDULE: #
FROM: Jul 31
TO: Aug 18

PROJECT NAME: Golden Eagle Dam

PROJECT NO: DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | |
| Backfill West End of Box | | | | | | | | | | | | | | | | | | | | | |
| Strip Forms | | | | | | | | | | | | | | | | | | | | | |
| Form Inlet Floor | | | | | | | | | | | | | | | | | | | | | |
| Place Inlet Steel | | | | | | | | | | | | | | | | | | | | | |
| Pour Inlet Floor | | | | | | | | | | | | | | | | | | | | | |
| Form Inlet Walls | | | | | | | | | | | | | | | | | | | | | |
| Pour Inlet Walls | | | | | | | | | | | | | | | | | | | | | |
| Ex Slope for Rip Rap | | | | | | | | | | | | | | | delayed | | | | | | |
| Place Fabric | | | | | | | | | | | | | | | delayed | | | | | | |
| Place Rip Rap | | | | | | | | | | | | | | | | | | | | | |
| Backfill Box Install Sand | | | | | | | | | | | | | | | | | | | | | |
| Install 60" & 24" | | | | | | | | | | | | | | | | | | | | | |
| Dig 60" Footing | | | | | | | | | | | | | | | | | | | | | |
| Pour Footing | | | | | | | | | | | | | | | | | | | | | |
| Form 60" Wall | | | | | | | | | | | | | | | | | | | | | |
| Form 60" Collar | | | | | | | | | | | | | | | | | | | | | |
| Set Steel | | | | | | | | | | | | | | | | | | | | | |
| Form Walls | | | | | | | | | | | | | | | | | | | | | |
| Pour Walls | | | | | | | | | | | | | | | | | | | | | |

done by 17th if poss.

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCEDULE: #
FROM: 8
TO: 8-18

PROJECT NAME: Golden Eagle Dam
PROJECT NO:
DATE:

| ACTIVITY DESCRIPTION: | M 7 | T 8 | W 9 | T 10 | F 11 | S 12 | S 13 | M 14 | T 15 | W 16 | T 17 | F 18 | S 19 | S 20 | M 21 | T 22 | W 23 | T 24 | F 25 | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pour Inlet Structure | | | | | | | | | | | | | | | | | | | | | |
| Grout 24" Pipe | | | | | | | | | | | | | | | | | | | | | |
| Backfill Wing Walls | | | | | | | | | | | | | | | | | | | | | |
| Place Rip Rap (up stream side) | | | | | | | | | | | | | | | | | | | | | |
| Ex Footing For 60" Inlet | | | | | | | | | | | | | | | | | | | | | |
| Place Steel - 1st half | | | | | | | | | | | | | | | | | | | | | |
| Pour Inlet Floor + Turn down - 1st half | | | | | | | | | | | | | | | | | | | | | |
| Install 60" + 24" Pipe | | | | | | | | | | | | | | | | | | | | | |
| Ex Floor + Turndown - 2nd half | | | | | | | | | | | | | | | | | | | | | |
| Place Steel - 2nd half | | | | | | | | | | | | | | | | | | | | | |
| Pour Floor + Turndown - 2nd half | | | | | | | | | | | | | | | | | | | | | |
| Form 60" Inlet + Pipe Collar | | | | | | | | | | | | | | | | | | | | | |
| Pour 60" Inlet | | | | | | | | | | | | | | | | | | | | | |
| Backfill Channel Bottom | | | | | | | | | | | | | | | | | | | | | |
| Replace Parks Waterline | | | | | | | | | | | | | | | | | | | | | |
| Backfill Box Inlet + Outlet | | | | | | | | | | | | | | | | | | | | | |
| Backfill Dam + Install Chips + Sandfilter | | | | | | | | | | | | | | | | | | | | | |
| Finish Block walls | | | | | | | | | | | | | | | | | | | | | |
| Paint Block walls | | | | | | | | | | | | | | | | | | | | | |
| Start Ex on Floodwall | | | | | | | | | | | | | | | | | | | | | |

JOB NO. 00 10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCHEDULE:
FROM: May 14
TO:

PROJECT NAME: Golden Eagle Dam

PROJECT NO:

DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | | |
| Pour 2nd Half of 60' Inlet Str (Floor) | | | | | | | | | | | | | | | | | | | | | |
| Form 60" Inlet Str + Pipe Collar | | | | | | | | | | | | | | | | | | | | | |
| Place Steel for 60" Str | | | | | | | | | | | | | | | | | | | | | |
| Pour 60" Inlet Str + Pipe Collar | | | | | | | | | | | | | | | | | | | | | |
| Strip 60" Inlet | | | | | | | | | | | | | | | | | | | | | |
| Set 24" Pipe for Inlet Str. | | | | | | | | | | | | | | | | | | | | | |
| Place Chips and Sand filter | | | | | | | | | | | | | | | | | | | | | |
| Backfill Box Ex | | | | | | | | | | | | | | | | | | | | | |
| Ex For Rip Rap (outlet end) | | | | | | | | | | | | | | | | | | | | | |
| Place Rip Rap (outlet end) | | | | | | | | | | | | | | | | | | | | | |
| Relocate 12" Reclaim Waterline | | | | | | | | | | | | | | | | | | | | | |
| Ex Footing For Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Place Footing Forms + Steel Racks for Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Pour high Footing - Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Form Walls - Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Backfill 60" Inlet Str | | | | | | | | | | | | | | | | | | | | | |
| Repair and Replace 4" Sewer | | | X | X | | | | | | | | | | | | | | | | | |
| Place Embankment (up stream side) | | | | | | | | | | | | | | | | | | | | | |
| Ex for Gabions | | | | | | | | | | | | | | | | | | | | | |
| Pour Floodwall | | | | | | | | | | | | | | | | | | | | | |

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCHEDULE:
FROM: Aug 21
TO:

PROJECT NAME: Golden Eagle Dam
PROJECT NO:
DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| | | | | | | | | | | | | Sept | | | Labor Day | | | | | | |
| Pour 60" Inlet + 60" Pipe Collar | | | | | | | | | | | | | | | | | | | | | |
| Strip 60" Inlet + Pipe | | | | | | | | | | | | | | | | | | | | | |
| Slurry 60" + 24" Pipe | | | | | | | | | | | | | | | | | | | | | |
| Pour High footing on Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Ex Turndown on Low Footing | | | | | | | | | | | | | | | | | | | | | |
| Form footing and place Steel Racks (Low Footing) | | | | | | | | | | | | | | | | | | | | | |
| Place Steal in Low Footing | | | | | | | | | | | | | | | | | | | | | |
| Ex for Gabions | | | | | | | | | | | | | | | | | | | | | |
| Pre Fab Wall forms + Set 1st Pour | | | | | | | | | | | | | | | | | | | | | |
| Pour wall (on high footing) | | | | | | | | | | | | | | | | | | | | | |
| Pour Low Footing | | | | | | | | | | | | | | | | | | | | | |
| Pour walls (on Low footing) | | | | | | | | | | | | | | | | | | | | | |
| Remove Diversion Dam | | | | | | | | | | | | | | | | | | | | | |
| Undercut and Recompact for fill | | | | | | | | | | | | | | | | | | | | | |
| Compact fill for Rip Rap | | | | | | | | | | | | | | | | | | | | | |
| Ex Slopes for Rip Rap | | | | | | | | | | | | | | | | | | | | | |
| Place Rip Rap | | | | | | | | | | | | | | | | | | | | | |
| Place + Compact fill | | | | | | | | | | | | | | | | | | | | | |

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCHEDULE:
FROM: Aug 28
TO: Sept 8

PROJECT NAME: Golden Eagle Dam
PROJECT NO:
DATE:

| ACTIVITY DESCRIPTION: | M 28 | T 29 | W 30 | T 31 | F 1 | S 2 | S 3 | M 4 | T 5 | W 6 | T 7 | F 8 | S 9 | S 10 | M 11 | T 12 | W 13 | T 14 | F 15 | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Finish pouring High Footing | | | | | | | | | | | | | | | | | | | | | |
| Pour 2 wall Sections on Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Place wall Steel (Low Section) | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Screen - impervious | | | | | | | | | | | | | | | | | | | | | |
| Place + Compact Fill (upstream) | | | | | | | | | | | | | | | | | | | | | |
| Place + Compact Core Dirt For Filter | | | | | | | | | | | | | | | | | | | | | |
| Finish Sand Filter | | | | | | | | | | | | | | | | | | | | | |
| Place Core Dirt To Top of existing Dam | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Pre-Cut Sidewalk Grade | | | | | | | | | | | | | | | | | | | | | |
| Place Rip Rap on Slopes For Sidewalk | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Ex Gabion aera To Subgrade | | | | | | | | | | | | | | | | | | | | | |
| Ex Fuse Plug aera | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Install Fence Posts IN Gabion aera | | | | | | | | | | | | | | | | | | | | | |
| GABION START ON 11th | | | | | | | | | | | | | | | | | | | | | |
| ACCESS PROBLEM AT FUSEPLUG | | | | | | | | | | | | | | | | | | | | | |
| 4" SCREEN TO PROCESS | | | | | | | | | | | | | | | | | | | | | |
| IMPERVIOUS MTL | | | | | | | | | | | | | | | | | | | | | |
| 9/6/00 PARTNERING MTG. | | | | | | | | | | | | | | | | | | | | | |

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCHEDULE:
FROM: Sept 11
TO: Sept 29

PROJECT NAME: Golden Eagle Dam
PROJECT NO:
DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | |
| Prefab Wall Forms | | | | | | | | | | | | | | | | | | | | | |
| Set Wall Forms | | | | | | | | | | | | | | | | | | | | | |
| Pour Walls | | | | | | | | | | | | | | | | | | | | | |
| Patch / Clean up | | | | | | | | | | | | | | | | | | | | | |
| Spillway wall Waiting for Liner | | | | Delivery | | | | START | | | | | | | | | | | | | |
| Trash Rack @ Galvanizing | | | | | | | | | | | ? | ? | | | | | | | | | |
| Haul Import | | | | | | | | | | | | | | | | | | | | | |
| Start Gabions | | | | X | X | | | | | | | | | | | | | | | | |

JOB NO. 00-10

# HUNTER CONTRACTING CO.
# TWO WEEK SCHEDULE

SCHEDULE:
FROM: 7-18-00
TO:

PROJECT NAME:
PROJECT NO: DATE:

| ACTIVITY DESCRIPTION: | M 18 | T 19 | W 20 | T 21 | F 22 | S 23 | S 24 | M 25 | T 26 | W 27 | T 28 | F 29 | S 30 | S 1 | M 2 | T 3 | W 4 | T 5 | F 6 | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Slopes (up stream) | | | | | | | | | | | | | | | | | | | | | |
| Haul + Place Dam fill | | | | | | | | | | | | | | | | | | | | | |
| Backfill Flood Wall | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Start Gabions | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Finish Pouring Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Clean up Forms | | | | | | | | | | | | | | | | | | | | | |

**JOB N[redacted]00-10**

# HUNTER CONT[redacted]CTING CO.
# TWO WEEK SCHEDULE

**SCEDULE:** 15[redacted]
**FROM:** 9-2[redacted]
**TO:** 10-13

'ROJECT NAME: Golden Eagle Dam

'ROJECT NO: DATE:

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | |
| Install Gabions STARTED 9/27/00 | | | | | | | | | | | | | | | | | | | | | |
| Backfill Floodwall | | | | | | | | | | | | | | | | | | | | | |
| Place Embankment | | | | | | | | | | | | | | | X | X | X | X | X | | |
| Dig & Pour Spillway | | | | | | | | | | | | | | | | | | | | | |

JOB N 00-16

# TWO WEEK HEDULE

SCHEDULE: 0
FROM: Oct 2
TO: Oct 13

PROJECT NAME: Golden Eagle Dam
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | | | | | | | | | | | | | | |
| | | WKG | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | |
| Install Gabions | | | | | | | | | | | | | | | | |
| Replace Fire Alarm Wire | | | | | | | | | | | | | | | | |
| Cleaning Around Floodwall | | | | | | | | | | | | | | | | |
| Install Trash Racks | | | | | | | | | | | | | | | | |
| Process Import Material | | | | | | | | | | | | | | | | |

WPDOCS\FORMS\TWWEEK.SCH

# TWO WEEK SCHEDULE

9-27

PROJECT NAME: Golden Eagle Dam

PROJECT NO: DATE:

OCT

| ACTIVITY DESCRIPTION: | M | T | W | T | F | S | S | M | T | W | T | F | | M | T | W | T | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9 | 10 | 11 | 12 | 13 | | | 16 | 17 | 18 | 19 | 20 | | | | | | |
| Install Gabions | | | | | | | | | | | | | | | | | | |
| Replace Fire Alarm Line | | | | | | | | | | | | | | | | | | |
| Process Silt With Barrow | | | | | | | | | | | | | | | | | | |

JOB 0010

# TWO WEEK SCHEDULE

SCHEDULE:
FROM: 10-16
TO: 10-27

Oct.

PROJECT NAME: Golden Eagle DAM
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | | WKG | | | | | | | | | | | | | | |
| INSTALL Gabion's | | | | [redacted] | | | | | | | [redacted] | | | | | |
| Process Silt with Borrow | | | | | | | | | | | [redacted] | | | | | |

WPD^^S\FORMS\TWWEEK.SCH

JOB 0010

# TWO WEEK SCHEDULE

SCHEDULE:
FROM: 10-23-00
TO: 11-3-00

PROJECT NAME: Golden Eagle DAM
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | OCT | | | | | | | | Nov | |
| | | CAL | | 23 | 24 | 25 | 26 | 27 | | | 30 | 31 | 1 | 2 | 3 | |
| | | WKG | | | | | | | | | | | | | | |
| INSTALL GABION'S | 10-23-00 RAIN DAY | | | R | X | X | X | X | | | X | X | | | | |
| HAUL BORROW TO DAM | SILT | | | | | | | X | | | X | X | X | X | X | |
| Survey | | | | | | | X | | | | | | | | | |

WPD~~SVFORMS\TWWEEK.SCH

JOB NO.: 0010

# TWO WEEK SCHEDULE

SCHEDULE:
FROM: 10-30-00
TO: 11-10-00

PROJECT NAME: Golden Eagle DAM
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Oct | | | | | | NOV. | | | | | | |
| | | CAL | | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| | | WKG | | | | | | | | | | | | | | |
| INSTALL GABION'S done | | | | X | X | X | X | – | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| HAUL BORROW TO DAM | R-Rain OR TO Wet & Muddy To | | | R | R | R | R | R | | | X | X | X | X | X | |
| muddy | WORK ON safely | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 6" fill OVER GABION'S | | | | | | | | X | | | X | | | | | |
| Need FINAL INSPECTION FROM HDWR | | | | | | | | | | | | | | | | |

WPDOCS\FORMS\TWWEEK.SCH

WINNER CONTRACTING CO., INC.

# TWO WEEK SCHEDULE

JOB NO.: 00-10

SCHEDULE:
FROM: 11-6-00
TO: 11-17-00

PROJECT NAME: Golden Eagle Dam
PROJECT NO.:

NOV.

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | |
| | | WKG | | | | | | | | | | | | | | |
| Haul Borrow to Dam | R-Rain or To Wet & Muddy To Work on Safely | | | - | R | R | X | X | | | X | X | X | X | X | |
| 6" Fill over Gabion | | | | X | R | X | | | | | | | | | | |
| Rock Mulch Deliver & Spread | | | | | R | X | X | | | | | | | | | |

WPDOCS\FORMS\TWWEEK.SCH

JOB N[redacted] 00-10

# TWO WEEK [redacted]CHEDULE

SCHEDULE: [redacted]
FROM: 11-13-00
TO: 11-24-00

PROJECT NAME: Golden Eagle Dam
PROJECT NO.:

Nov:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | [redacted] | 24 | 25 |
| | | WKG | | | | | | | | | | | | | | |
| Haul Borrow to Dam & Grade | 11-23 & 11-24 off Thanksgiving Holiday | | | X | X | X | X | X | | | X | X | X | | | |
| Rock Mulch Spread | | | | | | X | X | X | | | | | | | | |
| Excavate for cut off wall | | | | | | | X | X | | | X | X | | | | |
| Fence | START 11-20-00 | | | | | | | | | | X | X | X | | | |
| Paint Test Panel | | | | X | | | | | | | | | | | | |

WPD[redacted]S\FORMS\TWWEEK.SCH

JOB #: 00-10

TWO WEEK SCHEDULE

SCHEDULE
FROM: 11-20
TO: 12-1-00

PROJECT NAME: Golden-Eagle DAM
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | NOV. | | | | | | | | | | | | DEC |
| | | CAL | | 20 | 21 | 22 | 23 | 24 | | | 27 | 28 | 29 | 30 | 1 | |
| | | WKG | | | | | | | | | | | | | | |
| HAUL BORROW TO DAM & PROCESS | Thanksgiving Holiday 11-23-00 | | | X | X | X | | | | | X | X | X | X | X | |
| SILT GRADE | 11-24-00 4 day weekend | | | | | | | | | | | | | | | |
| Cut off WALL Form & Pour | | | | X | X | X | | | | | | | | | | |
| & STRUT | | | | | | | | | | | | | | | | |
| GRADE for LANDSCAPER | | | | X | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| FENCE | START 11-21-00 | | | — | X | X | | | | | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | |
| LANDSCAPER | TREE'S IRRIGATION | | | — | — | | | | | | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | |
| GABION'S | | | | | | | | | | | — | — | X | X | X | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

WPD^^S\FORMS\TWWEEK.SCH

JOB #: 00-10

# TWO WEEK SCHEDULE

SCHEDULE:
FROM: 11-27-00
TO: 12-8-00

PROJECT NAME: Golden Eagle Dam
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Nov | | | | | | | Dec | | | | | |
| | | CAL | | 27 | 28 | 29 | 30 | 1 | | | 4 | 5 | 6 | 7 | 8 | |
| | | WKG | | | | | | | | | | | | | | |
| Finish slopes + Top Dam + Cut | GRADALL TRIM TO SLOPES | | | X | X | X | X | X | | | | | | | | |
| grade for gabions | | | | | | | | | | | | | | | | |
| Place fuse plug partial | | | | X | X | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Landscape | Trees, irrigation | | | | | X | X | X | | | X | | | | | |
| | | | | | | | | | | | | | | | | |
| Fence | | | | X | X | X | X | X | | | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | |
| gabions Finish by Tues. or Wed. | Start 11-30-00 | | | | | X | X | X | | | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | |
| Painter | Complete 11-28-00 | | | X | X | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Misc grading sidewalk, Landscape clean-up | | | | | | | | | | | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Survey Set grade Top of Dam | BLUE TOPS | | | | | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

WPD~~S\FORMS\TWWEEK.SCH

JOB N[illegible] 00-10

# TWO WEEK[illegible]CHEDULE

SCHEDULE:
FROM: 12-4-00
TO: 12-15-00

Dec.

PROJECT NAME: Golden Eagle Dam
PROJECT NO.:

| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | | WKG | | | | | | | | | | | | | | |
| Finish slope's on Dam | | | | X | | | | | | | | | | | | |
| Sidewalk power step's & removal's | | | | X | X | | | | | | | X | X | X | X | |
| Curb | | | | | | | | | | | | | | | | |
| Misc grading - clean-up | | | | | X | X | X | X | | | X | X | X | X | X | |
| Fence - break away gates, handrail | | | | X | X | X | X | X | | | X | X | X | X | X | |
| Gabion's | | | | X | X | X | X | | | | | | | | | |
| Backfill Gabion's & place | | | | | | X | X | X | | | X | X | | | | |
| fuse plug & Rock mulch | | | | | | | | | | | | | | | | |
| Landscape | | | | | | | | | | | X | X | X | X | X | |
| Remove Temporary Fence | | | | | | | | | | | | | X | | | |

WPD~~S\FORMS\TWWEEK.SCH

JOB 00-10

# TWO WEEK SCHEDULE

SCHEDULE:
FROM: 12-11-00
TO: 12-22-00

PROJECT NAME: Golden Eagle Dam
PROJECT NO.:

Dec

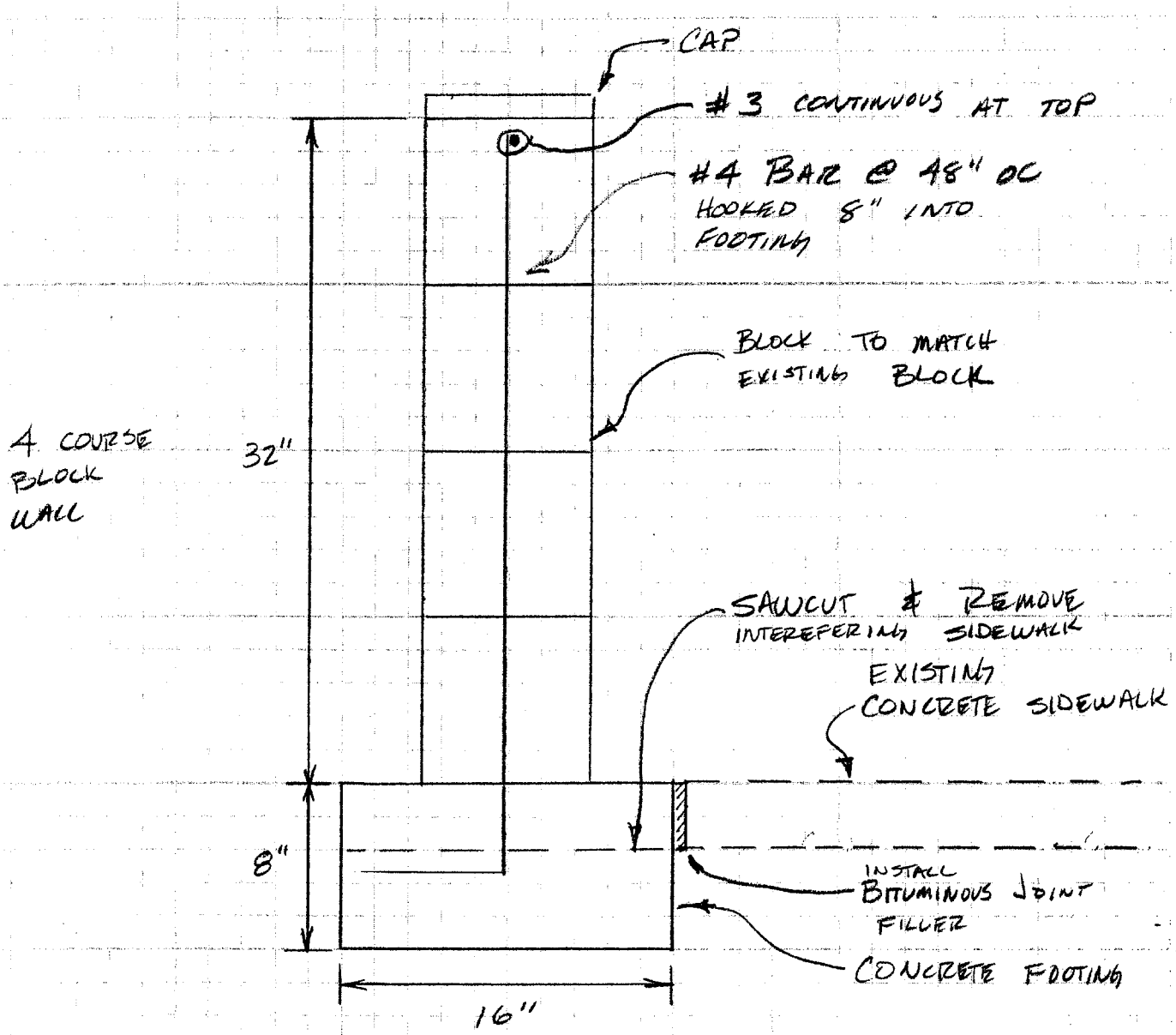
| ACTIVITY DESCRIPTION | REMARKS | DAY | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CAL | 10 | 11 | 12 | 13 | 14 | 15 | | | 18 | 19 | 20 | 21 | 22 | |
| | | WKG | | | | | | | | | | | | | | |
| Seed Slope's Dam + chanel | Seed Dam 12-11-00 | | | X | | | | X | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Pour Sidewalk + curb | | | | | | X | X | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Fence | | | | X | X | X | X | X | | | X | | | | | |
| | | | | | | | | | | | | | | | | |
| Place Rock Mulch | | | | X | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Landscape | | | | X | X | X | X | X | | | X | | | | | |
| | | | | | | | | | | | | | | | | |
| Remove Temporary Fence | | | | | | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Clean-up | Repair Masonary<br>Repair T. Rack | | | | X | X | X | X | | | X | X | | | | |
| | | | | | | | | | | | | | | | | |
| Final | | | | | | | | | | | | X | | | | |
| | | | | | | | | | | | | | | | | |
| Repair A.C. Parking Lot | | | | | | | | X | | | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | |

WPD~~S\FORMS\TWWEEK.SCH

# 0THER CHANGES AND REQUESTS FOR INFORMATION DURING CONSTRUCTION

Stantec

| | |
|---|---|
| Project: Golden Eagle Park Dam | Project Number: 82000157 |
| Notes: DETAILS FOR BLOCK WALL AT GYMNASIUM | Scale: 1 1/2" = 1'-0" |
| | Page 1 of 1 Page(s) |
| Computed By: [illegible] Date: 6/5/00 | Checked By: Date: |

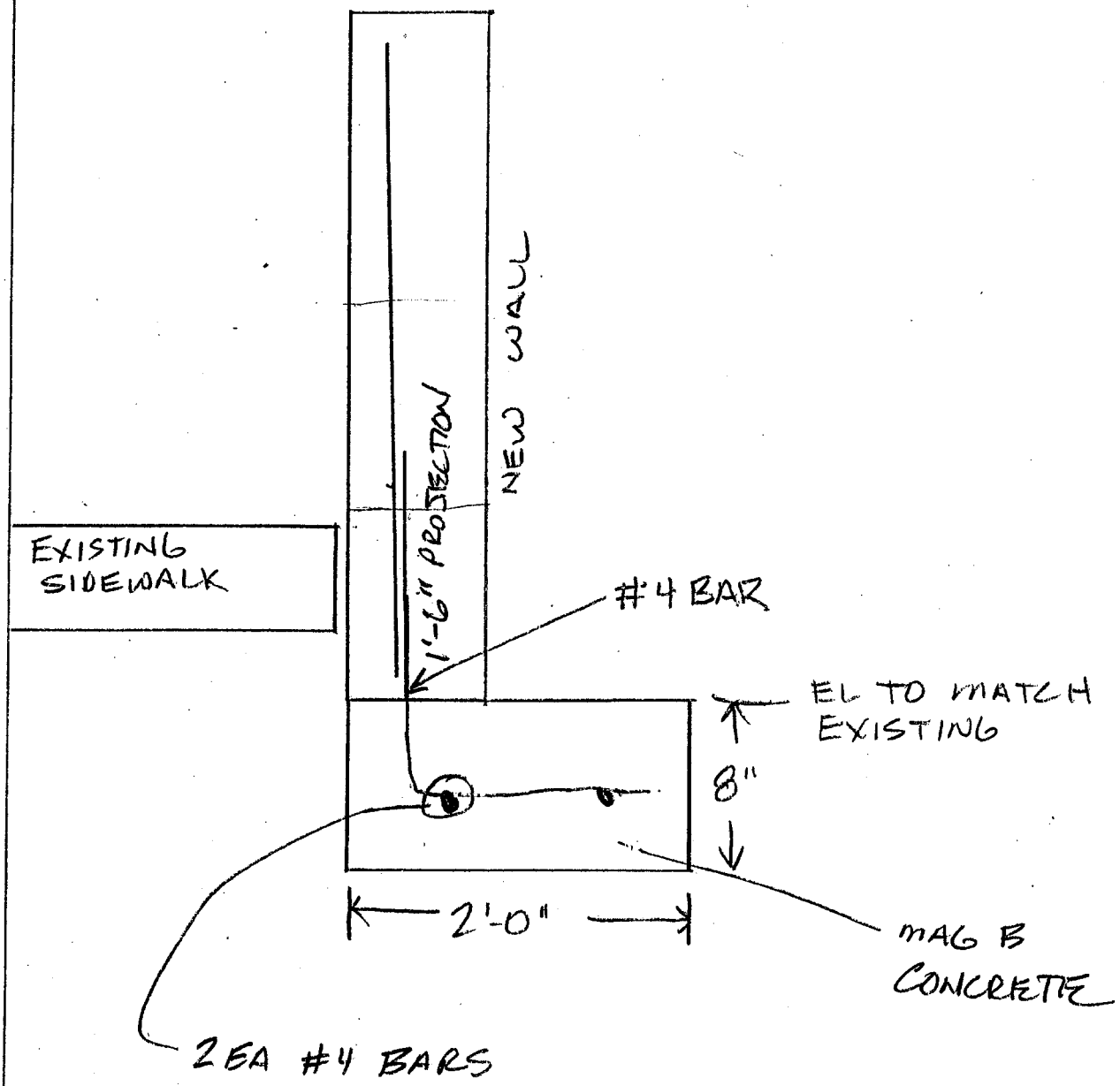



NOTES:
1. FILL ALL CELLS WITH GROUT
2. #3 BAR AT TOP BOND, MAY BE SUBSTITUTED BY CONTINUOUS #9 JOINT REINFORCEMENT
3. FOOTING SHALL BE CLASS A CONCRETE PER SECTION 505 AND SHALL BE POURED AGAINST UNDISTURBED EARTH

DETAIL 5

BLOCK WALL DETAIL

Proposed by Contractor




PROPOSED WALL FOOTING FOR
4 COURSE WALL W/ FOOTING

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone 602-417-2445
Fax 602-417-2423

June 13, 2000

**JANE DEE HULL**
**Governor**

**RITA PEARSON MAGUIRE**
**Director**

Mr. Charles V. Gopperton, P.E.
Project Engineer
Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355

**Subject: Golden Eagle Park Dam (07.33)**
**Application for Alteration**

Dear Mr. Gopperton:

Our letter to you , dated May 3, 2000, approving the application to alter Golden Eagle Park Dam listed several conditions of approval. Conditions Nos. 3 and 4 required the revision and resubmittal of Drawing Nos. D4, D6 and D9. Condition No. 5 required the revision and resubmittal of the Construction Quality Assurance Plan. These revised documents were recently submitted for our review. Specifically, they are:

1. Construction Drawing D4: *Auxiliary Outlet Works Inlet Structure – Structural Details*; Revised 6/5/00 (six copies received by ADWR on 6/7/00).

2. Construction Drawing D6: *Auxiliary Outlet Works Outlet Structural – Structural Details*; Revised 6/5/00 (six copies received by ADWR on 6/7/00).

3. Construction Drawing D9: *Principal Outlet Works Inlet Structure – Structural Details*; Revised 6/5/00 (six copies received by ADWR on 6/7/00).

4. CQA Plan: *Construction Quality Assurance Plan for Contract FCD 1999C071, Golden Eagle Park Dam Modifications, Fountain Hills, Arizona*; dated May 2000 (one copy received by ADWR on 5/2/00 and one copy on 5/22/00).

We have completed our review of these documents and they are satisfactory. Six full sets of Construction Drawings, including revised Drawings D4, D6 and D9, have been stamped with ADWR's approval stamp. Six copies of the Construction Specifications with Addenda Nos. 1, 2 and 3, and two copies of the CQA Plan have also been approved and stamped. Two sets of approved Construction drawings, two copies of approved Construction Specifications with Addenda and one copy of the CQA Plan have been retained for ADWR use. Three sets of approved Construction Drawings, three copies of approved Construction Specifications with Addenda and one copy of the approved CQA Plan have been transmitted to the Flood Control District of Maricopa County. One set of approved Construction Drawings and one copy of the approved Construction Specifications with Addenda has been transmitted to Stantec under separate cover.

If you have any questions regarding this approval please contact Gerald Cox at (602)-417-2445.

Sincerely,

Jon M. Benoist, P.E.
Supervisor
Dam Safety Section

cc: Tom Ward, Town of Fountain Hills
Tom Renckly, FCDMC
Shewa Shivaswamy,

COPY

23 June, 2000

File: 82000157

Arizona Department of Water Resources
Dam Safety Section
500 North 3rd St
Phoenix, AZ 85004-3093

**Attention:** **Jon Benoist, PE**

**Reference:** **GOLDEN EAGLE PARK DAM (07.33)**

Section B-C6 on drawing D1 requires that the filter sand for the sand diaphragm be compacted to 95% of the Standard Proctor Density (SPD). According to USACOE, EM 1110-2-1911, Construction Control for Earth and Rock Fill Dams, "standard impact compaction tests on such materials do not yield well-defined values of optimum water content and maximum dry density, and field densities are related to maximum and minum density determinations made according to the relative density procedures ... rather than to maximum dry density as determined in the standard compaction test". It is recommended that the following test methods be used to determine maximum and minimum densities to be used in determining the field relative density:

D4253-93(1996) Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table

D4254-91(1996) Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density

Recommended relative density of the compacted sand diaphragm material is 70% as recommended by USBUREC, Design of Small Dams.

I am requesting your approval of this proposed change to the required compaction and compaction testing of the sand diaphragm.

**Reference: Golden Eagle Park Dam**

Sincerely,

STANTEC CONSULTING INC.

---

Chuck Gopperton, PE
Project Engineer

c. Tom Renckly, Shewa Shivaswamy – FCDMC
Jerry Cox, ADWR

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# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

| | | | |
|---|---|---|---|
| To: | SHEWA SHIVASWAMY | Sender: | Chuck Gopperton |
| Attention: | FCDMC | Tel. No: | 438-2200 |
| Fax No: | 506-8561 | Fax No: | 431-9562 |
| Date: | 6/20/00 | page(s) total includes cover sheet | |
| File: | 82000157 | Original will **NOT** follow by mail. | |

THE CONTENT OF THIS FAX IS CONFIDENTIAL. IF THE READER IS NOT THE INTENDED RECIPIENT OR ITS AGENT, BE ADVISED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THE CONTENT OR OF THIS FAX IS PROHIBITED. IF YOU HAVE RECEIVED THIS FAX IN ERROR, PLEASE NOTIFY US IMMEDIATELY AND RETURN THE ORIGINAL FAX TO US BY MAIL AT OUR EXPENSE. THANK YOU.

**Reference:** Golden Eagle Park Dam

Attachments: Staking data requested by Contractor

Message:

cc: Ron Vogel, (480) 396-0570

Stantec

Project: Golden Eagle Park Dam Project Number: 82000157

Notes: STAKING DATA REQUESTED BY CONTRACTOR Scale:

Page 1 of 1 Page(s)

Computed By: [illegible] Date: 6/20/00 Checked By: Date:

END OF MASONRY WALL AT STA 9+20
BEARING IS S 67° 16' 30" E

FINISHED GRADE IN CLOUDBURST WASH, UPSTREAM TOE OF DAM

| STA | FG | STA | FG |
|---|---|---|---|
| 2+50 | 1697.52 | 6+25 | 1702.92 |
| 2+75 | 1697.88 | 6+50 | 1703.28 |
| 3+00 | 1698.24 | 6+75 | 1703.64 |
| 3+25 | 1698.60 | 7+00 | 1704.00 |
| 3+50 | 1698.96 | | |
| 3+75 | 1699.32 | | |
| 4+00 | 1699.68 | | |
| 4+25 | 1700.04 | | |
| 4+50 | 1700.40 | | |
| 4+75 | 1700.76 | | |
| 5+00 | 1701.12 | | |
| 5+25 | 1701.48 | | |
| 5+50 | 1701.84 | | |
| 5+75 | 1702.20 | | |
| 6+00 | 1702.56 | | |

1.44% SLOPE

2:1 CUT TO EXISTING (TYPICAL)

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
500 North Third Street, Phoenix, Arizona 85004
Telephone 602-417-2445
Fax 602-417-2423

**JANE DEE HULL**
*Governor*

**RITA PEARSON MAGUIRE**
**Director**

June 26, 2000

Mr. Charles Gopperton, P.E.
Project Engineer
Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355

Subject: Golden Eagle Park Dam (07.33)
Proposed Change to Filter Sand Compaction Requirements

Dear Mr. Gopperton:

We have reviewed your letter dated June 23, 2000, which we received by FAX on that date, concerning a proposed change to the compaction specifications of the sand filter diaphragm and drainage blanket. We understand you propose to compact and test the filter sand to 70% relative density using standard test methods ASTM D4253 –93 (1996) and ASTM D4254 – 91 (1996).

Your proposed change to the required compaction and compaction testing specifications of the filter sand is acceptable to ADWR. This change should also be noted in the Construction Quality Assurance Plan that was approved by ADWR.

Sincerely,

Jon M. Benoist, P.E.
Supervisor
Dam Safety Section

c: Tom Renckly, FCDMC
Shewa Shivaswamy, FCDMC

| Post-it® Fax Note 7671 | Date | # of pages ▶ 1 |
|---|---|---|
| To SHEWA | From Chuck Gopperton | |
| Co./Dept. FCD | Co. STANTEC | |
| Phone # 480 836 4529 | Phone # | |
| Fax # 480 836 4530 | Fax # | |

**Stantec Consulting Inc.**
8211 South 48th Street
Phoenix AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

**Stantec**

26 June, 2000

File: 82000157

Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009-6399

**Attention:** **Tom Johnson, PE**

**Reference:** **GOLDEN EAGLE PARK DAM**

I have reviewed the testing of samples of existing pervious and impervious materials excavated from the dam. These materials are currently stockpiled onsite. ASTM C136/C117 sieve analysis was run on 4 samples of the existing core zone material and 2 samples of the shell material.

Gradations of the stockpiled shell zone material meet the required gradation limits specified. Based on these two tests, the material is acceptable for use as pervious backfill and fill in the dam. However, additional gradation and PI tests must be conducted (see Table 2 of the CQA Plan). PI must not exceed 10 for the pervious material.

Gradations of samples A and B of the stockpiled core zone material meet the specification requirements for % passing the #4 screen and are equal to the lower limit for % passing the #200 screen. The maximum size requirement of 3" is exceeded. The PI is measured at 9 which meets the specifications. Gradation for only one sample out of four meet all specification requirements. Based on the plots of the grain size distribution for the samples taken so far, the material either just meets the specification or falls outside of the required specification limits and is marginal at best. If this material is to be reused as fill in the dam, it is recommended that additional samples be tested (see Table 2 of the CQA plan) to verify that all material placed meets the specified gradation. Samples should be taken for every 1,000 cubic yards placed in the embankment, and should be analyzed and approved <u>prior</u> to placement in the embankment. Also, between 5% and 10% of the material in samples A and B is oversize and should be screened or raked out as the lifts are placed to limit the maximum size to 3".

Buildings
Environment
Industrial
Management Systems
Transportation
Urban Land

Sample E was taken from the trench dug for the sand diaphragm. This material is poorly graded, and is too coarse to meet the specifications. It is not acceptable for reuse in the impervious zone. A calculation to verify that the proposed filter sand is a filter match to

**Reference: Golden Eagle Park Dam**

this material must be provided. Per the CQA Plan - Table 2, one additional sample of existing Zone 1 material from the area adjacent to the sand diaphragm is required to be tested for gradation and verified for a correct filter match.

Pervious fill placed within 3 feet on top of the sand filter blanket drain shall conform to the requirements of Pervious Fill but with the additional requirement that the Coefficient of Uniformity (Cu) be no greater than 6. The samples from the stockpile do not meet this requirement. It is likely that this material will not be found on site, and will have to be processed and imported. This is a total of approximately 280 Cu Yd of uniform pervious fill.

Additional samples of the existing Zone 2 material in the box culvert trench are to be sampled where they are adjacent to the filter drainage layer. One sample is to be taken for every 500 square feet of surface area adjacent to the filter. This will require samples to be taken from the sidewalls and bottom of the box culvert trench, downstream of the sand diaphragm trench. The total area is approximately 2,000 Sq Ft and will require 4 samples.

Sincerely,

STANTEC CONSULTING INC.

Chuck Gopperton, PE
Project Engineer

c. Tom Renckly – FCDMC
Shewa Shivaswamy – FCDMC
Jerry Cox - ADWR

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Stantec Consulting Inc.
8211 South 48th Street
Phoenix AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
www.stantec.com

COPY

Stantec

28 June, 2000

File: 82000157

Arizona Department of Water Resources
Dam Safety Section
500 North 3rd St
Phoenix, AZ 85004-3093

**Attention: Jon Benoist, PE**

**Reference: GOLDEN EAGLE PARK DAM (07.33)**

I have reviewed the testing and analysis for pre-qualification of the sand proposed to be used in the sand filter diaphragm and blanket drain. The material was sampled and the gradation meets the specifications. The permeability of the material was tested using ASTM D2434 and found to have an average permeability of k = 0.086 cm/sec. This meets the minimum specified requirement of k = 0.0125 cm/sec. Samples of the existing zone 1 material within the trench were also sampled for conformance with the specifications. One sample of existing core material obtained from the bottom of the sand diaphragm trench was shown to be outside of the specified gradation limits. An analysis of the filter match against this existing core zone material indicates that it will not be detrimental to the functioning of the sand diaphragm.

I recommend that the proposed sand be approved for construction of the filter diaphragm and blanket drain. I have attached copies of the test reports, plots of the gradation and analysis of the filter match to the existing core material to this memorandum.

Buildings

Environment

Industrial

Management Systems

Transportation

Urban Land

**Reference: Golden Eagle Park Dam**

Sincerely,

STANTEC CONSULTING INC.

---

Chuck Gopperton, PE
Project Engineer

c. Tom Renckly – FCDMC
Shewa Shivaswamy – FCDMC
Jerry Cox - ADWR

Attachments:

- Test reports for sieve analysis, compaction and hydraulic conductivity - AGRA
- Analysis of sand filter match against core zone - AGRA

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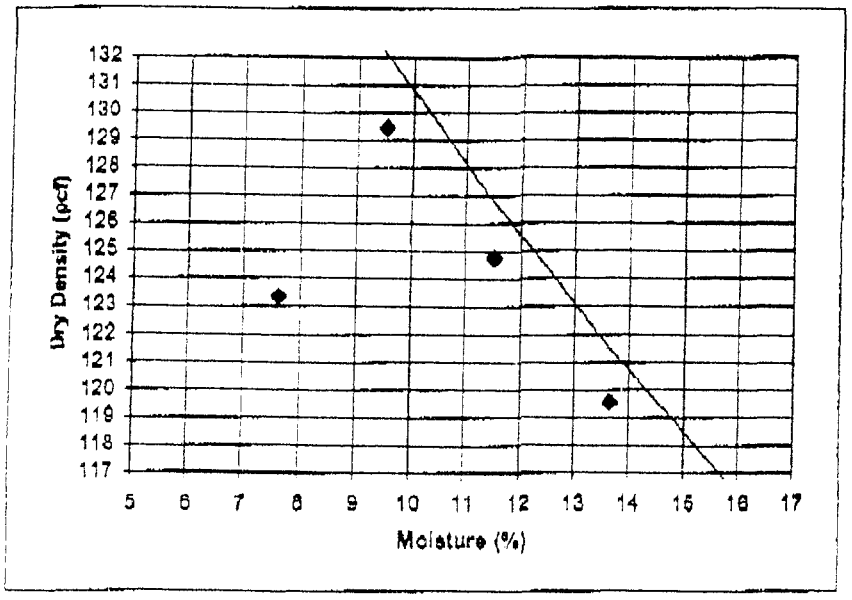
# AGRA Earth & Environmental, Inc.

| | | | |
|---|---|---|---|
| PROJECT: | GOLDEN EAGLE PARK DAM | JOB NO: | 0-119-000113 |
| LOCATION: | PALISADES & FOUNTAIN HILLS H.S. | WORK ORDER NO: | 11 |
| MATERIAL: | IMPERVIOUS FILL-SAMPLE E | LAB NO: | 14 |
| SAMPLE SOURCE: | ON SITE | SAMPLE DATE: | 8/19/00 |

**LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING STANDARD EFFORTS (12,400ft-lb-ft/cu.ft) (ASTMD698A)**
**SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)**
**LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ASTM D4318)**

| CURVE: | K |
|---|---|
| MAXIMUM DRY DENSITY (pcf): | 129.5 |
| OPTIMUM MOISTURE (%): | 9.5 |




| SIEVE SIZE | PERCENT PASSING | |
|---|---|---|
| 6" | 100 | |
| 4" | 100 | |
| 3" | 100 | -- 100 |
| 2" | 99 | |
| 1 1/2" | 98 | |
| 1 1/4" | 98 | |
| 1" | 97 | |
| 3/4" | 96 | |
| 1/2" | 94 | |
| 3/8" | 92 | |
| 1/4" | 87 | |
| #4 | 46 | 60-100 |
| #8 | 37 | |
| #10 | 34 | |
| #16 | 28 | |
| #30 | 23 | |
| #40 | 20 | |
| #50 | 19 | |
| #100 | 15 | |
| #200 | 12 | 15-60 |
| LL: | 22 | |
| PL: | 13 | |
| PI: | 9 | |
| USCS: | GC | |

NOTE: THE ZERO AIR VOIDS CURVE REPRESENTS A SPECIFIC GRAVITY OF: 2.651 ASSUMED.

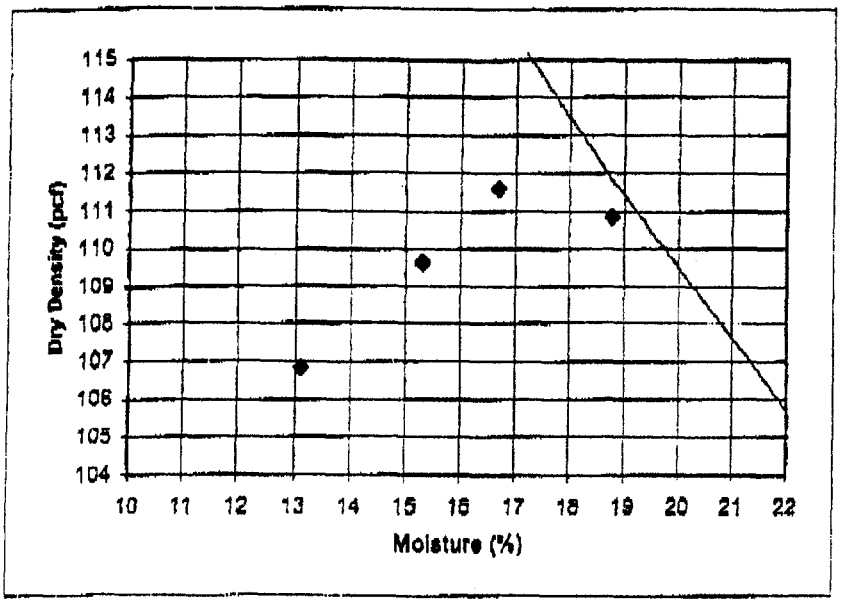
THIS IS A SUMMARIZED REPORT OF THE REFERENCED PROCEDURES AND DOES NOT INCLUDE ALL REPORTING REQUIREMENTS. ADDITIONAL DATA CAN BE PROVIDED AT CLIENT'S REQUEST.

* FROM EXCAVATED DEPTH BOTTOM of DIAPHRAGM - 5' BELOW S.G. LEVEL APPR. STA 2+95 ± - ZONE I EXISTING MATERIAL

| | | | |
|---|---|---|---|
| PROJECT: | GOLDEN EAGLE PARK DAM | JOB NO: | 0-119-000113 |
| LOCATION: | PALISADES & FOUNTAIN HILLS H.S. | WORK ORDER NO: | 10 |
| MATERIAL: | FILTER SAND | LAB NO: | 13 |
| SAMPLE SOURCE: | SALT RIVER SAND & ROCK | SAMPLE DATE: | 6/19/00 |

**LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING STANDARD EFFORTS (12,400ft-lb-ft/cu.ft) (ASTMD698A)**
**SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)**
**LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ASTM D4318)**

| | |
|---|---|
| CURVE: | J |
| MAXIMUM DRY DENSITY (pcf): | 111.6 |
| OPTIMUM MOISTURE (%): | 16.7 |




| SIEVE SIZE | PERCENT PASSING |
|---|---|
| 6" | 100 |
| 4" | 100 |
| 3" | 100 |
| 2" | 100 |
| 1 1/2" | 100 |
| 1 1/4" | 100 |
| 1" | 100 |
| 3/4" | 100 |
| 1/2" | 100 |
| 3/8" | 100 |
| 1/4" | 100 |
| #4 | 99 |
| #8 | 87 |
| #10 | 81 |
| #16 | 62 |
| #30 | 37 |
| #40 | 23 |
| #50 | 14 |
| #100 | 4 |
| #200 | 1.3 |

| | |
|---|---|
| LL: | NV |
| PL: | |
| PI: | NP |
| USCS: | SP |

NOTE: THE ZERO AIR VOIDS CURVE REPRESENTS A SPECIFIC GRAVITY OF: 2.701 ASSUMED.

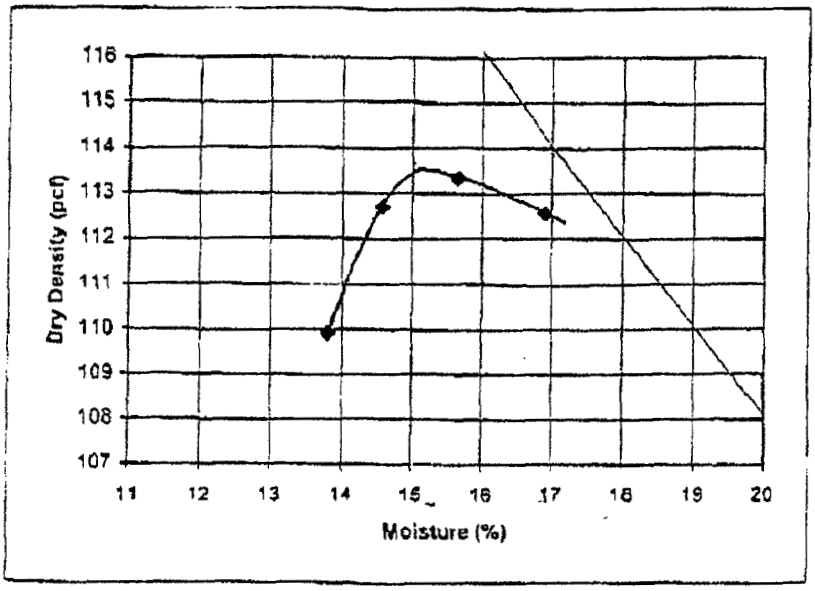
THIS IS A SUMMARIZED REPORT OF THE REFERENCED PROCEDURES AND DOES NOT INCLUDE ALL REPORTING REQUIREMENTS. ADDITIONAL DATA CAN BE PROVIDED AT CLIENT'S REQUEST.

# AGRA Earth & Environmental, Inc.

| | | | |
|---|---|---|---|
| PROJECT: | GOLDEN EAGLE PARK DAM-FCD1999C071 | JOB NO: | 0-119-000113 |
| LOCATION: | PALISADES & FOUNTAIN HILLS H.S. | WORK ORDER NO: | 1 |
| MATERIAL: | FILTER SAND | LAB NO: | 1 |
| SAMPLE SOURCE: | SALT RIVER SAND & ROCK | SAMPLE DATE: | 6/9/00 |

LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING
STANDARD EFFORTS (12,400ft-lb-ft/cu.ft) (ASTMD698A)
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

| CURVE: | A |
|---|---|
| MAXIMUM DRY DENSITY (pcf): | 113.6 |
| OPTIMUM MOISTURE (%): | 15.0 |




| SIEVE SIZE | PERCENT PASSING |
|---|---|
| 6" | 100 |
| 4" | 100 |
| 3" | 100 |
| 2" | 100 |
| 1 1/2" | 100 |
| 1 1/4" | 100 |
| 1" | 100 |
| 3/4" | 100 |
| 1/2" | 100 |
| 3/8" | 100 |
| 1/4" | 100 |
| #4 | 99 |
| #8 | 87 |
| #10 | 82 |
| #16 | 65 |
| #30 | 41 |
| #40 | 28 |
| #50 | 18 |
| #100 | 7 |
| #200 | 4.0 |

NOTE: THE ZERO AIR VOIDS CURVE REPRESENTS A SPECIFIC GRAVITY OF: 2.651 ASSUMED.

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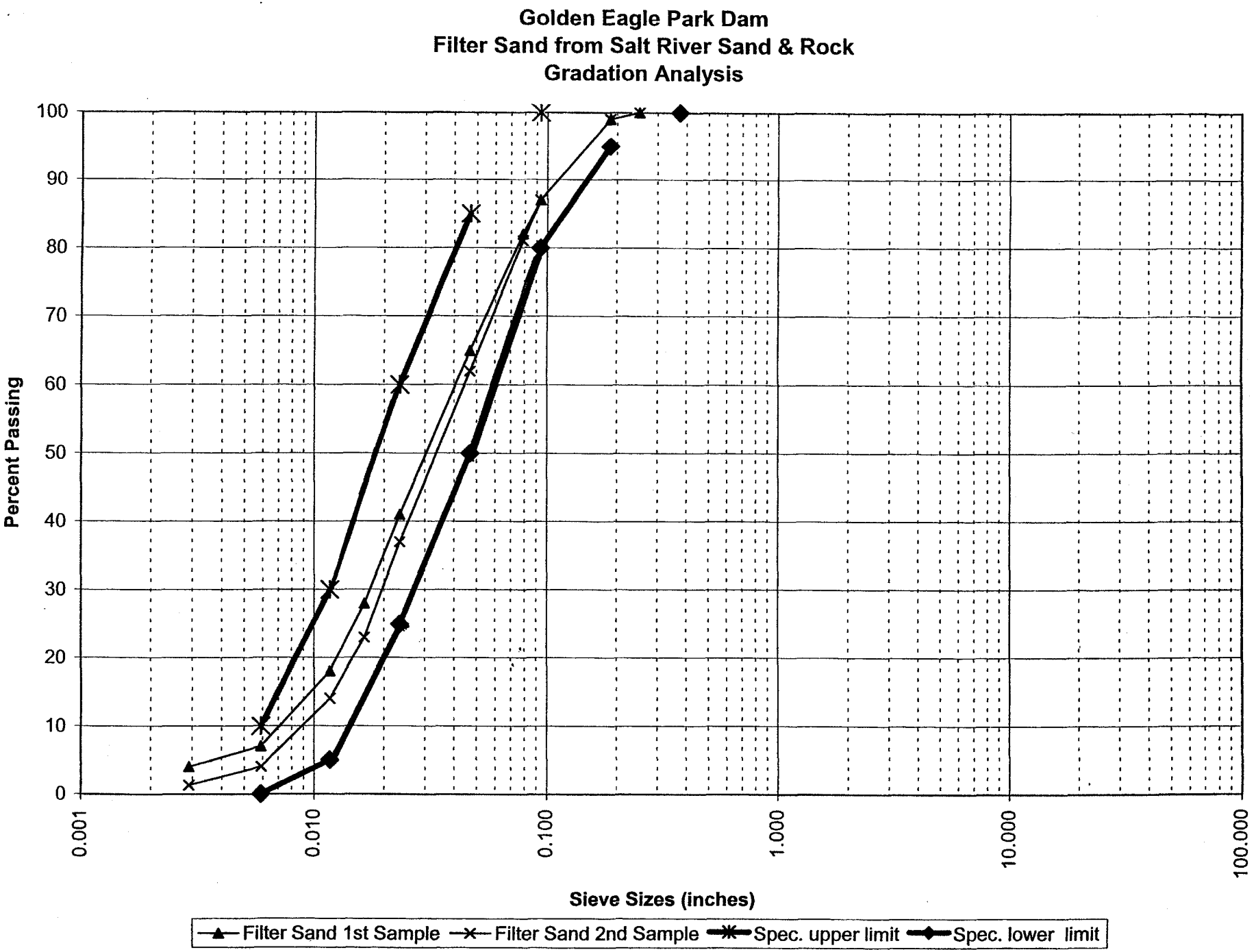



Filter Sand.xls - Chart1

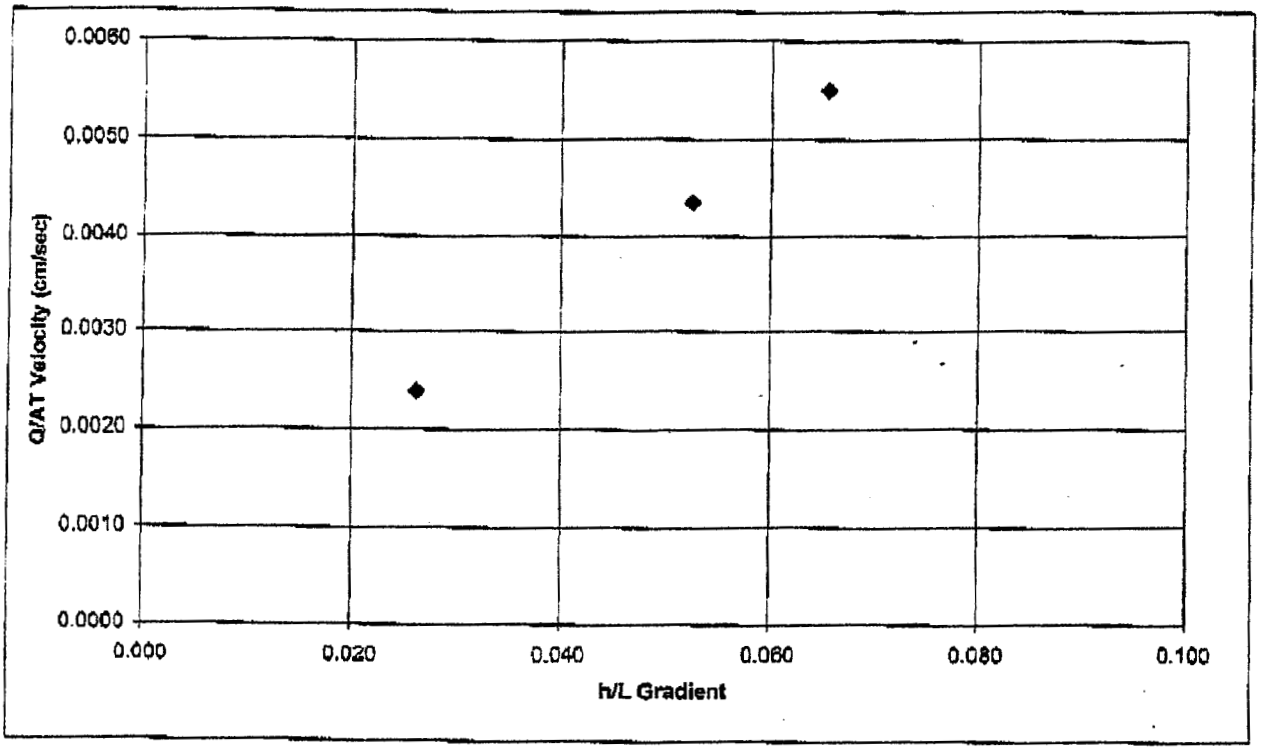
# AGRA Earth & Environmental, Inc.

| | | | |
|---|---|---|---|
| **PROJECT:** | GOLDEN EAGLE PARK DAM-FCD 1999 CO71 | **JOB NO:** | 0-119-000113 |
| **LOCATION:** | PALESIDES & FOUNTAIN HILLS H.S. | **WORK ORDER NO:** | 10 |
| **MATERIAL:** | FILTER SAND | **LAB NO:** | 13 |
| **SAMPLE SOURCE:** | SALT RIVER SAND & ROCK | **DATE SAMPLED:** | |
| **SAMPLE PREP:** | | | |

## PREMEABILITY OF GRANULAR SOILS (CONSTANT HEAD) (ASTM D2434)

| | |
|---|---|
| **AVERAGE PERMEABILITY (CM/SEC):** | 8.6E-02 |
| **DRY UNIT WEIGHT OF SAMPLE (PCF):** | 102.3 |
| **VOID RATIO:** | 0.62 |

| Head (cm) | Q (cu.cm) | Time (sec) | Q/AT Velocity (cm/sec) | h/L Gradient | k (cm/sec) |
|---|---|---|---|---|---|
| 0.2 | 10 | 93.8 | 0.0024 | 0.0262 | 0.0909 |
| 0.4 | 10 | 51.4 | 0.0044 | 0.0525 | 0.0829 |
| 0.5 | 20 | 81.5 | 0.0055 | 0.0656 | 0.0837 |



AGRA
ENGINEERING GLOBAL SOLUTIONS

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Phoenix, Arizona 85009-1502
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Toll Free 1-800-248-AGRA

JUN 2000

**FAX Transmission**

**To:** Chuck Gopperton
Stantec Consulting
**Fax:** 431-9562
**From:** Tony Freeman
**Fax Operator:**
**Subject:** Golden Eagle Park Dam
Filter Analysis Core / Sand Diaphragm

**Date:** 6/27/00
**File No:** 0-119-000113
**Charge No:**
**Total Pages:** 5 (incl. cover sheet)

cc:

Our analysis reveals that seperation criteria is achieved for Sample E of the existing core against the Sand Diaphragm material.

The gradation of the existing core crosses the sand at the fine side. This is not significant since we are not counting on the core zone to convey seepage away from the sand diaphragm.

We recommend that the placement of the sand be allowed in the core trench.

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Sand Gradation

| Sieve | % Passing |
|---|---|
| 3/8-inch | 100 |
| No. 4 | 95-100 |
| No. 8 | 80-100 |
| No. 16 | 50-85 |
| No. 30 | 25-60 |
| No. 50 | 5-30 |
| No. 10 | 0-10 |

Existing Core - Sample E

| Sieve | % Passing |
|---|---|
| 3-inch | 100 |
| 2-inch | 99 |
| 1 1/2-inch | 98 |
| 1 1/4-inch | 98 |
| 1-inch | 97 |
| 3/4-inch | 96 |
| 1/2-inch | 94 |
| 3/8-inch | 92 |
| 1/4-inch | 87 |
| No. 4 | 46 |
| No. 8 | 37 |
| No. 10 | 34 |
| No. 16 | 28 |
| No. 30 | 23 |
| No. 40 | 20 |
| No. 50 | 19 |
| No. 100 | 15 |
| No. 200 | 12 |

Specs

| % Passing |
|---|
| 100 |
| 60-100 |
| 15-60 |

* Check Fine Side of Sand Filter Zone Against "Sample E" *

Step 2 - Fine Side of Sand contains 100% passing No. 4 Sieve, therefore no re-grading is required.

Step 4 - Sand has 10% maximum passing No. 100 Sieve
two test results have 4 & 1 % passing No. 200 Sieve

Use 10% passing No 200 Sieve,

So... Base category is (4)

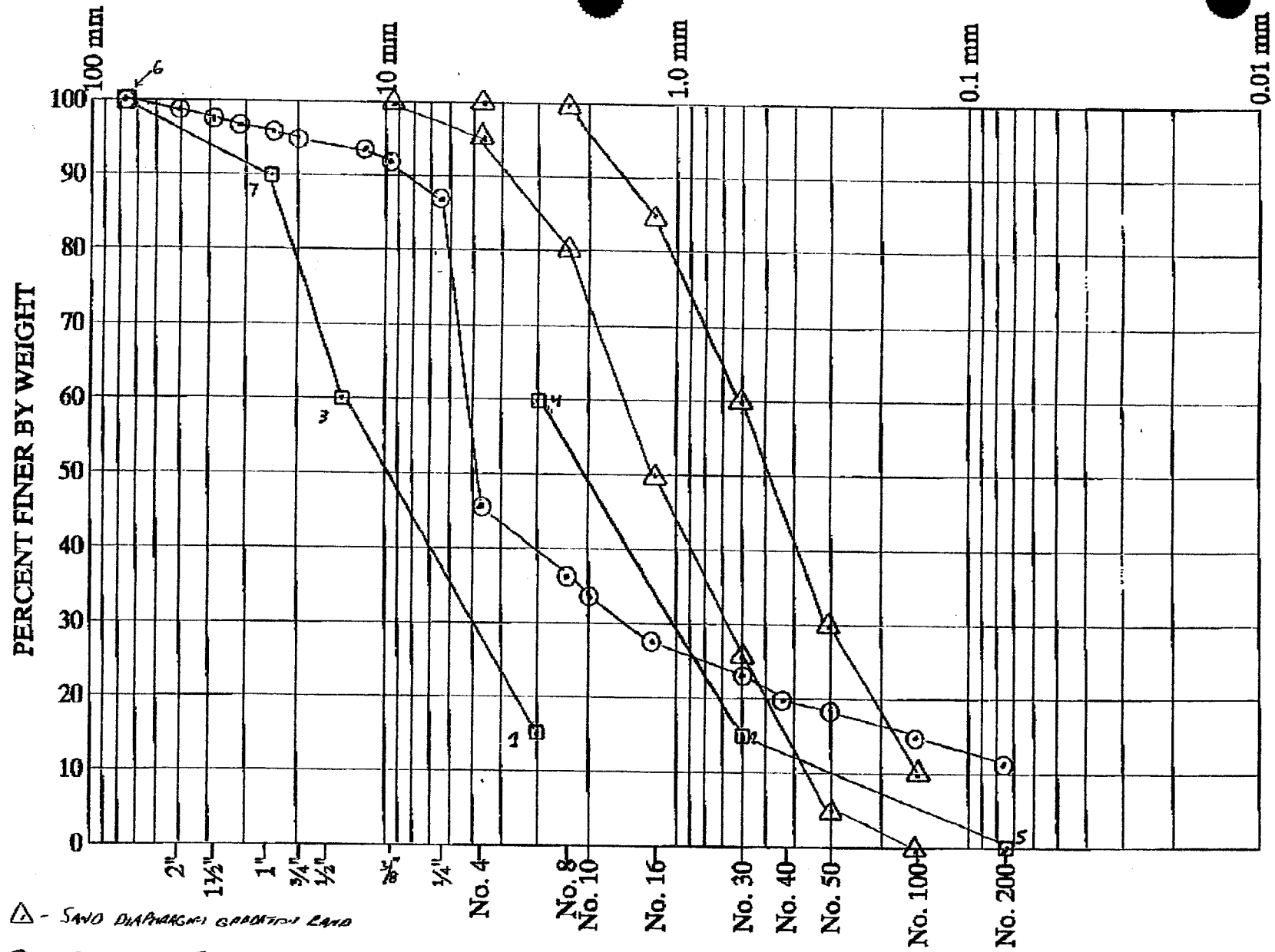
Step 5 - Maximum Allowable $D_{15}$ Size for Filter

$D_{15max} \leq 4\, d_{85}$

$\leq 4\,(1.18\,mm)$

$\leq 4.72\,mm$

| | | |
|---|---|---|
| AGRA Earth & Environmental<br>232 WEST VIRGINIA AVENUE<br>PHOENIX, AZ. U.S.A. 85009-1502 | JOB NO. 0-119-000113<br>DESIGN TJF<br>CHECK<br>DATE 6/27/00<br>PAGE 2 | GOLDEN EAGLE PARK DAM<br>CORE ZONE / SAND DIAPHRAGM<br>FILTER ANALYSIS |




△ - SAND DIAPHRAGM GRADATION BAND

⊙ - SAMPLE - E EXISTING CORE

**AGRA**
**Earth & Environmental**
3232 WEST VIRGINIA AVENUE
PHOENIX, AZ, U.S.A. 85009-1502

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| DRAWN | TJF |
| CHECKED | |
| DATE | 6/27/00 |

GOLDEN EAGLE PARK DAM
CORE ZONE / SAND DIAPHRAGM
FILTER ANALYSIS

STEP 6 - Minimum Allowable $D_{15}$

$D_{15min} \geq 4 d_{15}$ but not less than 0.1 mm

$d_{15} \approx$ No. 100 Sieve
$\approx 0.150$ mm

$D_{15\,min} \geq 4(0.150)$
$\geq 0.6$ mm (2) Control Point

STEP 7 - Width of Gradation Band

(a) $\frac{D_{15max}}{D_{15min}} < 5$ $D_{15\,min} = \frac{4.72}{5} = 0.94$ mm

(b) $D_{15max} = 5(0.6)$
$= 3$ mm (1) Control Point

Use this criteria since purpose of filter is to determine separation criteria.

STEP 8 - Uniformity Gradation Requirement

$D_{10max} = \frac{D_{15max}}{1.2} = \frac{3\text{ mm}}{1.2} = 2.50$ mm

$C_u = \frac{D_{60}}{D_{10}} \leq 6$ $D_{60max} = D_{10max}(6) = 15$ mm (3) Control Point

$D_{60\,min} = \frac{D_{60max}}{5} = \frac{15}{5} = 3$ mm (4) Control Point

STEP 9 - $D_{5\,min}$ & $D_{100\,max}$ Requirements

$D_{5\,min}$ = No. 200 Sieve = 0.075 mm (5) Control Point

$D_{100\,max} = 75$ mm (6) Control Point

| | | |
|---|---|---|
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STEP 10 – $D_{90max} / D_{90min}$ Segregation Evaluation

$D_{90min} = \frac{D_{15max}}{1.2} = \frac{0.6}{1.2} = 0.5mm$

$D_{90max} = 25mm$ (7) coarse part

Conclusions

Sample "E" meets seperation criteria above No. 16 sieve but does not meet permeability criteria at fine end. Sample E was obtained from bottom of sand diaphragm trench. Primary concern is that piping from placed sand diaphragm material into existing materials does not occur.

Our recommendation is to allow placement of C33 sand diaphragm against the existing core zone material.

| | | |
|---|---|---|
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## Fax Transmittal

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Phoenix, AZ 85044-5355

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Stantec

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**Reference:** Golden Eagle Park Dam

Attachments: Compaction & Relative density info for sand
(Filter diaphragm & blanket for box culvert)

Message:

**Fax Transmittal**

FAXED

Stantec Consulting Inc.
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Phoenix, AZ 85044-5355

Stantec

To: Shewa Shivaswamy
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**Reference:** Golden Eagle Park Dam

Attachments: information on testing & compaction of pervious materials from USACOE EM 1110-2-1911

Message: I will also talk with the engineer at AGRA to get his recommendations

EM 1110-2-1911
30 September 1995

US Army Corps
of Engineers

ENGINEERING AND DESIGN

# Construction Control for Earth and Rock-Fill Dams

ENGINEER MANUAL

CECW-ED

**DEPARTMENT OF THE ARMY**
**U.S. Army Corps of Engineers**
**Washington, DC 20314-1000**

EM 1110-2-1911

Manual
No. 1110-2-1911

30 September 1995

# Engineering and Design
# CONSTRUCTION CONTROL FOR EARTH AND ROCK-FILL DAMS

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successfully between rains. Water content of material spread on embankments can be reduced somewhat during periods between rains by plowing or disking before rolling.

(2) It is desirable to compact fill material as soon as possible after spreading to minimize the time loose fill is exposed to precipitation. Rubber-tired rollers are superior to sheepsfoot rollers when rains are frequent because they leave a relatively smooth compacted surface, whereas the sheepsfoot roller leaves a loose rough surface that readily soaks up rain water. If a sheepsfoot roller is used for general compaction, smooth-wheel rollers (steel or rubber) can be employed to seal the surface when rain is imminent. In any event, the construction surface should be kept sloped to allow the water to run off instead of standing in puddles and soaking in. After a rain, if some ponding does occur, it is usually easy for the contractor to install a few small ditches to drain these areas.

(3) It is often necessary after a rain to scarify and work the construction surface to a depth below that of excessive moisture penetration until it is dried to a satisfactory water content or, to remove and waste all affected material. If procedures to facilitate runoff are followed (sloping the surface, sealing the surface with smooth rollers, etc.), the depth of moisture penetration will be kept to a minimum.

*c. Dry weather.*

(1) If material being dumped on the fill is too dry for proper compaction, water must be added by sprinkling after it is spread and before it is rolled. The amount of water added and the blending required will depend on grain size and plasticity of the soil, fine-grained soils of high plasticity requiring the greatest amount of blending. Soil must be worked with disks to thoroughly blend and homogenize added water into the soil. The importance of uniform moisture distribution cannot be overemphasized; if pockets of wet and dry soil are allowed in uncompacted material, very poor compaction will result.

(2) Sprinkling the soil can be accomplished by hosing from a pipeline, located along either the embankment toe or the crest, or by the use of water trucks. The latter method is the most effective and the most commonly used today. Pressure sprinkling systems on trucks are superior to gravity systems and should be employed if at all possible. Water sprays must not be directed on the soil with such force as to cause fines to be washed out. Until the inspectors and contractor personnel have gained a "feel" for the amount of water needed, rough computations of the number of gallons to add for a given area should be made, and water applied accordingly. After a few trials, a feel for the proper amount will develop. The coarser and less plastic the soil, the more easily water can be added and worked uniformly into it. It is very difficult to obtain uniform water content distribution in plastic clays containing lumps without a "curing" period of a few days; this is, of course, not practical on the embankment surface. Consequently, disking followed by addition of water and then thorough mixing with a heavy rotary pulverizer may be required to obtain uniform distribution of water in such soils.

## 5-12. Compaction in Confined Areas

*a.* Confined areas are those where normal rolling operations with heavy equipment are restricted or where heavy equipment cannot be used at all and hand compactors must be used. Compaction with hand compactors should be avoided and heavy equipment used in these areas if at all possible. Confined areas, where heavy equipment can often be used on a careful basis if maneuvering room is available, include fairly smooth abutments (rock or earth), conduit barrels, towers, etc. Confined areas where hand compactors often must be employed are adjacent to thin concrete structures, such as wing walls, guide walls, etc., where heavy equipment might damage the structure; adjacent to rough, irregular rock abutment slopes where heavy equipment cannot get in close enough to the surface to squeeze the fill into all the irregularities and openings in the rock; and around seep rings or plugs where maneuverability is a problem.

(1) Heavy equipment. When conditions are such that heavy compaction equipment can be used to compact the soil against rock abutments or walls of concrete structures, the construction surface of the embankment should be sloped at about 1V on 6H for a distance of 8 to 12 ft away from the rock or concrete. This will allow the roller to act more directly in compacting the soil against the abutment or structure. The area can then be rolled perpendicular to the face of the abutment or structure by heavy pneumatic equipment or a sheepsfoot roller or by heavy pneumatic equipment in a direction parallel to the face.

(2) Hand compactors. If heavy rollers cannot be used in this manner, the roller should be allowed to work as close as possible, and the portion of embankment directly against the rock or concrete should be compacted with smaller equipment in thinner lifts. Smaller equipment refers to hand-operated power tampers, as shown in Figure 5-12, or power tampers mounted on small tractors. These tampers are usually gasoline-operated or operate on compressed air. Hand-operated power tampers (sometimes called rammer compactors) are probably the most widely used equipment for compacting fine-grained soils in confined areas. A loose lift thickness of not more than 4 in. should be employed in conjunction with these power tampers. Hand compactors should have a minimum static weight of 100 lb, and the

**Figure 5-12. Compacting against rock abutment with a hand-operated power tamper, Green River Dam, Kentucky**

inspector should carefully check to ensure that the manufacturer's recommended air pressure is being developed. Experience has shown "two-by-four" wood rammers, or single-foot compressed air tampers (commonly referred to as "powder puffs" or "pogo sticks") do not produce adequate compaction. It is important that zones of hand compaction and compaction by heavy equipment overlap so that no uncompacted material exists between them.

*b.* Where impervious material is to be placed adjacent to abutments or concrete structures, it should be as fine-grained as practicable. Soil must be plastic enough to penetrate all irregularities in the abutments and to form a well bonded seal.

*c.* Close compaction control must be exercised in these areas since they are generally more critical with respect to seepage and damaging settlements causing cracking and piping than the main embankment. A special sampling program should be established, and an inspector must watch operations involving the use of power tampers at all times.

*Section IV*
*Pervious Fill*

## 5-13. Definition

Pervious fill material as used in this manual is defined as free-draining cohesionless sand and/or gravel, containing less than approximately 5 percent passing the No. 200 sieve.[1] Standard impact compaction tests on such materials do not yield well-defined values of optimum water content and maximum dry density, and field densities are related to maximum and minimum density determinations made according to the relative density procedures in EM 1110-2-1906 rather than to maximum dry density as determined in the standard compaction test.

## 5-14. Compaction Equipment

*a.* Vibratory steel-wheel rollers in the weight range of 5 to 10 tons are the best equipment for compacting pervious sands and/or gravel. It should be noted that compaction equipment has been steadily increasing in weight and it is not uncommon to find steel-wheel roller compactors with a weight of 15 or more tons. Drum-drive self-propelled vibratory rollers have been found to be effective on fine uniform sands when other vibratory rollers were not. Rubber-tired rollers are sometimes specified, and crawler tractors are sometimes used if they can produce required densities. Crawler tractors may be effective for compaction in rough or hilly areas where a vibratory roller cannot operate well—for example, in compacting a horizontal drainage layer on an undulating foundation. The contact pressure of the tractor should be at least 9 PSI, and the tractor should operate at that speed which imparts the greatest vibration to the fill.

*b.* Where free-draining pervious material is placed as backfill against concrete walls and around concrete structures such as outlet conduits, small compaction equipment is needed because of restricted area or because heavy equipment is not allowed close to the walls. Two common types of vibratory compactors are a small steel-wheel vibratory roller and a "vibrating plate" compactor. Air-operated concrete vibrators have also been used successfully in densifying narrow, relatively deep zones of pervious backfill. Figure 5-13 shows pervious backfill being placed against a concrete wall with a hand-operated compactor in the background. Vibratory-type units should be checked frequently to ensure that they are operating at a frequency level giving the highest possible density. For cohesionless materials, the frequency of vibration should generally fall between 1,100 and 1,500 vibrations/cycles per minute.

[1] Outer embankment zones of some dams composed of coarse-grained soils containing appreciable amounts of fines (i.e., greater than 5 percent) are sometimes designated as "pervious zones." The compaction equipment, procedures, and control for materials comprising the pervious zones referred to here are those presented in *Section III* on impervious and semipervious fill.

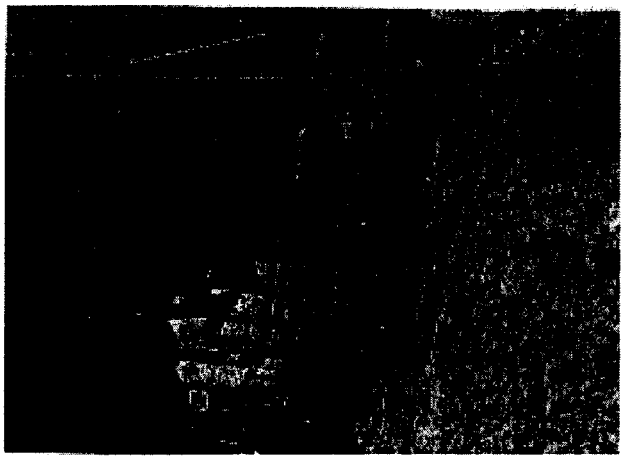


**Figure 5-13. Placement of pervious material adjacent to stilling basin wall, Brookville Dam**

**Figure 5-14. Sprinkling system built on frame of vibratory roller (feeder pipes are shown above frame, spray bars are attached below) used at DeGray Dam, Arkansas**

## 5-15. Material Gradations

Gradations of materials to be placed in large pervious embankment zones are generally not specified except to restrict the maximum size and/or the percentage by weight of particles smaller than the No. 200 sieve. On the other hand, a particle-size distribution within limits defined by roughly parallel gradation curves on the standard grain-size (semi-log) plot is specified for select pervious materials to be used in horizontal and inclined drainage layers and in pervious transition layers.

## 5-16. Water Content Control

Water content control is unnecessary in gravel, and the material may simply be compacted in its as-received condition. If the material is sand or contains a significant proportion of sand sizes, the material must be maintained in a high degree of saturation during compaction using water trucks with pressure spray bars, hoses connected to header pipes laid along the embankment, or other approved methods of water application. If pervious sand is compacted at a low degree of saturation (with insufficient water), surface tension between the water present and the sand grains will cause the moist soil to "bulk," and in this state it will not densify efficiently under an applied compactive effort; the result will be a poorly compacted weak layer which may cause problems. It is therefore imperative that sand be in a high degree of saturation as the roller passes over it, but it is often difficult to achieve a high degree of saturation because surface tension will also prevent water from flowing freely through sandy soils. Figure 5-14 shows the unique wetting system used to saturate the sand for the vertical sand drain at DeGray Dam. The entire spray system was attached to the frame of the vibratory roller itself. The water was fed to the system by means of a long hose connected to a water truck which moved as necessary to accommodate the roller. Very good results were achieved with this arrangement. If a so-called pervious material contains appreciable fines (say, more than 5 to 10 percent passing the No. 200 sieve), it is probable that water content control must be exercised to ensure that the water content is within a range that will permit desired compacted densities to be obtained.

## 5-17. Lift Thicknesses and Number of Passes or Coverages

These will be established in the specifications. Pervious fill is commonly placed in 6- to 15-in. lifts when it is to be compacted by three or four passes of a vibratory steel-wheel roller or a 50-ton rubber-tired roller, or in 6- to 8-in. loose lifts when it is to be compacted by three to six coverages by a crawler tractor. A note of clarification is necessary here. Guide Specification CE-1306 calls for a specified number of "complete passes" of a rubber-tired roller or a vibratory steel-wheel roller, where a "complete pass" is defined to be complete areal coverage of the lift. This concept does not retain the same meaning in a crawler tractor where the tracks (because of their wide separation) do not make complete areal coverage of the lift. Therefore, when compaction by a crawler tractor is specified, the specification should require coverages by the *tracks* of the tractor. In confined areas where small vibratory rollers or hand-operated vibrating compactors are required, material is normally placed in 2- to 3-in.-thick layers with vibratory compaction applied until densities comparable to those required for areas compacted with heavy equipment are achieved.

## 5-18. Density Requirements

Compaction equipment and procedures are normally specified without field densities being specified. The expectation is that the prescribed field compaction methods will produce the desired densities. If these are not achieved in the field, then the contractor is paid for additional rolling. Requirements established by the Office of Chief of Engineers are that the average in-place relative density of pervious fill zones should be at least 85 percent and that no portion of the fill should have a relative density less than 80 percent.

## 5-19. Construction Control

*a. Simple control procedures.*

(1) Checking lift thicknesses of pervious fill can be accomplished by the simple procedures described for impervious and semipervious materials, except that in using a shovel or rod it is often difficult to determine when the top of the underlying compacted layer is reached. This procedure is also not practical in fills containing large gravel particles. In some cases, it is possible to excavate a small hole in the loose material to the top of the underlying layer, which is identified by a relatively higher resistance to digging.

(2) The inspector must make certain that the embankment is always graded so that surface waters will not wash fines from impervious or semipervious fill materials into the pervious fill. During construction of earth dams, placement of filter materials for drainage layers should be kept higher than adjacent fill containing fines in order to prevent spillage of fine-grained soil onto the pervious material or to reduce the washing of fine-grained soils into the materials by surface runoff. The inspector should be trained to recognize the appearance of pervious material meeting specifications so that he can more easily detect, without the delay of testing, the presence of excess fines. A good indication of excessive fines is when the hauling and compacting equipment sinks in and causes ruts in the fill surface. This usually indicates that water applied during compaction is not draining through the material as it should because of clogging by excess fines.

(3) In general, a vibratory roller should push only a small amount of material ahead of it and leave a smooth surface behind on the first pass. If the roller sinks in and pushes a large amount of material in front of it, either the frequency of vibration is not correct for the particular soil being compacted or the material contains too many fines.

(4) It is more difficult to judge the compacted density of pervious material than that of fine-grained material. Resistance to penetration of a shovel or a reinforcing steel rod often is not a suitable way of checking density, and it is necessary for the inspector to rely more heavily on field control tests. Some inspectors can judge the compaction obtained in pervious fill by walking over it and feeling the reaction of the material. The uniformity of particle-size gradations in the lift should be observed. Too much vibration may cause segregation of the fill material, causing the fines to settle to the bottom of the lift. Conversely, if particles are being crushed during compaction, a layer of fines will develop in the upper few inches of the lift.

(5) The inspector should observe loading, dumping, and spreading operations, particularly if the pervious fill is well-graded material, to ensure that undesirable segregation of particles is not occurring as a result of such operations.

(6) The particular importance of horizontal and inclined drainage layers to the function of a dam, and the fact that these features are so limited in thickness, justify the special attention of inspectors to see that gradations and densities of the in-place filter materials meet the specifications.

*b. Gradation.* Gradation tests should be performed to ensure that the material being placed is within specification limits. The number of gradation tests needed will, of course, depend on the variability of natural pervious material as obtained from the borrow areas. Complete gradation tests should be performed on material for which the entire range of particle sizes is specified. For those materials for which only the percent finer than the No. 200 sieve or some other sieve is specified, the material should be soaked and then washed over the No. 4 and the designated lower-limit sieve in accordance with procedures given in EM 1110-2-1906. Gradation tests should also be performed on compacted material especially when it is suspected that there has been contamination with fines from surface waters or when the fill material may have been degraded by breakage of particles during compaction.

*c. Field density testing and relative density determinations.*

(1) The water balloon and sand volume density test methods described in paragraph 5-10*d*(1) can be used to determine the in-place density of pervious fill. It is, of course, more difficult to dig holes in pervious materials. When the fill material contains high percentages of large particles, it may be necessary to increase the volume of holes substantially and to line the holes with plastic film so that the volume may be determined by the quantity of water or oil needed to fill it. The nuclear density meter can be used for supplementary density determinations under the conditions stated in paragraph 5-10*d*(2)(b). The density of

free-draining pervious fills and filter materials cannot be related to standard impact compaction test results since water content/density relations are not valid for such materials, as they are for materials having varying degrees of plasticity. Field densities must be expressed in terms of maximum-minimum densities as determined by laboratory tests described in EM 1110-2-1906. Field densities are expressed in terms of their relation to these laboratory values, i.e., in terms of relative density. The percent relative density, $D_d$, of the in-place material can be computed by the equation:

$$D_d = \frac{\gamma_d - \gamma_{min}}{\gamma_{max} - \gamma_{min}} \times \frac{\gamma_{max}}{\gamma_d} \times 100$$

where

$\gamma_d$ = dry unit weight of the pervious fill in place (the in-place density), pcf
$\gamma_{min}$ = minimum density, pcf, from laboratory tests
$\gamma_{max}$ = maximum density, pcf, from laboratory tests

(2) Field density determinations using the water balloon or sand volume procedures should be made for every 1,000 cu yd of pervious fill placed at the beginning of the job and for every 3,000 cu yd thereafter, with more frequent determinations desirable for testing in drainage layers. These tests generally should be taken one lift thickness deep, especially in sands. Although the performance of maximum and minimum density determinations on material from each field density test would give the most accurate determination of the relative density of the in-place material, this is frequently not feasible because of time and manpower restrictions. Therefore, it is often advisable to attempt to develop correlations between the gradation data and the maximum-minimum density values on materials representing the range of gradations to be expected from the sources of supply. Figure 5-15 is an example of a correlation between the percent finer than the No. 16 sieve and the maximum-minimum density values. Where a good correlation like this is developed, a simple determination of the percent finer than the No. 16 sieve is all that is needed to obtain the appropriate maximum-minimum density values in the in-place material. In other instances, good correlations may be developed between maximum-minimum density values and the percent of material passing other sieve sizes or the coefficient of uniformity. Correlations developed between minimum and maximum density values can be used to obtain minimum density after the performance of a maximum density test alone. Caution should be exercised in using such correlations for uniform sands, since the spread between the maximum and minimum density is very small and large errors may result.

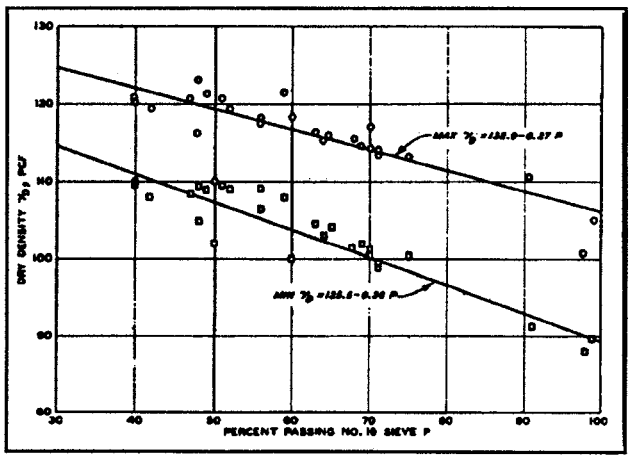



**Figure 5-15. Correlation between density and percent passing No. 16 sieve**

(3) Correlations such as those described above should be used only on materials from the particular sources for which the correlations were developed. Application to materials from other, geologically different sources may lead to considerable error because of differences in particle shapes and degradation characteristics. The selection of maximum-minimum density values by visual comparisons of field density test material with samples of materials on which maximum-minimum density determination have previously been made is generally not a good procedure; small differences in particle sizes that cannot be adequately detected by visual comparisons have significant effects on these density values.

## 5-20. Test Results and Actions to be Taken

Assume, for example, that it has been established that a lift has in-place relative densities between 80 and 85 percent. A review must be made of the relative densities of all previous lifts to ensure that a minimum average of 85 percent relative density will be maintained if the questionable lift is to be accepted. The intent of the relative density criteria is that the relative density of the material measured immediately after compaction must conform to the requirements stated in paragraph 5-18 without any consideration of increase in density caused by the placement and compaction of subsequent lifts.

cent of the laboratory standard maximum soil density (dry) as determined by the Proctor compaction test for the materials being compacted.

(1) *Compaction test.*—The compaction tests will be made by the contracting authority. The standard maximum soil density is the dry weight per cubic foot of the soil compacted at optimum moisture content by laboratory procedure. The compaction test can be made by the Bureau of Reclamation procedure using a 1/20-cubic-foot compaction mold, or by ASTM Designation D 698–42T or the standard AASHO T 99–49 method, both using a 1/30-cubic-foot compaction mold.

(c) *Compacting Cohesionless Free-Draining Material.*—Where compacting of cohesionless free-draining materials, such as sands and gravels, is required, the material shall be deposited in horizontal layers and compacted to the relative density specified below.

The thickness of the horizontal layers after compaction shall not be more than 6 inches if compaction is performed by tampers or rollers, not more than 12 inches if compaction is performed by treads of crawler-type tractors, surface vibrators, or similar equipment, and not more than the penetrating depth of the vibrator if compaction is performed by internal vibrators.

The relative density of the compacted material shall be not less than 70 percent as determined by the standard Bureau of Reclamation relative density tests for cohesionless free-draining soils (sec. 115(f)).

(1) *Relative density test.*—The relative density tests will be made by the contracting authority. The relative density of a cohesionless free-draining soil, expressed as a percentage, is defined as its state of compactness with respect to the loosest and most compact states at which it can be placed by laboratory procedures. The relative density will be based on the following formula, wherein the maximum density is the highest unit weight of the soil, minimum density is the lowest unit weight of the soil, and in-place density is the unit weight of the soil in-place. Tests for moisture content are made on the materials and the unit weights are expressed in terms of ovendry weights.

$$\left[\begin{matrix}\text{Relative}\\ \text{density (\%)}\end{matrix}\right]=\frac{\left[\begin{matrix}\text{maximum}\\ \text{density}\end{matrix}\right]\times\left[\left(\begin{matrix}\text{in-place}\\ \text{density}\end{matrix}\right)-\left(\begin{matrix}\text{minimum}\\ \text{density}\end{matrix}\right)\right]}{\left[\begin{matrix}\text{in-place}\\ \text{density}\end{matrix}\right]\times\left[\left(\begin{matrix}\text{maximum}\\ \text{density}\end{matrix}\right)-\left(\begin{matrix}\text{minimum}\\ \text{density}\end{matrix}\right)\right]}\times 100$$

(d) *Cost.*—The cost of compacting backfill as described in this section shall be included in the unit price bid in the schedule for compacting backfill.

G–30. *Filters.*—Graded sand and gravel filters shall be constructed under the *(apron, weir, spillway floor lining) as shown on the drawings or as directed. All materials for the filters shall be furnished by the contractor.

Trenches for the filters shall be excavated to lines, shapes, and dimensions shown on the drawings. Overexcavation in a manner to disturb the compacted foundations will not be permitted, and any material outside of the required lines which is disturbed shall be removed, and shall be replaced at the expense of the contractor in the manner described in section G–6 (Open-Cut Excavation, General). The sand and gravel shall be placed and tamped into place in such a manner that mixing of sand with gravel in the filter or with foundation or backfill materials will not occur. The graded sand and gravel shall be placed and tamped to the dimensions shown. *(After the graded sand and gravel in the filter have been shaped and compacted to the required depths, surfaces of the filter over which concrete is to be placed shall be covered with a layer of mortar 1 inch thick to provide a covering that will prevent the filter material from being displaced during the placing of the concrete. The mortar coating shall be applied carefully to the required thickness. The consistency of the mortar and methods of application shall be such as to avoid unnecessary filling of the voids in the filter material.)

Materials for filters shall be as follows:

(1) Gravel under the _____ shall be clean, well-graded gravel from 3/8 inch to 1½ inches in size.

(2) Sand shall conform to the requirements specified for concrete in section G–49 (Sand).

*Revise or delete as appropriate.

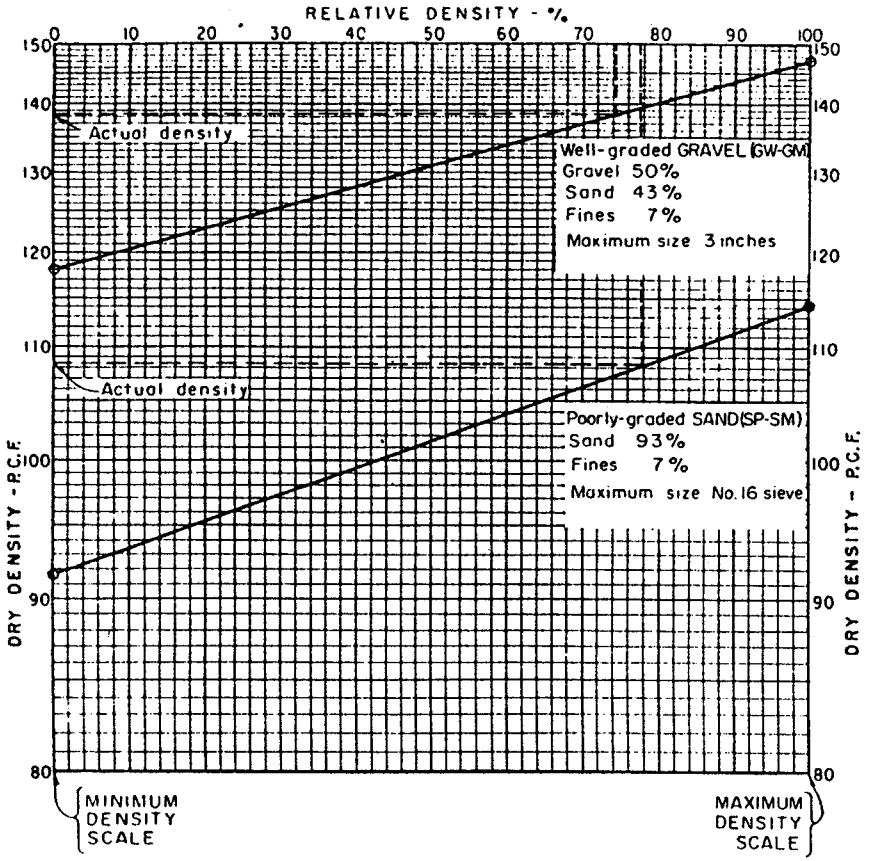
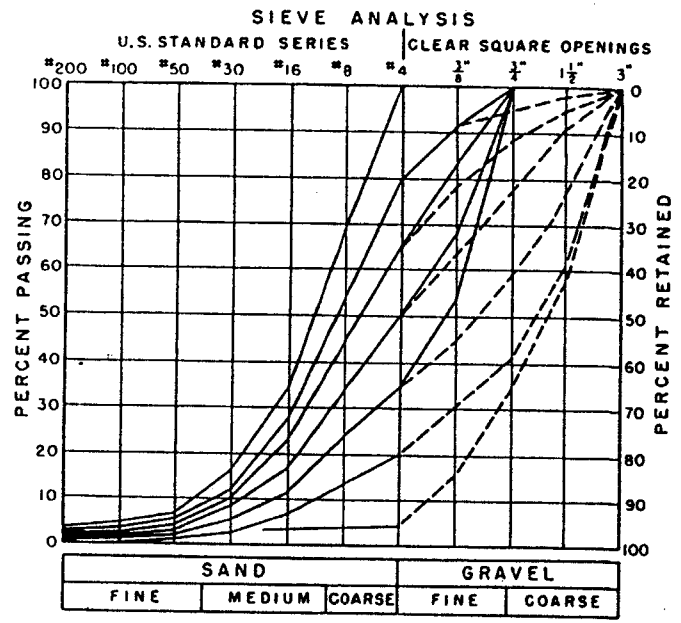



**Figure 14.—Relation of relative density and dry density (scaled to plot as a straight line on form 7-1595.) 101-D-572.**

Figure 14 shows a chart from which relative density may be determined if the maximum, minimum, and the actual densities of the material are known. Figure 15 shows the maximum and minimum densities for typical sand and gravel soils.

*Compacted fill density.*—The density of the soil as it is compacted into a manmade fill is called the compacted fill density to distinguish it from the natural density of a foundation or any of the various densities determined in the laboratory. It is usually expressed as dry density, although wet densities are also used to some extent. The compacted fill density is determined according to procedures outlined in designation E-24. It is used primarily for construction control to assure that the compacted fill is at least as large as the conditions assumed in preparing designs.





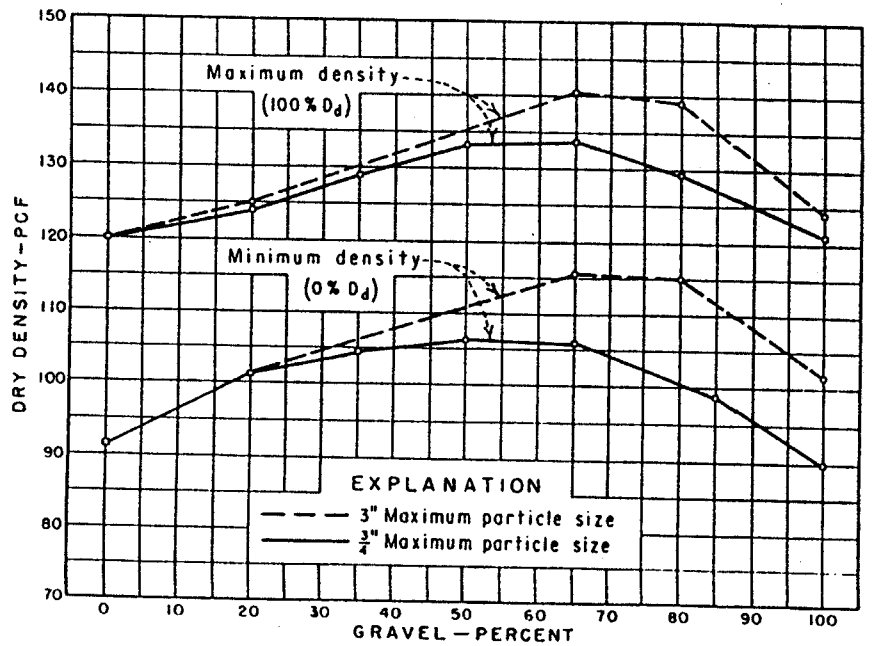




**Figure 15.—Maximum and minimum densities of typical sand and gravel soils. 101-D-173.**

**Stantec Consulting Inc.**
8211 South 48th Street
Phoenix AZ 85044-5355 USA
Tel: (602) 438-2200 Fax: (602) 431-9562
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COPY

**Stantec**

13 July, 2000

File: 82000157

Arizona Department of Water Resources
Dam Safety Section
500 North 3rd St
Phoenix, AZ 85004-3093

**Attention: Jon Benoist, PE**

**Reference: GOLDEN EAGLE PARK DAM (07.33)**

I am writing this letter in response to a request by Hunter Contracting to pour adjacent sections of the reinforced concrete box culvert floor slab with a 4 day curing time instead of the required 7 days. I have researched this and discussed it with Mr. Larry Lambert of the Flood Control District.

I am recommending for your approval, that the slab may be poured adjacent to the existing slabs after 4 days of curing. All slabs must be cured for a minimum of 7 days after pouring, per the specifications. This is an exception to the specification for the center of the floor slab, and all future concrete pours should be scheduled for the full 7 day cure period prior to pouring adjacent sections.

I have attached a copy of my memorandum detailing my research on concrete shrinkage and the backup material.

Buildings

Environment

Industrial

Management Systems

Transportation

Urban Land

**Reference: Golden Eagle Park Dam**

Sincerely,

STANTEC CONSULTING INC.

Chuck Gopperton, PE
Project Engineer

c.

- Tom Renckly – FCDMC
- Shewa Shivaswamy – FCDMC
- Jerry Cox - ADWR

Attachments:

- Memorandum regarding concrete shrinkage

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## Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

FAXED 7/13/00

Stantec

To: ADWR

Attention: Jerry Coy

Fax No: (602) 417 2423

Date: 7-13-00

File: 82000157

Sender: Chuck Gopperton

Tel. No: 438-2200

Fax No: 431-9562

18 page(s) total includes cover sheet

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**Reference:** Golden Eagle Park Dam

Attachments: Letter & MEMO regarding Concrete shrinkage & requesting permission to pour box culvert floor slabs after 4 days cure

Message:

## Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

FAXED 7/11

Stantec

To: Shewa Shivaswami
Sender: Chuck Gopperton
Attention: GEP Dan Traylor
Tel. No: 438-2200
Fax No: 480 836 4530
Fax No: 431-9562
Date: 7-11-00
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**Reference:** Golden Eagle Park Dam

Attachments: Memo regarding curing of concrete & Shrinkage

Message:

**Fax Transmittal**

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

FAXED 7/11

Stantec

| | | | |
|---|---|---|---|
| To: | FCDMC | Sender: | Chuck Gopperton |
| Attention: | TOM Reckly | Tel. No: | 438-2200 |
| Fax No: | 602 506 4601 | Fax No: | 431-9562 |
| Date: | 7-11-00 | 15 page(s) total includes cover sheet | |
| File: | 82000157 | Original will **NOT** follow by mail. | |

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**Reference:** Golden Eagle Park Dam

Attachments: Memo regarding curing of concrete and shrinkage

Message: Tom - I would like to ask ADWR to Approve this change - please get back to me with your response ASAP Chuck

**Memo**

Stantec

To: File

File: 82000157

From: Chuck Gopperton

Date: 11 July, 2000

**Re: DRYING SHRINKAGE OF CONCRETE**

---

**Message:**

This memo is being written in response to a request by Hunter Contracting to pour adjacent sections of the reinforced concrete box culvert with a 5 day curing time instead of the required 7 days.

I talked with Mr. Jim Wilson of the Arizona Cement Association on July 10th and received some research information from the Portland Cement Association. Jim assured me that the incremental amount of shrinkage between 5 and 7 days would be very small. Application of curing compound will reduce the amount of drying and shrinkage. In fact, according to the literature, concrete that is kept moist will expand due to hydration of the cement. Curing should be continued until sufficient strength gain is reached in the concrete to resist the tensile stresses induced by plastic shrinkage. The trial mixtures reached full design strength in 3-4 days.

I also talked with Mr. Ron Burg at the Portland Cement Association, Construction Technology Laboratories about this. He had the following comments:

- Curing can continue even if another slab is poured adjacent to the first. By applying a curing compound, curing continues indefinitely.
- With the heavy reinforcement, the shrinkage volume change doesn't occur at just one end, it occurs throughout the slab.
- In the lab, 50% of the total shrinkage occurs within 40 days, however, in the field it takes much longer. The incremental shrinkage difference between 5 and 7 days would be quite small.
- Hydration of the cement will cause expansion. With the high cement content, low w/c ratio and high ambient temperatures, expansion of the slab may be a greater concern than shrinkage. However, with the rapid strength gain indicated by the trial mixture, most of the cement will be already hydrated in 3-4 days.

I also talked with Mr. Kyle Lloyd who is the technical representative for the waterstop manufacturer. The waterstop is typically tested in tension by stretching it up to 3 times the bulb diameter. It is designed to stretch or

compress up to 7/8 inch. It can easily accommodate the movement caused by drying shrinkage.

I reviewed the literature and found two studies which presented graphs of shrinkage vs time. Both studies studied shrinkage of laboratory specimens occuring up to 38 months after initial casting. The graphs are asymptotic with 90% of the shrinkage occuring in the first 12 months, and the majority of the shrinkage occuring within the first two months. My analysis showed that of the total average shrinkage, the incremental change between 5 and 7 days was on the order of 2%. The 7 day average shrinkage was between 7% to 9% of the total. The 7 day average shrinkage strain was between 40 - 60 millionths of an inch per inch with a total shrinkage of between 500 - 700 millionths after 2 - 3 years. The incremental difference would be on the order of 10 - 20 millionths. Assuming that shrinkage movement occurs where there is no steel to absorb the stress, approximately a two foot strip along the edge of the control joint is assumed to shrink and move. This would produce a total movement of approximately 0.0005 inches caused by shrinkage. This amount of strain can easily be absorbed by the waterstop.

In my opinion, it would not be detrimental to allow an adjacent concrete pour after 5 days.

References:

1. *Design and Control of Concrete Mixtures - 13th Edition*, Portland Cement Association, Engineering Manual, 1994

2. *Long-Time Study of Cement Performance in Concrete - Tests of 28 Cements Used in the Parapet Wall of Green Mountain Dam, Materials Laboratories Report No. C-345*, U.S. Department of the Interior, Bureau of Reclamation, Denver, 1947.

3. Jackson, F.H., *Long-Time Study of Cement Performance in Concrete - Chapter 9. Correlation of the Results of Laboratory Tests With Field Performance Under Natural Freezing and Thawing Conditions*, Research Department Bulletin RX060, Portland Cement Association, 1955.

4. Hansen, Torben C., and Mattock, Alan H., *Influence of Size and Shape of Member on the Shrinkage and Creep of Concrete*, Development Department Bulletin DX103, Portland Cement Association, 1966.

---

STANTEC CONSULTING INC.

Chuck Gopperton, PE
Associate, Water Resources Division
cgopperton@stantec.com

Attachments - Supporting data on concrete shrinkage (11 sheets)

*Fax and mail original*

c. Tom Johnson c/o Shewa Shivaswami - FCDMC
Tom Renckly - FCDMC

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Shrinkage may continue for a number of years, depending on the size and shape of the concrete mass. The rate and ultimate amount of shrinkage are usually smaller for large masses of concrete than for small masses, although shrinkage continues longer for large masses. Higher volume-to-surface ratios (larger elements) yield lower shrinkage as shown in Fig. 13-7.

The rate and amount of drying shrinkage for small concrete specimens are shown in Fig. 13-8. Specimens were initially moist-cured for 14 days at 70°F, then stored for 38 months in air at the same temperature and 50% relative humidity. Shrinkage recorded at the age of 38 months ranged from 600 to 790 millionths. An average of 34% of this shrinkage occurred within the first month. At the end of 11 months an average of 90% of the 38-month shrinkage had taken place. The general uniformity of shrinkages of all the types of cement at the different ages can be noted.

If the tensile stress that results from restrained drying shrinkage exceeds the tensile strength of the concrete, cracks will develop. Where there is no restraint, movement occurs freely and no stresses or cracks develop. Recommendations for proper joint spacing to control cracks are discussed in Chapter 9. See "Plastic Shrinkage Cracking" in Chapter 11 for information on early volume changes.

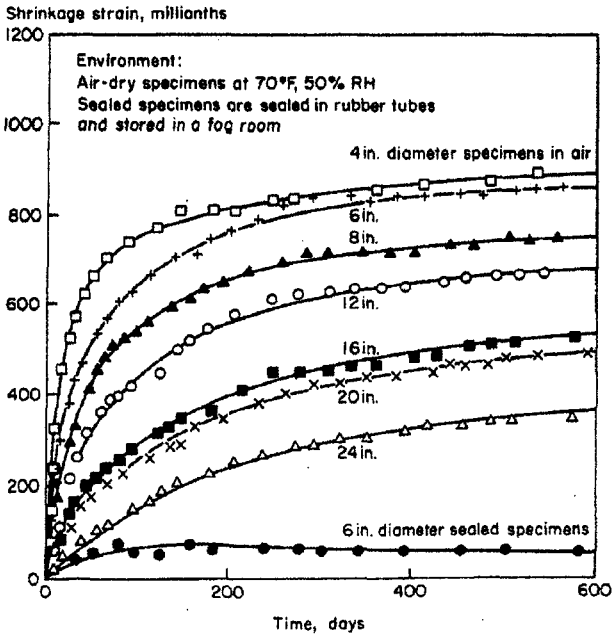


**Fig. 13-7. Drying shrinkage of various sizes of cylindrical specimens of Elgin gravel concrete. Reference 13-24.**

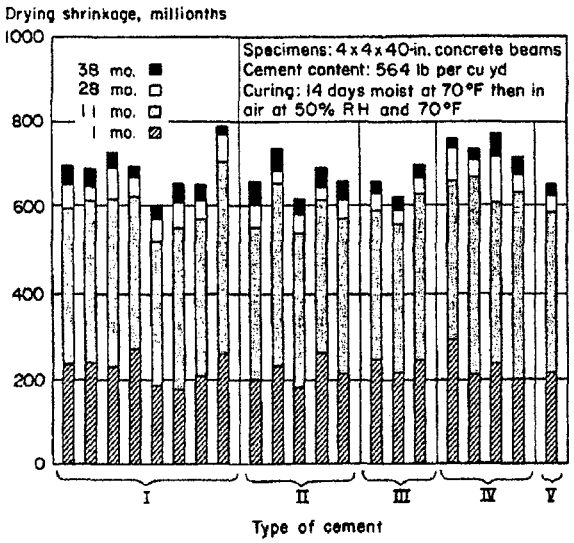


**Fig. 13-8. Results of long-term drying shrinkage tests by the U.S. Bureau of Reclamation. Shrinkage ranged from 600 to 790 millionths after 38 months of drying. The shrinkage of concretes made with air-entraining cements was similar to that for non-air-entrained concretes in this study. References 13-4 and 13-6.**

## Effect of Concrete Ingredients on Drying Shrinkage

The most important controllable factor affecting shrinkage is the amount of water per unit volume of concrete. The results of tests illustrating the water content-shrinkage relationship are shown in Fig. 13-9. Shrinkage can be minimized by keeping the water

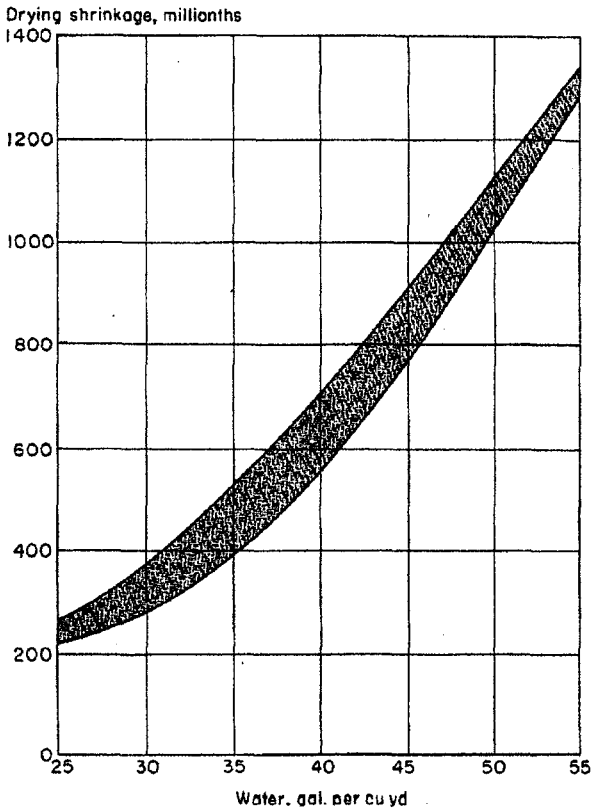


**Fig. 13-9. Relationship of total water content and drying shrinkage. A large number of mixtures with various proportions is represented within the area of the band curves. Drying shrinkage increases with increasing water contents. 1 gal = 8.34 lb of water.**

content of concrete as low as possible. This is achieved by keeping the total coarse aggregate content of the concrete as high as possible. Use of low slumps and placing methods that minimize water requirements are thus major factors in controlling concrete shrinkage. Any practice that increases the water requirement of the cement paste, such as the use of high slumps, excessively high freshly mixed concrete temperatures, high fine-aggregate contents, or small-size coarse aggregate, will increase shrinkage. Work performed at the Massachusetts Institute of Technology showed that for each 1% increase in mixing water, concrete shrinkage increased about 2%.*

The type of cement, cement fineness and composition, and cement content have relatively little effect on the drying shrinkage of normal-strength concrete. Table 13-3 illustrates that within the range of practical concrete mixes—5 to 8 bags of cement per cubic yard—cement content has little effect on shrinkage of concrete.

**Table 13-3. Effect of Cement Content on Drying Shrinkage of Concrete***

| Cement content, bags/cu yd** | Concrete composition by absolute volume† | | | | | Water + Air | Water-cement ratio by wt. | Slump, in. | Shrinkage†† |
|---|---|---|---|---|---|---|---|---|---|
| | Cement | Water | Air | Total, paste | Aggregate | | | | |
| 4.99 | 0.089 | 0.202 | 0.017 | 0.308 | 0.692 | 0.219 | 0.72 | 3.3 | 0.0330 |
| 5.99 | 0.107 | 0.207 | 0.016 | 0.330 | 0.670 | 0.223 | 0.62 | 3.6 | 0.0330 |
| 6.98 | 0.124 | 0.210 | 0.014 | 0.348 | 0.652 | 0.224 | 0.54 | 3.8 | 0.0289 |
| 8.02 | 0.143 | 0.207 | 0.015 | 0.365 | 0.635 | 0.223 | 0.46 | 3.8 | 0.0300 |

*American River sand and gravel graded to 1-in. maximum.
**One bag equals 94 lb.
†Average of 3 batches.
††Average of nine 3x3x10-in. prisms cured wet for 7 days, then dried for 14 days.
Reference 13-17.

Aggregates in concrete, especially coarse aggregate, physically restrain the shrinkage of hydrated cement paste. Paste content affects the drying shrinkage of mortar more than that of concrete. Drying shrinkage is also dependent on the type of aggregate. Hard, rigid aggregates are difficult to compress and provide more restraint to shrinkage of cement paste. As an extreme example, if steel balls were substituted for ordinary coarse aggregate, shrinkage would be reduced 30% or more. Drying shrinkage can also be reduced by avoiding aggregates that have high drying shrinkage properties and aggregates containing excessive amounts of clay. Quartz, granite, feldspar, limestone, and dolomite aggregates generally produce concretes with low drying shrinkages.** Steam curing will also reduce drying shrinkage. (See Chapter 10, "Curing Concrete.")

Some admixtures require an increase in the unit water content of concrete and for this reason they can be expected to increase drying shrinkage. The use of accelerators such as calcium chloride results in increased drying shrinkage of concrete. Despite reductions in water content, many chemical admixtures of the water-reducing type increase drying shrinkage substantially, particularly those that contain an accelerator to counteract the retarding effect of the admixture. Air entrainment and some finely divided mineral admixtures such as fly ash, have little or no effect on drying shrinkage. Drying shrinkage can be evaluated in accordance with ASTM C 157.

## CURLING (WARPING)

In addition to horizontal movement caused by changes in moisture and temperature, curling of slabs on ground can be caused by differences in moisture content and temperature between the top and bottom of slabs.

The edges at the joints tend to curl upward when the surface of a slab is drier or cooler than the bottom. A slab will assume a reverse curl when the surface is wetter or warmer than the bottom, but enclosed slabs, such as floors on ground, curl only upward. When the edges of an industrial floor slab are curled upward, lift-truck traffic passing over joints causes a repetitive vertical deflection that creates a great potential for fatigue cracking in the slab. The amount of vertical curl upward (curling) is small for a short, thick slab.

Even though designers are aware of moisture effects and the existence of curling of slabs, they tend to use only temperature-range changes as the design factor when determining slab length and the size of joint openings.†

Curling can be reduced or eliminated by using design and construction techniques that minimize shrinkage differentials and by using techniques described earlier to reduce temperature and moisture-related volume changes.††

## ELASTIC AND INELASTIC DEFORMATION

### Compression Strain

The series of curves in Fig. 13-10 illustrate the amount of compressive stress and strain that results instantaneously due to loading of unreinforced concrete. With

*Reference 13-2, page 425.
**Reference 13-39.
†Reference 13-40.
††See References 13-46 and 13-47 for more information.

USE 16" – APPROX. THICKNESS OF SLAB

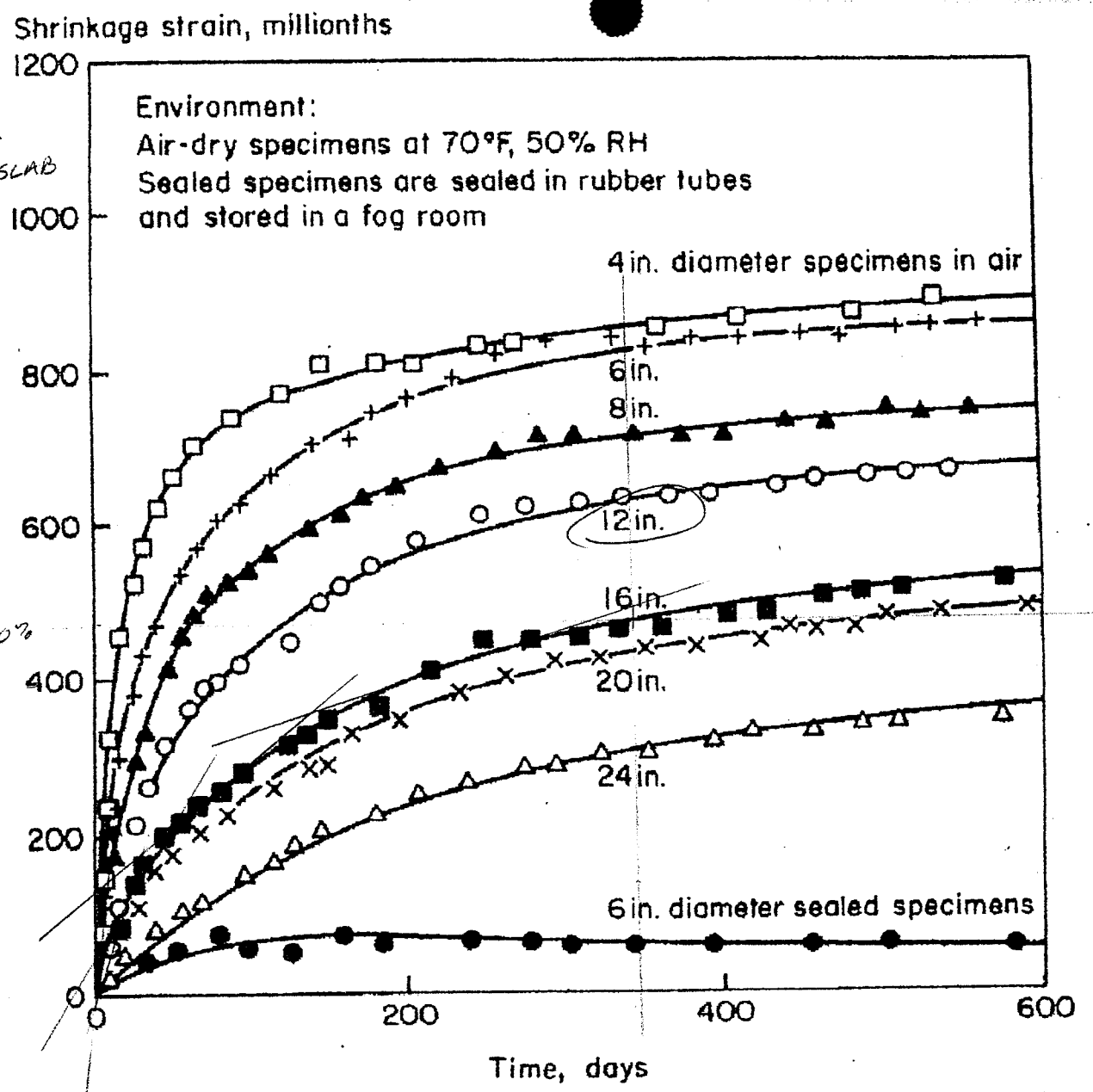


**Fig. 13-7. Drying shrinkage of various sizes of cylindrical specimens of Elgin gravel concrete. Reference 13-24.**

shrinkage exceeds
cracks will develop
ment occurs freely
Recommendations
cracks are discusse
age Cracking" in
volume changes.

## Effect of Concr
## Drying Shrinka

The most impo
shrinkage is the a
concrete. The re
content-shrinkage
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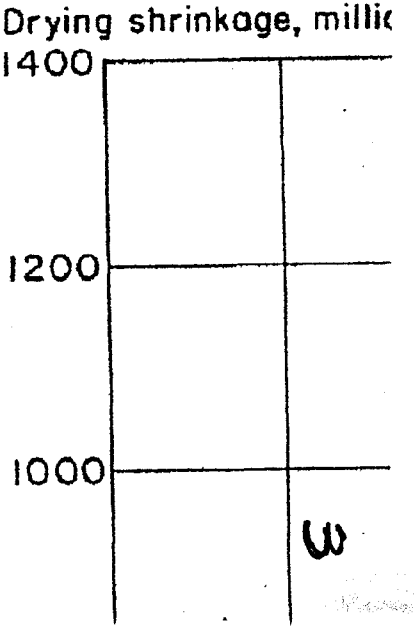

AVG 38 MONTH 15 647 MIL. 5 DAY IS 6.3% OF TOTAL
7 DAY IS 8.7% OF TOTAL

AVG. 34% OCCURRED IN FIRST MONTH
USING STRAIGHT LINE INTERPOLATION -
72% OF THE 7 DAY SHRINKAGE OCCURS IN 5 DAYS

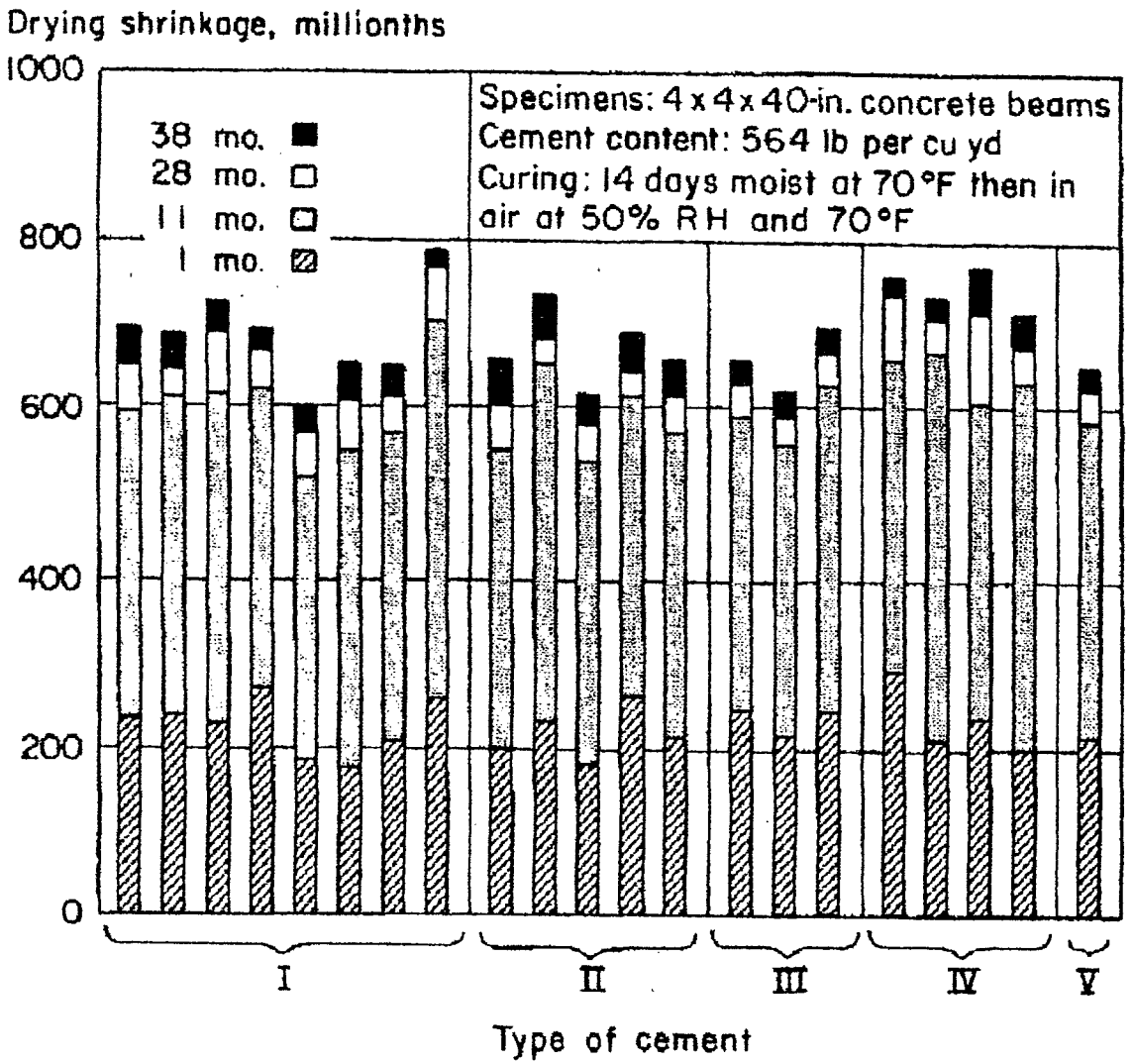


**Fig. 13-8. Results of long-term drying shrinkage tests by the U.S. Bureau of Reclamation. Shrinkage ranged from 600 to 790 millionths after 38 months of drying. The shrinkage of concretes made with air-entraining cements was similar to that for non-air-entrained concretes in this study. References 13-4 and 13-6.**

ONLY 2.4% OF TOTAL 38 MONTH SHRINKAGE OCCURS
BETWEEN 5 AND 7 DAYS

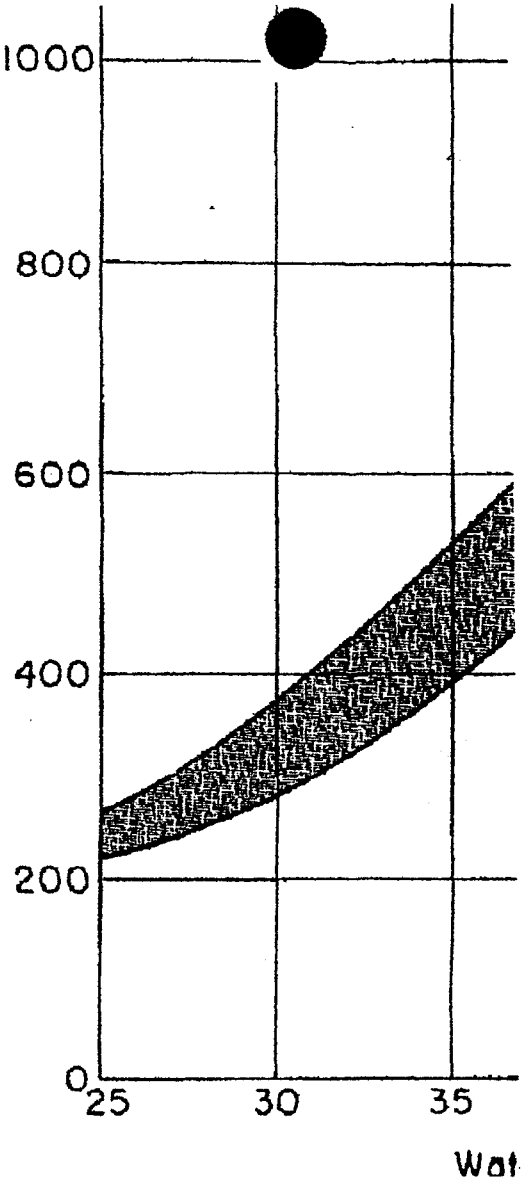


**Fig. 13-9. Relationship o shrinkage. A large numbe tions is represented with Drying shrinkage increa tents. 1 gal = 8.34 lb of wa**

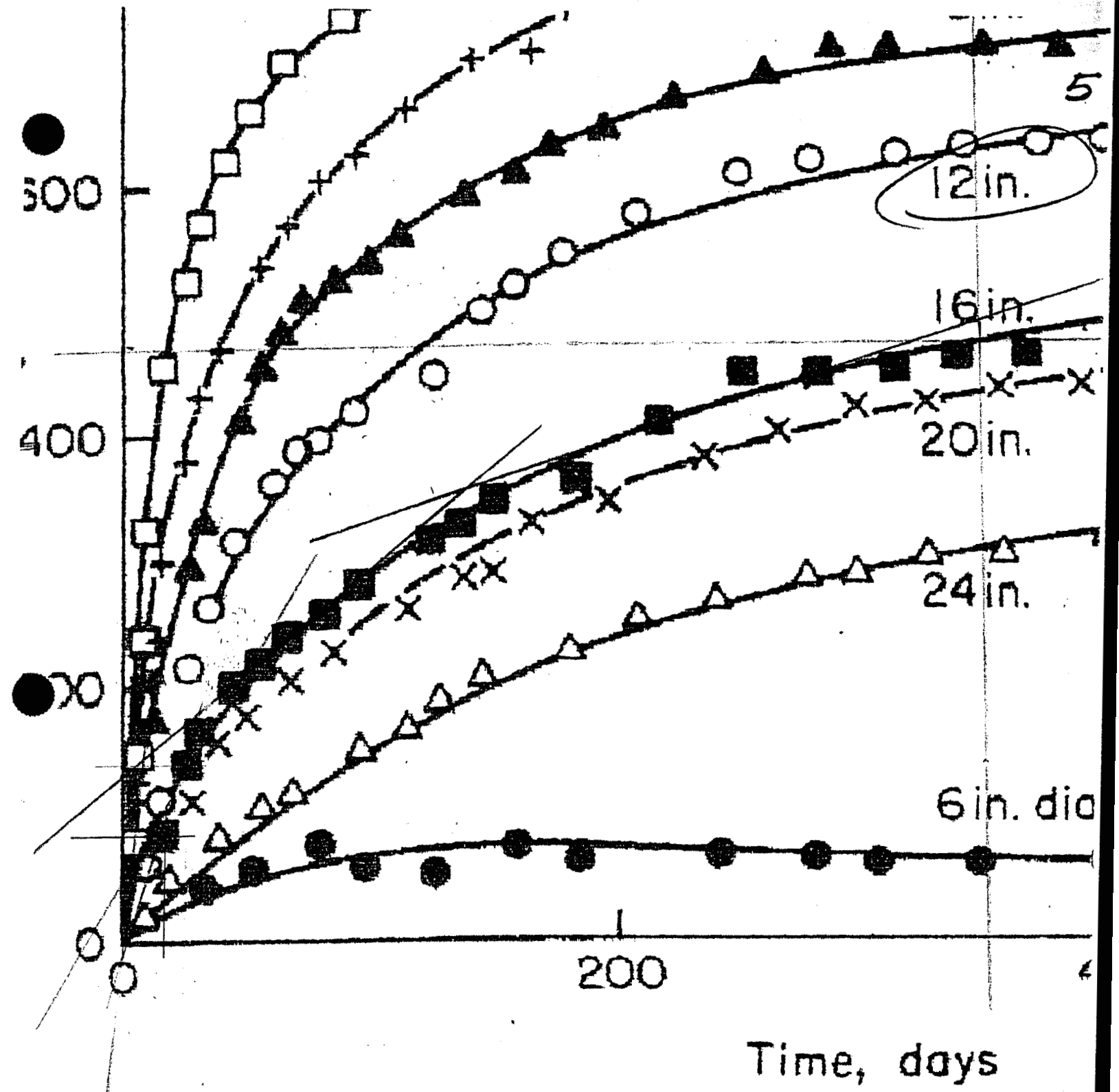


**Fig. 13-7. Drying shrinkage of various specimens of Elgin gravel concrete. R**

Drying shrinkage, millionths

Stantec

Project: Golden Eagle Park Dam  Project Number: 82000157

Notes: 16" SPECIMEN  Scale:

Page 6 of ___ Page(s)

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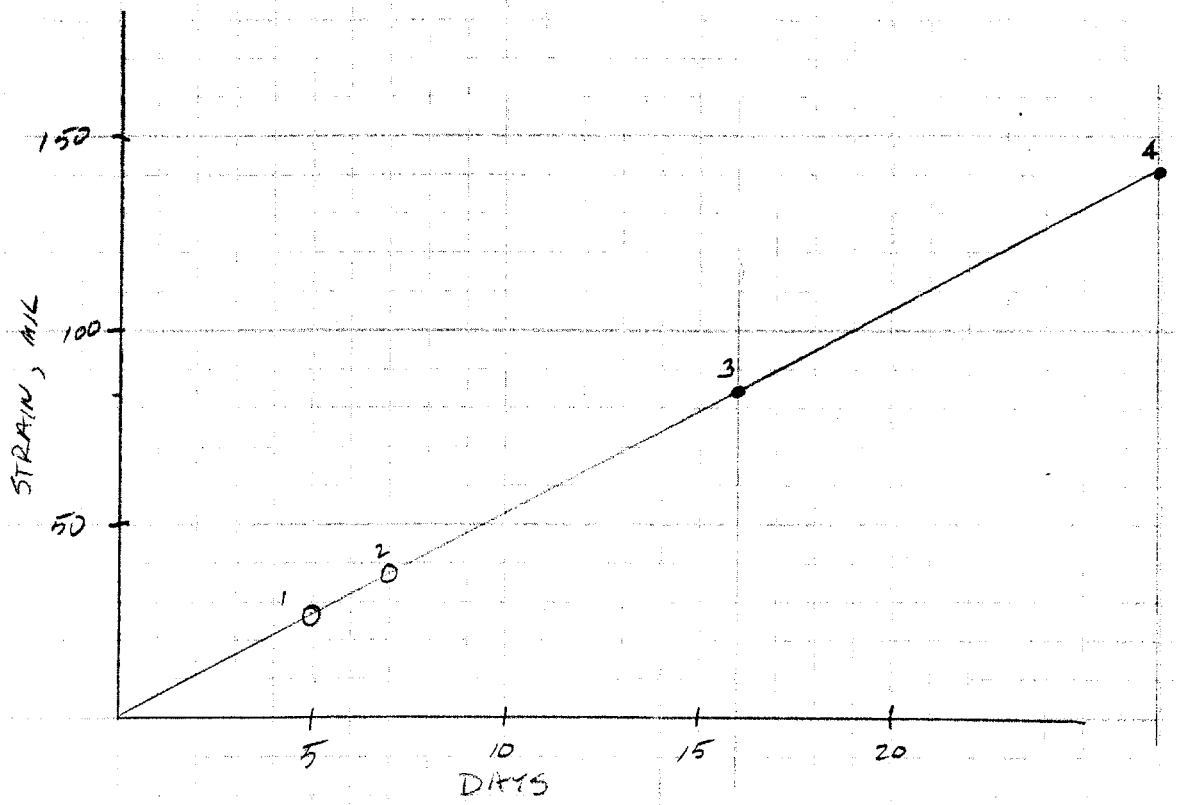


POINT 1 - 5 days, Strain = 28 mil

2 - 7 days, Strain = 38 mil

3 - 16 days, Strain = 84 mil

4 - 27 days, Strain = 141 mil

• per test data

○ interpolated

Stantec

Project: Calculations Project Number: 82000157

Notes: Scale:

Page 7 of Page(s)

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Figure 13-7

0.96" = 200 mil
1.88" = 200 days

16" Specimen

Total Shrinkage 521 mil @ 600 days

5 days = 0.047"
7 days = 0.066"

90% = 469 mil @ 349 days

5 days 28/521 = 5.4%
7 days 38/521 = 7.3%

1.9% INCREMENTAL
= 10 mil

Figure 13-8

0.87" = 200 mil

1 month = 1.02" = 234 mil

5 day Alg = 42 mil
7 day Alg = 58 mil

38 months = 667 mil

$\frac{5}{30}$ = 0.167 months

0.167 x 234 = 39 mil

$\frac{7}{30}$ = 0.23 months

0.23 x 234 = 54 mil

1 mo: $\frac{1.18"}{0.87"}$ = 271 mil

5 day 0.167 x 271 = 45
7 day 0.23 x 271 = 62

$\frac{42}{667}$ = 6.3%

$\frac{58}{667}$ = 8.7%

2.4% INCREMEN

.024 x 667 = 16 mil

fective as a thin slab with narrow openings. For an effectiveness of 60%, the openings in joints of 7- and 9-in.-thick (180- and 230-mm) slabs were 0.025 and 0.035 in. (0.64 and 0.89 mm) respectively.

### Influence of Subgrade Support

While it is true that concrete floors on ground do not necessarily require strong support from the subgrade to successfully carry design loads, strong support from the subgrade (as measured by *k* value) will increase joint effectiveness. Silts and clays have low support values, that is, $k = 50$ to 100 pci (13-27 MPa/m), that hasten the loss of aggregate interlock effectiveness after only a few repetitive loading cycles. Sandy soils with midrange support values of $k = 200$ pci (54 MPa/m) can keep joint effectiveness at an acceptable percentage limit of 50% through one million load cycles. Sand-gravel and cement-treated subbases with high support values, $k =$ 300 pci (81 MPa/m) and higher, keep aggregate interlock effectiveness at high percentages through one million load cycles.

### Influence of Load Magnitude

Light loads of 5000 lb (2270 kg) or less usually cause little or no joint deterioration and probably do not need to be considered. Significant differences in aggregate interlock effectiveness, however, develop under repetitive heavy loads. Effectiveness decreases as the magnitude of load increases. Joints that successfully provide load transfer for one load condition may break down under a new, heavier load condition.

### Influence of Aggregate Shape

Aggregate interlock is more effective in load transfer when the aggregate is crushed gravel or crushed stone rather than natural gravel. The higher effectiveness is attributed to the angularity of the coarse aggregate particles.

## HOW TO IMPROVE LOAD TRANSFER ACROSS JOINTS

The ability of a joint to effectively transfer repetitious loading will be improved by—

- Keeping a small joint opening, 0.035 in. (0.89 mm)
- Increasing the slab thickness
- Strengthening the subgrade support
- Using an angular coarse aggregate
- Using dowel bars (see page 5).

# Concrete Myths

Myths or fallacies surround just about all fields of endeavor, and concrete technology is no exception. In fact, concrete may have more than its share of old wives' tales. The following comments are intended to dispel a myth involving the cement content of concrete mixtures and the resulting drying shrinkage. Comments on other widely held concrete myths will be published in future issues of *Concrete Technology Today*.

### Myth: High Cement Contents Cause High Shrinkage

The single most important factor affecting drying shrinkage of portland cement concrete mixes is the amount of water per unit volume of concrete. Consequently, concrete with a wet consistency will shrink more after curing than one with a dry consistency because the wetter consistency is obtained by use of a higher water-cement ratio, a greater volume of paste, or a combination of the two.

If one were disposed to compare apples with oranges, it is true that it could be shown that a higher cement content increases shrinkage; for example, the relative drying shrinkages of neat cement paste, mortar, and concrete may be of the order of 5, 2, and 1. However, for a given set of materials and a uniform water content per cubic yard, the drying shrinkage of concrete varies but little for a wide range of cement contents. This is because a rich mix will have a lower water-cement ratio—factors that offset each other.

Tests made by Tremper and Spellman at the California Division of Highways[1] indicate that within the range of practical concrete mixes—5 to 8 bags of cement per cubic yard (279 to 446 kg/m³)—cement content has little effect on shrinkage (see table).

The California tests were made with concrete containing 1-in. (25-mm) maximum-size river sand and gravel. The percentage of sand was reduced progressively with increasing cement content in accordance with American Concrete Institute standard practices for proportioning concrete mixes.

The data show that the volume of paste (cement, water, and air) increased and the volume of aggregate decreased with increasing cement contents, but the drying shrinkage did not change significantly because the volume of water in the various mixes was nearly constant. The California data corroborate the statement made by the U.S. Bureau of Reclamation, and other reputable agencies, that shrinkage is governed mainly by the unit water content of fresh concrete.[2]

The California tests also included mortar mixes made with portland cement and graded Ottawa sand in the proportions of 1:3, 1:2½, 1:2, and 1:1½. Corresponding cement contents were 8.0, 9.3, 11.2, and 13.5 bags per cubic yard (446, 519, 625, and 753 kg/m³). The mortar data showed trends similar to those found for concrete mixes. As the volume of paste increased, the volume of sand decreased with increasing cement contents. The water contents and shrinkage of the mortars were essentially constant.


**References**

1. Tremper, Bailey; and Spellman, D. L., "Shrinkage of Concrete—Comparison of Laboratory and Field Performance," *Highway Research Record No. 3*, Highway Research Board of the National Academy of Sciences, National Research Council, Washington, D.C., pages 32-34.
2. *Concrete Manual*, U.S Department of the Interior, Bureau of Reclamation, Eighth Edition, 1975, pages 16-17.


### Effect of Cement Content on Shrinkage of Concrete[a]

| Cement content, bags/cu yd | Concrete composition by absolute volume[b] | | | | | Water cement ratio, by wt. | Slump, in. | Shrinkage,[c] % |
|---|---|---|---|---|---|---|---|---|
| | Cement | Water | Air | Total paste | Aggregate | | | |
| 4.99 | 0.089 | 0.202 | 0.017 | 0.308 | 0.692 | 0.72 | 3.3 | 0.0330 |
| 5.99 | 0.107 | 0.207 | 0.016 | 0.330 | 0.670 | 0.62 | 3.6 | 0.0330 |
| 6.98 | 0.124 | 0.210 | 0.014 | 0.348 | 0.652 | 0.54 | 3.8 | 0.0289 |
| 8.02 | 0.143 | 0.207 | 0.015 | 0.365 | 0.635 | 0.46 | 3.8 | 0.0300 |

[a] Adapted from Reference 1.
[b] Average of 3 batches.
[c] Average of nine 3- by 3- by 10-in. prisms cured wet for 7 days, then dried for 14 days.

1 in. = 25.4 mm

1 bag/cu yd = 55.77 kg/m³



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## Volume Stability

Hardened concrete changes volume slightly due to changes in temperature, moisture, and stress. These volume or length changes may range from about 0.01% to 0.08%. Thermal volume changes of hardened concrete are about the same as those for steel.

Concrete kept continually moist will expand slightly. When permitted to dry, concrete will shrink. The primary factor influencing the amount of drying shrinkage is the water content of the freshly mixed concrete. Drying shrinkage increases directly with increases in this water content. The amount of shrinkage also depends upon several other factors, such as amounts of aggregate used, properties of the aggregate, size and shape of the concrete mass, relative humidity and temperature of the environment, method of curing, degree of hydration, and time. Cement content has little to no effect on shrinkage of concrete with cement contents between 5 and 8 bags per cu yd.

Concrete under stress will deform elastically. Sustained stress will result in additional deformation called creep. The rate of creep (deformation per unit of time) decreases with time.

The magnitude of volume changes and factors influencing them are discussed in Chapter 13, "Volume Changes of Concrete."

## Control of Cracking

Two basic causes of cracks in concrete are (1) stress due to applied loads and (2) stress due to drying shrinkage or temperature changes in restrained conditions.

Drying shrinkage is an inherent, unavoidable property of concrete; therefore, properly positioned reinforcing steel is used to reduce crack widths, or joints (Fig. 1-16) are used to predetermine and control the location of cracks. Thermal stress due to fluctuations in temperature can cause cracking, particularly at an early age.

Concrete shrinkage cracks occur because of restraint. When shrinkage occurs and there is no restraint, the concrete does not crack. Restraint comes from several sources. Drying shrinkage is always greater near the surface of concrete; the moist inner portions restrain the concrete near the surface, which can cause cracking. Other sources of restraint are reinforcing steel embedded in concrete, the interconnected parts of a concrete structure, and the friction of the subgrade on which concrete is placed.

Joints are the most effective method of controlling unsightly cracking. If a sizable expanse of concrete (a wall, slab, or pavement) is not provided with properly spaced joints to accommodate drying shrinkage and temperature contraction, the concrete will crack in a random manner.*

Control joints are grooved, formed, or sawed into sidewalks, driveways, pavements, floors, and walls so that cracking will occur in these joints rather than in a random manner. Control joints permit movement in the plane of a slab or wall. They extend to a depth of approximately one-quarter the concrete thickness.

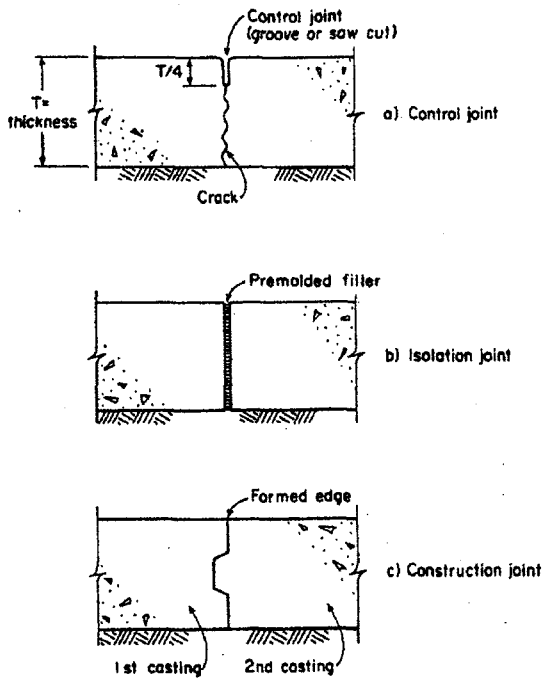


**Fig. 1-16. The three basic types of joints used in concrete slab-on-ground construction.**

Isolation joints separate a slab from other parts of a structure and permit horizontal and vertical movements of the slab. They are placed at the junction of floors with walls, columns, footings, and other points where restraint can occur. They extend the full depth of the slab and include a premolded joint filler.

Construction joints occur where concrete work is concluded for the day; they separate areas of concrete placed at different times. In slabs-on-ground, construction joints usually align with and function as control or isolation joints.

*Refer to Chapter 9 for more information.

## REFERENCES

1-1. McMillan, F. R., and Lyse, Inge, "Some Permeability Studies of Concrete," *Journal of the American Concrete Institute, Proceedings,* vol. 26, December 1929, pages 101-142.

1-2. Powers, T. C., *The Bleeding of Portland Cement Paste, Mortar, and Concrete Treated As a Special Case of Sedimentation,* Research Department Bulletin RX002, Portland Cement Association, 1939.

Cement temperature has only a minor effect on the temperature of the freshly mixed concrete because of cement's low specific heat and the relatively small amount of cement in the mixture. A cement temperature change of 10°F generally will change the concrete temperature by only 1°F. Because cement loses heat slowly during storage, it may be warm when delivered. (This heat is produced in grinding the cement clinker during manufacture.) Since the temperature of cement does affect the temperature of the fresh concrete to some extent, some specifications place a limit on its temperature at the time of use. The ACI 305 recommended maximum temperature at which cement should be used in concrete is 170°F.* However, it is preferable to specify a maximum temperature for freshly mixed concrete rather than place a temperature limit on individual ingredients.**

## PREPARATION BEFORE CONCRETING

Before concrete is placed, certain precautions should be taken during hot weather to maintain or reduce concrete temperature. Mixers, chutes, belts, hoppers, pump lines, and other equipment for handling concrete should be shaded, painted white, or covered with wet burlap to reduce solar heat.

Forms, reinforcing steel, and subgrade should be fogged or sprinkled with cool water just before the concrete is placed. Fogging the area during placing and finishing operations cools the contact surfaces and surrounding air and increases its relative humidity. This reduces the temperature rise of the concrete and minimizes the rate of evaporation of water from the concrete after placement. For slabs on ground, it is a good practice to moisten the subgrade the evening before concreting. There should be no standing water or puddles on forms or subgrade at the time concrete is placed.

During extremely hot periods, improved results can be obtained by restricting concrete placement to early morning, evening, or nighttime hours, especially in arid climates. This practice has resulted in less thermal shrinkage and cracking of thick slabs and pavements.

## TRANSPORTING, PLACING, FINISHING

Transporting and placing concrete should be done as quickly as is practical during hot weather. Delays contribute to loss of slump and an increase in concrete temperature. Sufficient labor and equipment must be available at the jobsite to handle and place concrete immediately upon delivery.

Prolonged mixing, even at agitating speed, should be avoided. If delays occur, the heat generated by mixing can be minimized by stopping the mixer and then agitating intermittently. The Standard Specification for Ready Mixed Concrete (ASTM C 94) requires that discharge of concrete be completed within 1½ hours or before the drum has revolved 300 times, whichever occurs first. During hot weather the time limit can be reasonably reduced to 1 hour or even 45 minutes.

Since concrete hardens more rapidly in hot weather, extra care must be taken with placement techniques to avoid cold joints. For placement of walls, shallower layers can be specified to assure enough time for consolidation with the previous lift. Temporary sunshades and windbreaks help to minimize cold joints.

Floating should be done promptly after the water sheen disappears from the surface or when the concrete can support the weight of a finisher. Finishing on dry and windy days requires extra care. Rapid drying of the concrete at the surface may cause plastic shrinkage cracking.

## PLASTIC SHRINKAGE CRACKING

Plastic shrinkage cracks are cracks that sometimes occur in the surface of freshly mixed concrete soon after it has been placed and while it is being finished (Fig. 11-7). These cracks appear mostly on horizontal surfaces and can be substantially eliminated if preventive measures are taken.

Plastic shrinkage cracking is usually associated with hot-weather concreting; however, it can occur any time ambient conditions produce rapid evaporation of moisture from the concrete surface. Such cracks occur when water evaporates from the surface faster than it can appear at the surface during the bleeding process. This creates rapid drying shrinkage and tensile stresses in the surface that often result in short, irregular cracks. The following conditions, singly or collectively, increase evaporation of surface moisture and increase the possibility of plastic shrinkage cracking:

1. High air and concrete temperature
2. Low humidity
3. High winds

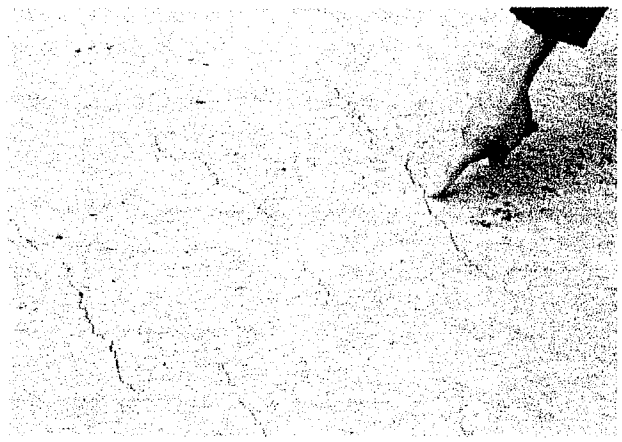

**Fig. 11-7. Typical plastic shrinkage cracks.**

*Reference 11-7, page 8.
**See Reference 11-1 for more information.

The crack length is generally from a few inches to a few feet in length and they are usually spaced in an irregular pattern from a few inches to 2 ft apart. Fig. 11-8 is useful for determining when precautionary measures should be taken. There is no way to predict with certainty when plastic shrinkage cracking will occur. However, when the rate of evaporation exceeds 0.2 lb per square foot per hour, precautionary measures are almost mandatory. Cracking is possible if the rate of evaporation exceeds 0.1 lb per square foot per hour.

The simple precautions listed below can minimize the possibility of plastic shrinkage cracking. They should be considered while planning for hot-weather-concrete construction or while dealing with the problem after construction has started. They are listed in the order in which they should be done during construction.

1. Moisten the subgrade and forms.
2. Moisten concrete aggregates that are dry and absorptive.
3. Erect temporary windbreaks to reduce wind velocity over the concrete surface.
4. Erect temporary sunshades to reduce concrete surface temperatures.
5. Keep the freshly mixed concrete temperature low by cooling the aggregates and mixing water.

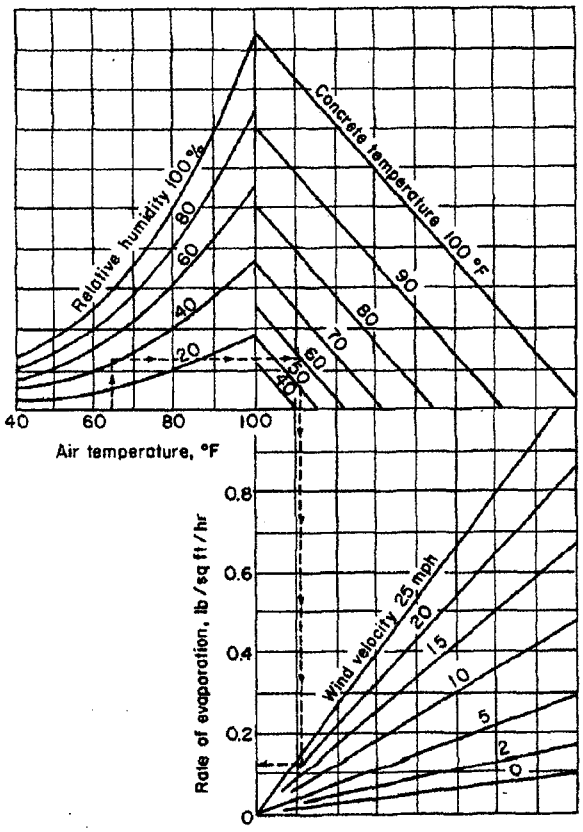


**Fig. 11-8. Effect of concrete and air temperatures, relative humidity, and wind velocity on rate of evaporation of surface moisture from concrete. Reference 11-2.**

6. Protect the concrete with temporary coverings, such as polyethylene sheeting, during any appreciable delay between placing and finishing. Evaporation retarders (usually polymers) can be spray-applied immediately after screeding to retard water evaporation before final finishing operations and curing commence. These materials are floated and troweled into the surface during finishing and should have no adverse effect on the concrete or inhibit the adhesion of membrane-curing compounds.
7. Reduce time between placing and start of curing by eliminating delays during construction.
8. Protect the concrete immediately after final finishing to minimize evaporation. This is most important to avoid cracking. Use of a fog spray to raise the relative humidity of the ambient air is an effective means of preventing evaporation from the concrete. Fogging should be continued until a suitable curing material such as a curing compound, wet burlap, or curing paper can be applied.

If plastic shrinkage cracks should appear during finishing, the cracks can be closed by striking each side of the crack with a float and refinishing. However, the cracking may recur unless the causes are corrected.

## CURING AND PROTECTION

Curing and protection are more critical in hot and cold weather than in temperate periods. Retaining forms in place cannot be considered a satisfactory substitute for curing in hot weather; they should be loosened as soon as practical without damage to the concrete. Water should then be applied at the top exposed concrete surfaces, for example, with a soil-soaker hose, and allowed to run down inside the forms. On hardened concrete and on flat concrete surfaces in particular, curing water should not be excessively cooler than the concrete. This will minimize cracking caused by thermal stresses due to temperature differentials between the concrete and curing water.

The need for moist curing is greatest during the first few hours after finishing. To prevent the drying of exposed concrete surfaces, moist curing should commence as soon as the surfaces are finished and continue for at least 24 hours. In hot weather, continuous moist curing for the entire curing period is preferred. However, if moist curing can not be continued beyond 24 hours, the concrete surfaces should be protected from drying with curing paper, heat-reflecting plastic sheets, or membrane-forming curing compounds while the surfaces are still damp. Moist-cured surfaces should dry out slowly after the curing period to reduce the possibility of surface crazing* and cracking.

*Crazing, a network pattern of fine cracks that do not penetrate much below the surface, is caused by minor surface shrinkage. Crazing cracks are very fine and barely visible except when the concrete is drying after the surface has been wet. The cracks encompass small concrete areas less than 2 in. in dimension, forming a chicken-wire pattern.

**ARIZONA DEPARTMENT OF WATER RESOURCES**
**Dam Safety Section**
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**Governor**

**RITA PEARSON MAGUIRE**
**Director**

July 13, 2000

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JUL 17 2000
STANTEC

Mr. Charles V. Gopperton, P.E.
Project Engineer
Stantec Consulting, Inc.
8211 South 48th Street
Phoenix, Arizona 85044-5355

**Subject: Golden Eagle Park Dam (07.33)**
**Temporary Deviation from Approved Specifications**

Dear Mr. Gopperton:

We have reviewed your letter dated July 13, 2000 and the accompanying material on concrete shrinkage. Your request to allow the placement of concrete for adjacent sections of the outlet box culvert slab with a 4 day curing time instead of the specified 7 days is satisfactory to ADWR.

This permission for a deviation from the required 7 days curing time between the placement of adjacent concrete structural sections is only for the concrete placement scheduled for Friday, July 14, 2000. Future concrete placement must adhere to the approved specifications in all respects.

If you have any questions regarding this approval please contact Gerald Cox at (602)-417-2445.

Sincerely,

Dan Roger Lawrence, P.E.
Manager
Dam Safety Section

cc: Tom Renckly, FCDMC
Shewa Shivaswamy, FCDMC

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

To: FCD TRAILER
Sender: Chuck Gopperton
Attention: SHIWA SHIVASUMMI
Tel. No: 438-2200
Fax No: 480 836 4530
Fax No: 431-9562
Date: 7-13-00
5 page(s) total includes cover sheet
File: 82000157
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**Reference:** Golden Eagle Park Dam

Attachments: ASTM Spec for hydrostatic testing of Pipe joints (section 10)

Message: Proposed test for pipe at principal outlet works

Designation: C 443 – 98

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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# Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets[1]

This standard is issued under the fixed designation C 443; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

## 1. Scope

1.1 This specification covers flexible watertight joints for circular concrete sewer and culvert pipe and precast manhole sections, using rubber gaskets for sealing the joints, where infiltration or exfiltration is a factor in the design. The specification covers the design of joints and the requirements for rubber gaskets to be used therewith, for pipe conforming in all other respects to Specification C 14 or Specification C 76, and precast manhole section conforming in all other respects to Specification C 478, provided that if there is conflict in permissible variations in dimensions the requirements of this specification for joints shall govern.

1.2 A complete metric companion to Specification C 443 has been developed—C 443M; therefore, no metric equivalents are presented in this specification.

NOTE 1—This specification covers the design, material, and performance of the rubber gasket joint only. Joints covered by this specification are normally adequate for hydrostatic pressures up to 13 psi (30 ft) without leakage, when tested in accordance with Section 10. Infiltration or exfiltration quantities for an installed pipeline are dependent upon many factors other than the joints, and allowable quantities must be covered by other specifications and suitable testing of the installed pipeline and system.

## 2. Referenced Documents

2.1 *ASTM Standards:*

C 14 Specification for Concrete Sewer, Storm Drain, and Culvert Pipe[2]

C 76 Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe[2]

C 478 Specification for Precast Reinforced Concrete Manhole Sections[2]

C 822 Terminology Relating to Concrete Pipe and Related Products[2]

D 395 Test Methods for Rubber Property—Compression Set[3]

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers— Tension[3]

D 471 Test Method for Rubber Property—Effect of Liquids[3]

D 573 Test Method for Rubber—Deterioration in an Air Oven[3]

D 1149 Test Method for Rubber Deterioration—Surface Ozone Cracking in a Chamber[3]

D 2240 Test Method for Rubber Property—Durometer Hardness[3]

## 3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe, see Terminology C 822.

## 4. Basis of Acceptance

4.1 The acceptability of the pipe joints and gaskets shall be determined by the results of the physical tests prescribed in this specification, if and when required, and by inspection to determine whether the pipe joints and gaskets conform to this specification as to design and freedom from defects.

## 5. Materials and Manufacture for Gaskets

5.1 All rubber gaskets shall be extruded or molded and cured in such a manner that any cross section will be dense, homogeneous, and free of porosity, blisters, pitting, and other imperfections. The gaskets shall be extruded or molded to the specified size within a tolerance of ±6 % on any dimension, measured at any cross section. The rubber gasket shall be fabricated from a high-grade rubber compound. The basic polymer shall be natural rubber, synthetic rubber, or a blend of both acceptable to the owner and meeting the physical requirements prescribed in Section 6.

## 6. Physical Requirements for Gaskets

6.1 *Testing*—Testing shall be in accordance with Section 9.

6.1.1 *Standard Gasket Requirement*—The gaskets shall meet with the following physical requirements:

[1] This specification is under the jurisdiction of ASTM Committee C-13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.08 on Rubber Gaskets.

Current edition approved May 10, 1998. Published December 1998. Originally published as C 443 – 59 T. Last previous edition C 443 – 94.

[2] *Annual Book of ASTM Standards*, Vol 04.05.

[3] *Annual Book of ASTM Standards*, Vol 09.01.

| | |
|---|---|
| Tensile strength, min | 1200 psi |
| Elongation at break, min, % | 350 |
| Shore durometer hardness: | |
| Min | 35[A] |
| Max | 65[A] |
| Compression set, max, % of original deflection | 25 |
| Accelerated aging, max % of original | |
| Decrease in tensile strength | 15 |
| Decrease in elongation | 20 |
| Liquid immersion, max % weight increase | |
| Water absorption | 10 |
| Ozone resistance | no cracks in accordance with Test Method D 1149 |

[A] Allowable variation ±5 from manufacturer's specified hardness provided the actual hardness is within the limits of 35 to 65.

6.1.2 *Oil Resistant Gasket Requirements*—The compound shall contain not less than 50 % by volume oil resistant polymer and shall meet the following physical requirements:

| | |
|---|---|
| Tensile strength, min, psi | 1220 |
| Elongation at break, min, % | 350 |
| Shore durometer hardness, nominal: | |
| Min | 35[A] |
| Max | 65[A] |
| Durometer aging, max, increase | 15 |
| Compression set, % (22 h at 158°F) | 25 |
| Accelerated aging (96 h at 158°F) | |
| Decrease in tensile strength, max, % of original | 20 |
| Decrease in elongation, max, % of original | 40 |
| Liquid immersion (volume change): | |
| Oil, max, % after immersion in ASTM #3 for 70 h at 212°F | 80 |
| Water, max, % after immersion for 48 h at 158°F | 15 |
| Ozone resistance, after 72 h exposure in 50 PPHM ozone concentration at 104°F | no visible cracking |

[A] Allowable variation ±5 from manufacturers specified hardness provided the actual hardness is within the limits of 35 to 65.

6.2 If a splice is used in the manufacture of the gasket, the strength shall be such that the gasket shall withstand 100 % elongation over the part of the gasket which includes the splice with no visible separation of the splice. While in the stretched position, the gasket shall be rotated in the spliced area a minimum of 180° in each direction in order to inspect for separation. In addition, any portion of the splice shall be capable of passing a bend test without visible separation. The bend test for gaskets is defined as wrapping the portion of the unstretched gasket containing the splice a minimum of 180° and a maximum of 270° around a rod. For O-ring gaskets the diameter of the rod shall be equal to the cross-section diameter of the gasket. For noncircular gaskets, the rod diameter shall not be less than ½ in. or more than 1 in.

## 7. Design of Joints

7.1 The manufacturer shall furnish the owner with the detailed design of the joint or joints including design and durometer hardness of the rubber gasket proposed to be furnished under this specification.

7.1.1 The joint design shall consist of a bell or groove on one end of a unit of pipe, and a spigot or tongue on the adjacent end of the joining pipe.

7.1.2 All surfaces of the joint upon or against which the gasket may bear shall be smooth, free of spalls, cracks or fractures, and imperfections that would adversely affect the performance of the joint.

7.1.3 The joints of the pipe shall be of such design that they will withstand the forces caused by the compression of the gasket when joined, without cracking or fracturing when tested in accordance with Section 10.

7.1.4 The angle of taper on the conic surfaces of the inside of the bell or groove and the outer surface of the spigot or tongue where the gasket seats shall be not more than 3.5° measured from the pipe axis, except that tapers up to 5° may be used if proven adequate by plant tests as specified in Section 10 and approved by the owner. The conic surface on the spigot or tongue may be modified to properly contain and seat the gasket.

7.1.5 The annular space between the gasket-bearing surfaces of the assembled and centered joint shall be not more than 75 % of the uncompressed thickness of the applied gasket including the manufacturer's tolerances of the joint and gasket. The joint design shall provide for the deflection of a pipe unit by opening one side of the outside perimeter of the joint ½ in. wider than the assembled position without reducing its watertightness. Where greater deflections are required than provided by the joint design, beveled joints or elbows must be provided.

7.1.6 The gasket shall be the sole element depended upon to make the joint flexible and watertight. The gasket shall be a continuous ring which fits snugly into the annular space between the overlapping surfaces of the assembled pipe joint to form a flexible watertight seal.

7.1.7 The gasket shall not be stretched more than 30 % of its original circumference when seated on the spigot or tongue end of the pipe.

7.1.8 Where the particular joint design utilizing a rubber gasket dictates the use of a lubricant to facilitate assembly, the lubricant composition shall have no detrimental effect on the performance of the gasket and joint due to prolonged exposure.

NOTE 2—Joints in an assembled position are defined as joints in the position after assembly in accordance with the manufacturer's design.

7.2 *Alternative Joint Designs*—If permitted by the owner, manufacturers may submit to the owner detailed designs for joints and gaskets other than those described in Section 7. Design submissions shall include joint geometry, tolerances, gasket characteristics, proposed plant tests, gasket splice bend tests, and such other information as required by the owner to evaluate the joint design for field performance. Joints and gaskets of alternative joint designs shall at least meet all test requirements of this specification if permitted by the owner. Alternative joint designs shall be acceptable provided the designs are approved by the owner prior to manufacture and provided the test pipe comply with the specified tests.

## 8. Permissible Variations in Dimensions

8.1 The planes formed by the ends of nonbeveled pipe shall not vary from the perpendicular to the pipe axis by more than 3/16 in. for internal diameters 30 in. and smaller; or by more than ¼ in. for internal diameters 33 to 54 in. inclusive; or not more than ⅜ in. for internal diameters 60 in. and larger.

8.2 The manufacturer's tolerances for the width of the annular space between the gasket bearing surfaces shall not vary by more than ± 10 % of the uncompressed thickness of the applied gasket.

## 9. Test Methods for Gaskets

9.1 The physical properties of the gaskets shall be determined in accordance with the following methods:

9.1.1 *Tensile Strength and Elongation*—Test Methods D 412.

9.1.2 *Hardness*—Test Method D 2240, with the exception of Section 5. The determination shall be taken directly on the gasket. The presser foot shall be applied on areas that are ¼.in. or greater in thickness. If ¼in. or greater thickness is not available in the gasket, thinner samples may be plied up to obtain this thickness.

9.1.3 *Compression Set*—Test Methods D 395, Method B. Test conditions to be 22 h at 70°C. Specimens shall not be prepared from laboratory prepared slabs or by direct molding.

9.1.4 *Accelerated Aging*—Test Method D 573. Test conditions to be 96 h at 70°C.

9.1.5 *Water Absorption*—Test Method D 471. Use distilled water for the standard test liquid. When a 1-in wide test specimen cannot be obtained, use the greatest width obtainable from the test sample. Test conditions shall be 48 h at 70°C.

9.1.6 *Ozone Resistance*—Determine the resistance to ozone in accordance with Test Method D 1149.

9.1.6.1 Specimens shall be the test specimen length of the finished gasket cross-section.

9.1.6.2 Conduct test for 76 h in 50 PPHM concentration at 104 ± 4°F stressed to 20 % extension.

## 10. Performance Requirements for Joints

10.1 The owner may require that assembled joints pass the following performance tests without leakage at the joints, and the manufacturer shall have the option of allowing the assembled joints to stand under a pressure of 13 psi or less, for a maximum of 24 h prior to the test:

10.1.1 *Pipes in Straight Alignment*—Hydrostatic pressure tests on joints shall be made on an assembly of two sections of pipe, properly connected in accordance with the joint design. At the option of the owner a second such test may be required. Suitable bulkheads may be provided within the pipe adjacent to and on either side of the joint, or the outer ends of the two joined pipe sections may be bulkheaded. No mortar or concrete coatings, fillings, or packings shall be placed prior to watertightness tests. After the pipe sections are fitted together with the gasket or gaskets in place, the assembly shall be subjected to an internal hydrostatic pressure of 13 psi (30 ft) pressure head for 10 min. Moisture or beads of water appearing on the surface of the joint will not be considered as leakage. If leakage of joints should initially occur, the manufacturer shall have the option to extend the test period up to 24 h.

10.1.2 *Pipes in Maximum Deflected Position*—Upon completion of the test for pipes in straight alignment in 10.1.1, the test sections shall be deflected to create a position ½ in. wider than the assembled position on one side of the outside perimeter of each joint and shall be subjected to an internal hydrostatic pressure of 10 psi for 10 min. Moisture or beads of water appearing on the surface of the joint will not be considered as leakage.

## 11. Storage

11.1 The gaskets shall be stored in as cool, clean, and shaded a place as practicable, preferably at 70°F or less.

11.2 The lubricant shall be stored in accordance to the lubricant manufacturer's recommended temperature range.

## 12. Inspection

12.1 The quality of the materials and the finished pipe joint and gasket shall be subject to inspection and approval by an inspector employed by the owner.

## 13. Certification

13.1 When requested by the owner, the manufacturer shall furnish written certification that the joint lubricant conforms to all requirements of this specification for the specific gaskets supplied.

## 14. Marking

14.1 *Lubricant*—The following information shall be clearly marked on each container of lubricant.

14.1.1 Name of lubricant manufacturer.

14.1.2 Usable temperature range for application and storage.

14.1.3 Shelf life.

14.1.4 Lot or batch number.

## 15. Repairs

15.1 Spalled areas, manufacturing imperfections, or damage during handling, of each pipe end, may be repaired and will be acceptable, if in the opinion of the owner, the repaired pipe conforms to the requirements of 7.1.2; provided the circumferential length of a single area to be repaired shall not exceed one fourth of the inside diameter of the pipe or the circumferential length of several areas combined does not exceed one half of the inside diameter of the pipe.

15.2 At the option of the owner, the pipe joint that has been repaired shall be subjected to the designated hydrostatic test in accordance with 10.1.1 and shall be accepted if it passes the hydrostatic test requirements.

## 16. Rejection

16.1 Pipe joints and gaskets shall be subject to rejection upon failure to conform to any of the requirements of this specification. Pipe that is damaged because of carelessness or continuing failure to prevent recurrent imperfections in manufacture or damage during handling shall be subject to rejection.

16.2 Gaskets shall be subject to rejection whenever they show surface checking, weathering, or other deterioration prior to installation in the work.

## 17. Keywords

17.1 concrete pipe; joints; rubber gaskets

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*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, West Conshohocken, PA 19428.*

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

To: FCDMC TRAILER
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Tel. No: 438-2200
Fax No: 480 836 4530
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**Reference:** Golden Eagle Park Dam

Attachments: reclaimed waterline relocation plan (AT FLOODWALL)

Message:

65 LF

1 = 10

1 INCH

90° BEND & THRUST BLOCK

LONG BODY DRESSOR

2' SPOOL

22½° BEND

12" DIP

90° BEND

12" DIP

CUT & remove EXIST AC LINE

22½° BEND (DOWN)

2' SPOOL

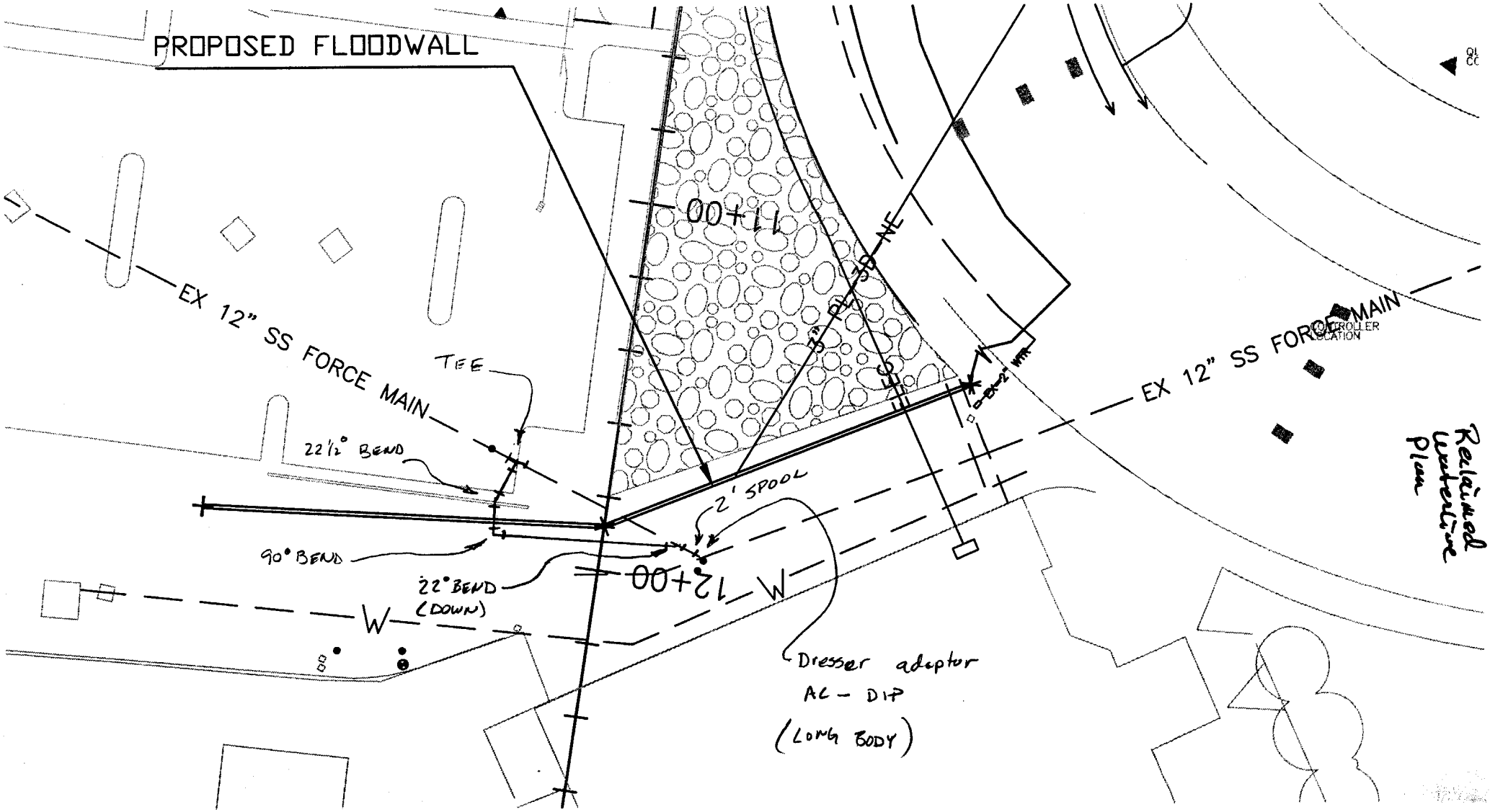
LONG BODY DRESSOR

M 12+00

USE 12" DIP WITH MEGALUGS

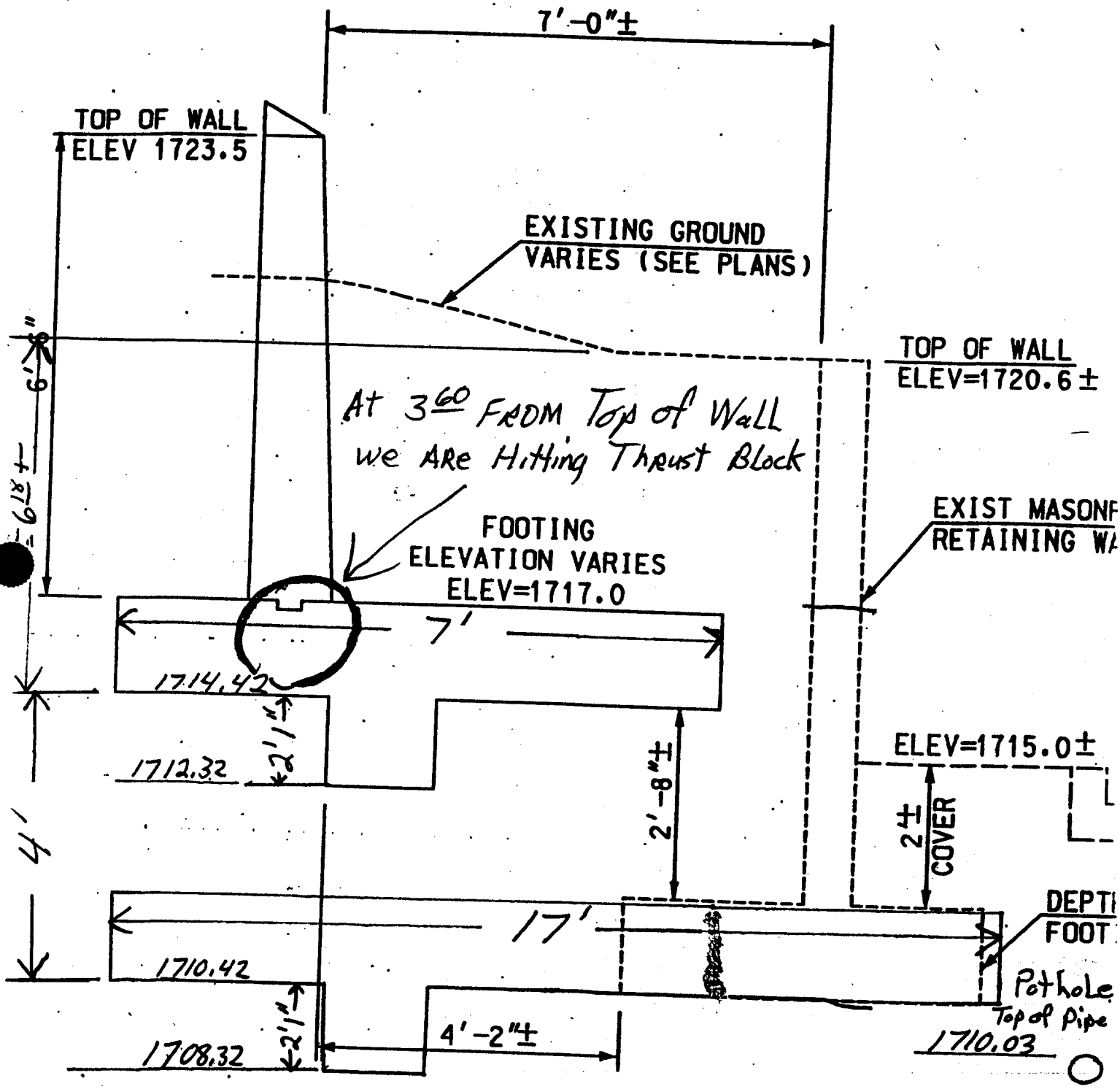
EFFLUENT FORCE MAIN RELOCATION

7/26/00


PROPOSED FLOODWALL
EX 12" SS FORCE MAIN
TEE
22½° BEND
90° BEND
22° BEND (DOWN)
2' SPOOL
W 12+00
11+00
15" PVC 30" NE
EX 12" SS FORCE MAIN
CONTROLLER LOCATION
Dresser adaptor
AC - DIP
(LONG BODY)
Revised Waterline Plan

H 1" = 20'

Reclaimed waterline at Floodwall



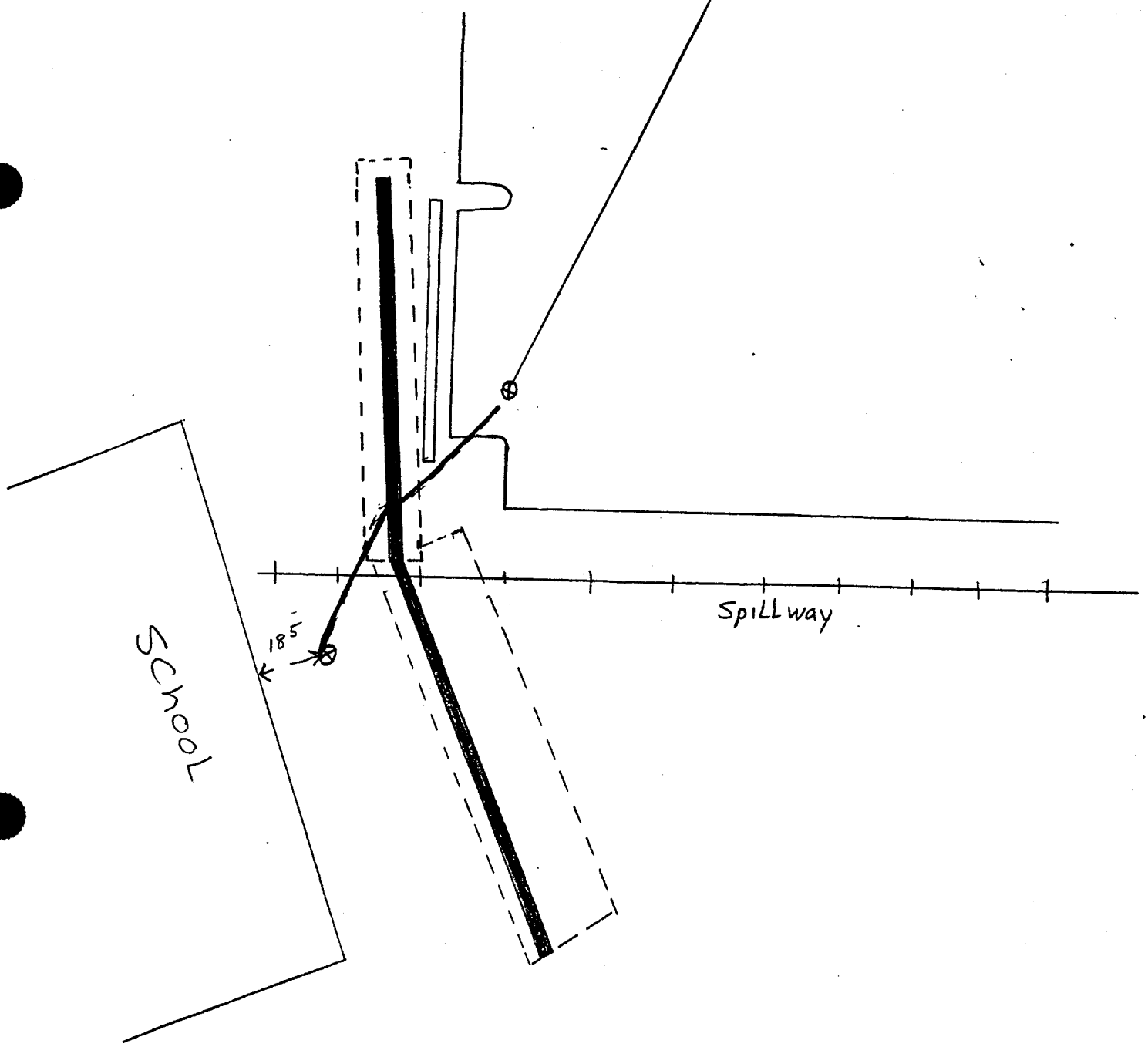

1709.28

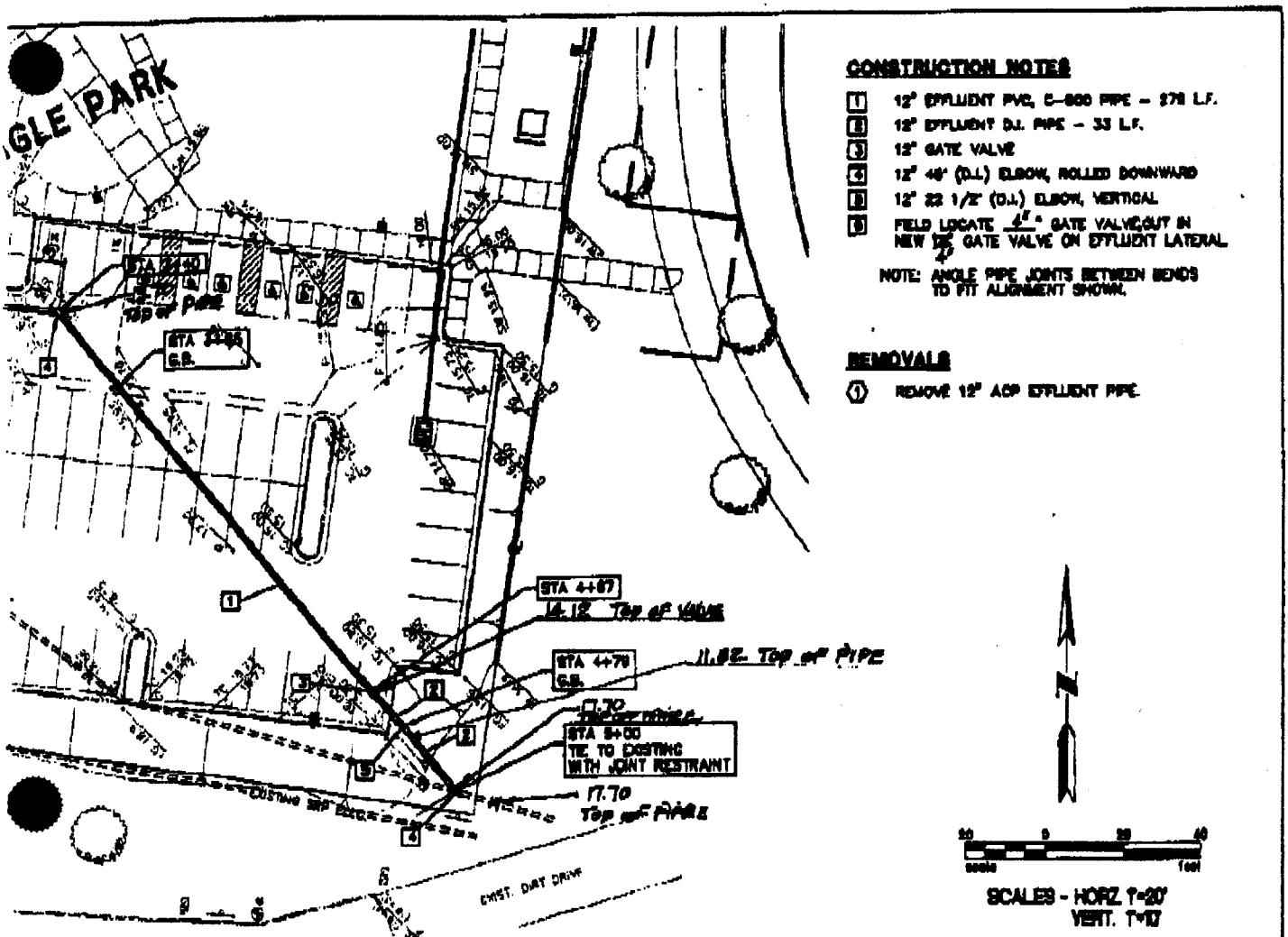
hole -Top of Pipe EL

School Fire Lane

TYPICAL SECTION - STA 41+12 TO 42

H 1" = 20'
V 1" = 20'


School
185
Spillway



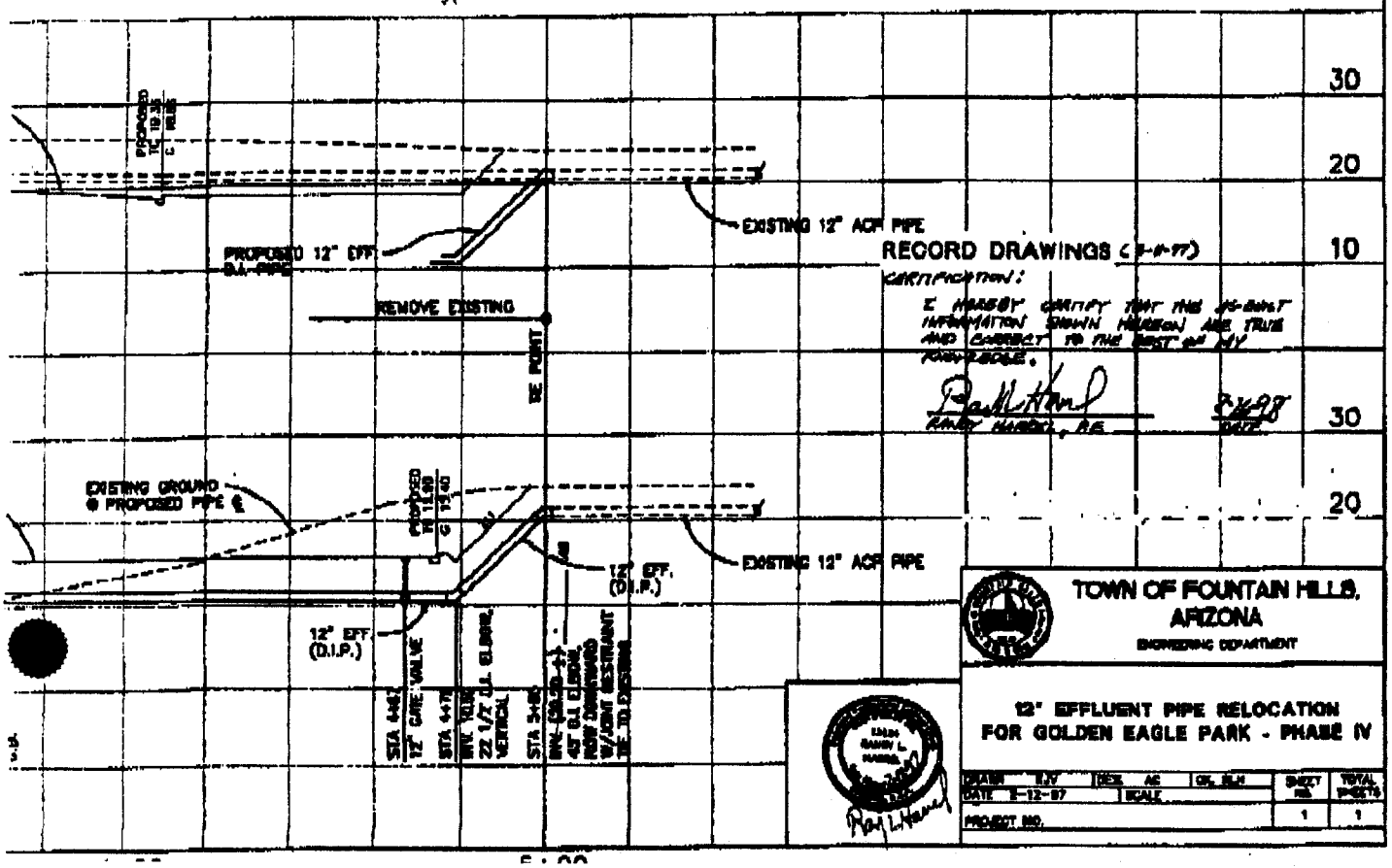

**CONSTRUCTION NOTES**

1. 12" EFFLUENT PVC, C-900 PIPE – 378 L.F.
2. 12" EFFLUENT D.I. PIPE – 33 L.F.
3. 12" GATE VALVE
4. 12" 45° (D.I.) ELBOW, ROLLED DOWNWARD
5. 12" 22 1/2° (D.I.) ELBOW, VERTICAL
6. FIELD LOCATE 4" GATE VALVE/CUT IN NEW 12" GATE VALVE ON EFFLUENT LATERAL.

NOTE: ANGLE PIPE JOINTS BETWEEN BENDS TO FIT ALIGNMENT SHOWN.

**REMOVALS**

(1) REMOVE 12" ACP EFFLUENT PIPE.




RECORD DRAWINGS (8-8-97)

CERTIFICATION:

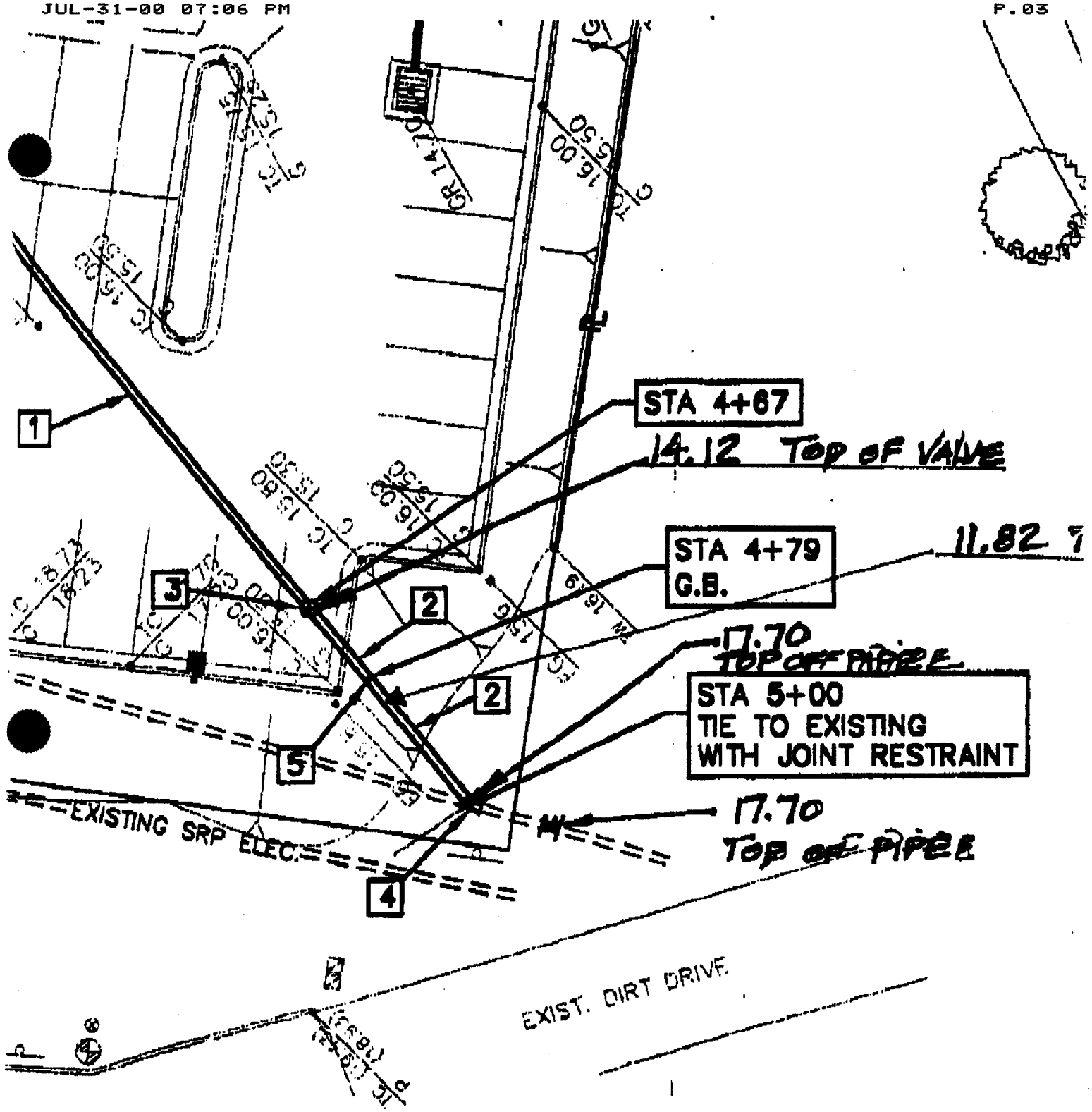
I HEREBY CERTIFY THAT THE AS-BUILT INFORMATION SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

RANDY HARRIS, P.E. 8/8/98 DATE

TOWN OF FOUNTAIN HILLS, ARIZONA
ENGINEERING DEPARTMENT

12" EFFLUENT PIPE RELOCATION FOR GOLDEN EAGLE PARK - PHASE IV

| DRAWN RJV | DES. AE | CK. RLH | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|
| DATE 5-12-97 | SCALE | | 1 | 1 |
| PROJECT NO. | | | | |


STA 4+67
14.12 TOP OF VALVE
STA 4+79
G.B.
11.82
7.70
TOP OF PIPE
STA 5+00
TIE TO EXISTING
WITH JOINT RESTRAINT
17.70
TOP OF PIPE
EXISTING SRP ELEC.
EXIST. DIRT DRIVE
1
2
2
3
4
5

# Fax Transmittal

Stantec Consulting Inc.
8211 South 48th Street
Phoenix, AZ 85044-5355

Stantec

To: Sheena Shivasumm Sender: Chuck Gopperton

Attention: FCDMC - TRAILER Tel. No: 438-2200 (707 4637)

Fax No: 480 836-4530 Fax No: 431-9562

Date: 8-10-00 page(s) total includes cover sheet

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**Reference:** Golden Eagle Park Dam

Attachments: Fuseplug fill specs

Message:

Waste concrete and sacked concrete shall not be used for riprap.

The gradation shall be based on the median rock diameter, identified as the D50 class. The D50 shall be 12" or 18" as specified on the plans and the riprap shall meet the gradation requirements in Tables 2 and 3 below:

**Table 2 - Riprap Gradation, $d_{50}$ = 12"**

| Median rock diameter | PERCENT BY WEIGHT, PASSING Upper Limit | Lower Limit |
|---|---|---|
| 24 inch | 100 | 90 |
| 18 inch | 85 | 70 |
| 12 inch | 50 | 30 |
| 8 inch | 15 | 5 |
| 4 inch | 5 | 0 |

**Table 3 - Riprap Gradation, $D_{50}$ = 18"**

| Median rock diameter | PERCENT BY WEIGHT, PASSING Upper Limit | Lower Limit |
|---|---|---|
| 36 inch | 100 | 90 |
| 27 inch | 85 | 70 |
| 18 inch | 50 | 30 |
| 12 inch | 15 | 5 |
| 6 inch | 5 | 0 |

Filter Layer

Filter layer for riprap construction shall be filter fabric per Section 222 - GEOSYNTHETICS. A cushion layer of sand and gravel shall be provided over the fabric with sufficient thickness to prevent tearing when dumping the riprap. Cushion layers for construction of the bedding for riprap shall be a pervious mixture of sand and gravel and not more than 5 percent, by weight, of material passing a No. 200 sieve.

FUSEPLUG FILL

Fuseplug fill shall be a uniformly graded, fine gravel (pea gravel) which meets the requirements of AASHTO M57-80 and M146-91. The material shall be washed clean and shall exhibit essentially no cohesion under any circumstance.

*Standard Definitions*
*for*

# Terms Relating to Subgrade, Soil-Aggregate, and Fill Materials

AASHTO DESIGNATION: M 146-91

## 1. SCOPE

**1.1** These definitions cover terms used in descriptions and specifications of materials occurring as or employed in the construction of subgrades, soil-aggregate base and surface courses, and fills.

**1.2** The values stated in SI units are to be regarded as the standard.

## 2. DEFINITIONS OF ROCK AND SOIL

**2.1** *Rock*—Natural solid mineral matter occurring in large masses of fragments.

**2.2** *Soil*—Sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter.

**2.3** *Broken Rock*—Angular fragments of rock which will be retained on a 75-mm (3-in.) sieve.

**2.4** *Cobble (Cobblestone)*—A rock fragment, usually rounded or semi-rounded, with an average dimension between 75 and 305 mm (3 and 12 in.).

**2.5** *Boulder*—A rock fragment, usually rounded by weathering or abrasion, with an average dimension of 305 mm (12 in.) or more.

## 3. DEFINITIONS OF SOIL-AGGREGATE AND ITS COMPONENTS

**3.1** *Soil-Aggregate (Dense-Graded Aggregate)*—Natural or prepared mixtures consisting predominately of stone, gravel or sand and containing slit-clay (minus 0.075-mm (No. 200) material.

**3.2** *Binder (Soil Binder)*—Portion of soil passing 0.425-mm (No. 40) sieve.

**3.3** *Stone*—Crushed or naturally angular particles of rock which will pass a 75-mm (3-in.) sieve and be retained on a 2.00-mm (No. 10) sieve.

**3.3.1** Coarse Stone. Stone passing the 75-mm (3-in.) sieve and retained on the 25.0-mm (1-in.) sieve.

**3.3.2** Medium Stone. Stone passing the 25.0-mm sieve and retained on the 9.5-mm ($^3/_8$-in.) sieve.

**3.3.3** Fine Stone. Stone passing the 9.5-mm sieve and retained on the 2.00-mm (No. 10) sieve.

**3.4** *Gravel*—Rounded particles of rock which will pass a 75-mm (3-in.) sieve and be retained on a 2.00-mm (No. 10) sieve.

**3.4.1** Coarse Gravel. Gravel passing the 75-mm (3-in.) sieve and retained on the 25.0-mm (1-in.) sieve.

**3.4.2** Medium Gravel. Gravel passing the 25.0-mm (1-in.) sieve and retained on the 9.5-mm ($^3/_8$-in.) sieve.

**3.4.3** Fine Gravel. Gravel passing the 9.5-mm ($^3/_8$ in.) sieve and retained on the 2.00-mm (No. 10) sieve.

**3.5** *Sand*—Granular material resulting from the disintegration, grinding, or crushing of rock and which will pass the 2.00-mm (No. 10) sieve and be retained on the 0.075-mm (No. 200) sieve.

**3.5.1** Coarse Sand. Sand passing the 2.00-mm (No. 10) sieve and retained on the 0.425-mm (No. 40) sieve.

**3.5.2** Fine Sand. Sand passing the 0.425-mm (No. 40) sieve and retained on the 0.075-mm (No. 200) sieve.

**3.6** *Silt-Clay (Minus 0.075-mm (No. 200) Material)*—Fine soil particles which will pass the 0.075-mm (No. 200) sieve.

**3.6.1** Silt Fraction. Material passing the 0.075-mm (No. 200) sieve and larger than 0.002 mm.

**3.6.2** Clay Fraction. Material smaller than 0.002 mm.

**3.6.3** Colloids. Materials smaller than 0.001 mm.

## 4. DEFINITIONS OF PAVEMENT SUBSTRUCTURE COMPONENTS

**4.1** *Embankment Foundation*—The material on which an embankment is placed.

**4.2** *Embankment (Fill)*—A raised structure of soil, soil-aggregate, or rock.

**4.3** *Subgrade (Basement Soil)*—The prepared and compacted soil immediately below the pavement system and extending to such depth as will affect the structural design.

**4.4** *Subbase*—The layer used in the pavement system between the subgrade and the base course.

**4.5** *Base*—The layer used in a pavement system to reinforce and protect the subgrade or subbase.

*Standard Specification*
*for*

# Materials for Embankments and Subgrades

AASHTO DESIGNATION: M 57-80 (1990)

## 1. SCOPE

**1.1** This specification covers materials for use in the construction of embankments and subgrades.

**1.2** The values stated in SI units are to be regarded as the standard.

## 2. DEFINITIONS

**2.1** Definitions of these materials are given in Standard Definitions of Terms Relating to Subgrade, Soil-Aggregate, and Fill Materials (AASHTO M 146).

## 3. GENERAL REQUIREMENTS

**3.1** Materials shall be free from detrimental quantities of organic material, such as leaves, grass, roots, and sewage.

**3.2** Materials obtained from cuts or borrow areas shall conform to one of the following requirements:

NOTE 1—See Standard Recommended Practice for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes (AASHTO M 145).

**3.2.1** *In Embankments*—Materials classified in the A-1, A-2-4, A-2-5, or A-3 groups as in AASHTO M 145 shall be used when available and shall be compacted to the depth specified to not less than 95 percent of the maximum density per AASHTO T 99. If material of this character is not available and materials from the A-2-6, A-2-7, A-4, A-5, A-6, or A-7 groups must be used, special attention should be given to the design and construction of the embankment. Materials from these groups shall be compacted to not less than 95 percent of the maximum density and within two percentage points of the optimum moisture content per AASHTO T 99.

**3.2.2** *In subgrades*—Materials classified in the A-1, A-2-4, A-2-5, or A-3, groups as shown in AASHTO M 145 shall be used when available and shall be compacted to the depth specified to not less than 95 percent of the maximum density per AASHTO T 99. Materials in the A-2-6, A-2-7, A-4, A-5, A-6, or A-7 groups may be used if compacted to the depth specified to not less than 95 percent of the maximum density and within two percentage points of the optimum moisture content per AASHTO T 99.

**3.3** Local shale may be used in embankment or subgrade construction if the condition of existing pavements and embankments indicate satisfactory results. Appropriate special specifications shall be prepared for such material.

## 4. DENSITY REQUIREMENTS

**4.1** Density percentage requirements may be specified in terms of AASHTO T 180, provided the resultant density and optimum moisture content are comparable with AASHTO T 99 under the above conditions.

## 5. METHODS OF TESTING

**5.1** Methods of testing materials for embankments and subgrades shall be in accordance with the standard methods of the American Association of State Highway and Transportation Officials (see table entitled "AASHTO Standard Methods").

NOTE 2—Either Method T 88 or T 11 and T 27 will be used to determine the particle size distribution as a basis for classification.

**AASHTO Standard Methods**

| | |
|---|---|
| Soil preparation (dry method) | T 87 |
| Soil preparation (wet method) | T 146 |
| Material passing 0.075-mm (No. 200) sieve | T 11 |
| Sieve analysis | T 27 |
| Mechanical analysis of soils | T 88 |
| Liquid limit | T 89 |
| Plastic limit | T 90 |
| Moisture—density relationship [4.54-kg (10-lb) hammer] | T 180 |
| Moisture—density relationship [2.5-kg (5.5-lb) hammer] | T 99 |
| Density of soil in place | T 191, T 204, T 205, T 233, and T 238 |
| Moisture in place by nuclear methods | T 239 |
| Coarse particle correction | T 224 |

Proposed for Floodwall

# MARICOPA READY MIX

**CUSTOMER:** Hunter Contracting Co. **DATE:** 08/15/00

**PROJECT:** Golden Eagle Dam Modifications

**MIX #:** 240400 **DESCRIPTION:** 4000 PSI - MAG AA

THE FOLLOWING IS OUR PROPOSED CONCRETE MIX DESIGN FOR THE ABOVE NOTED PROJECT. ALL QUANTITIES ARE LISTED FOR ONE CUBIC YARD NET AND AGGREGATE WEIGHTS ARE FOR AGGREGATES IN A SATURATED, SURFACE DRY CONDITION. CORRECTIONS MUST BE MADE FOR AGGREGATES THAT VARY FROM THESE MOISTURE CONDITIONS

| MIX PROPORTIONS | | | | VOLUME |
|---|---|---|---|---|
| Water | | 34gal | 280 lb. | 4.49 cu. ft. |
| Cement | | ASTM C - 150 Type 2 | 510 lb. | 2.59 cu. ft. |
| Fly Ash | | ASTM C - 618 | 108 lb. | 0.80 cu. ft. |
| Coarse Aggregate | 1 inch | ASTM C-33 | 980 lb. | 5.93 cu. ft. |
| Coarse Aggregate | 1/2 inch | ASTM C-33 | 830 lb. | 5.02 cu. ft. |
| Coarse Aggregate | 3/8 inch | ASTM C-33 | 0 lb. | 0.00 cu. ft. |
| Sand | | ASTM C - 33 | 1300 lb. | 7.86 cu. ft. |
| WRA | WRDA 64 | ASTM 394 TYPE A | 25.0 oz | |
| AEA | 0 | ENTRAPPED AIR @ 1.2% | 0.0 oz. | 0.32 cu. ft. |
| HRWR | | ASTM 394 TYPE F | 0.0 oz. | |
| | | | TOTAL | 27.0 cu. ft. |

air doesn't meet specs

**CONCRETE PROPERTIES**

| | |
|---|---|
| Water/Cementicious Ratio (by weight) | 0.45 |
| Slump (+/- 1 inch) | 3.0 inches |
| Air Content (+/- 1%) | 1.2 % |
| Unit Weight of Mixed Concrete: | 148.4 lb./cubic ft. |
| Mix Density | 4008 lb./cubic yd. |

| MATERIAL | SOURCE | SPEC. GRAVITY |
|---|---|---|
| Cement | Cemex or Arizona Portland | 3.15 |
| Fly Ash (if used) | Material Resources Technologies | 2.16 |
| Coarse Agg | Cemex | 2.65 |
| Sand | Salt River Sand and Rock | 2.65 |
| Water Reducer | W.R. Grace | N/A |
| Air Entrainer | W.R. Grace | N/A |

requires 14 day cure time

7400 E. McDonald, Suite 120 • Scottsdale, AZ 85250 • (602) 607-3999 • Fax (602) 607-3335

**Maricopa Ready Mix L.L.C.** **8/16/00** **Page: 1 of 1**

240400 :4000psi Mag AA;8/8/99 to 8/8/00;-

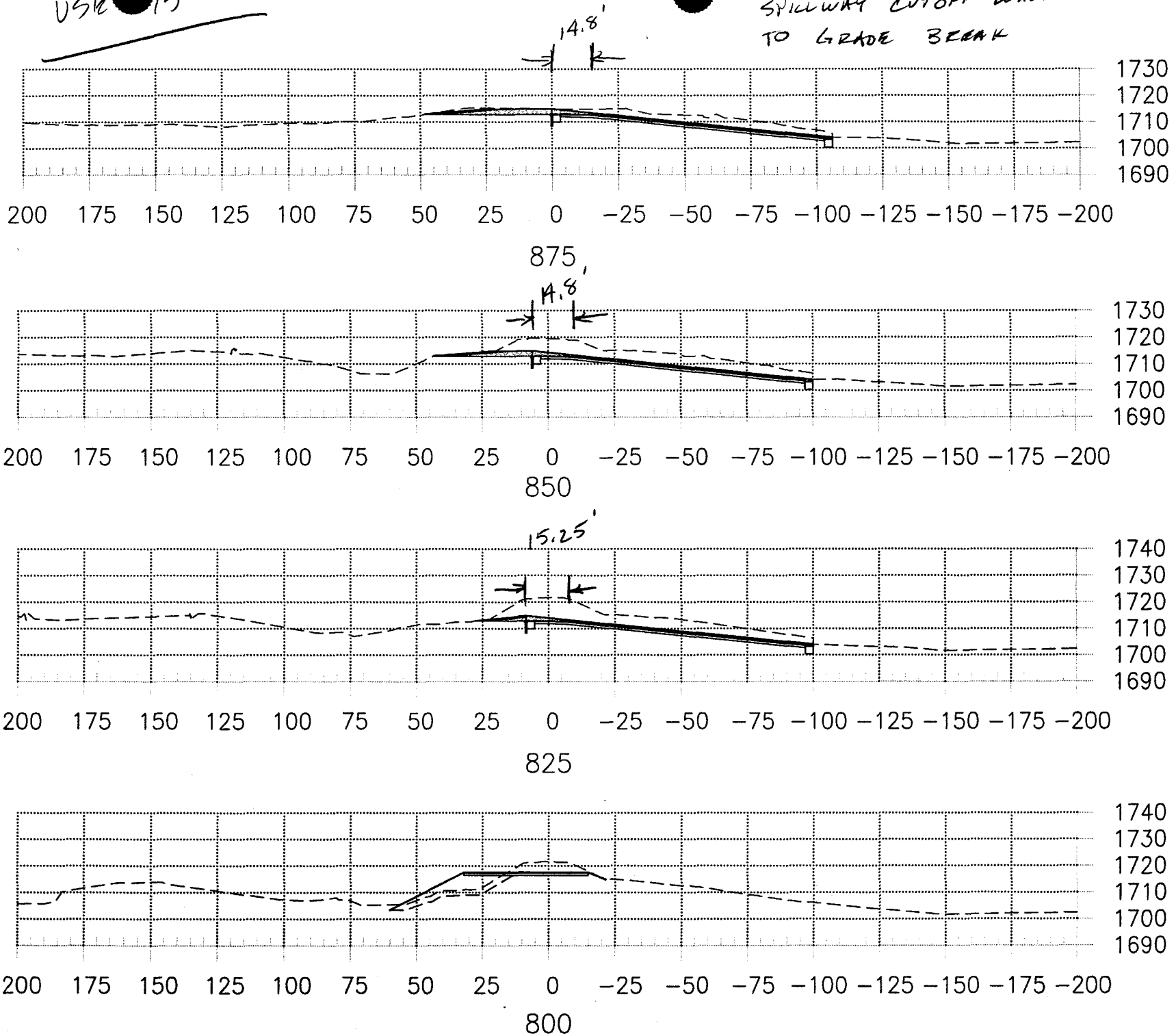
PERIOD:8/8/99 to 8/8/00; Total Results:9; Specs. Below F'c:0; 28D samples < F'c: 0; Basic SD:500

Slump out of tolerance:"*" = Wet, "#" = Dry

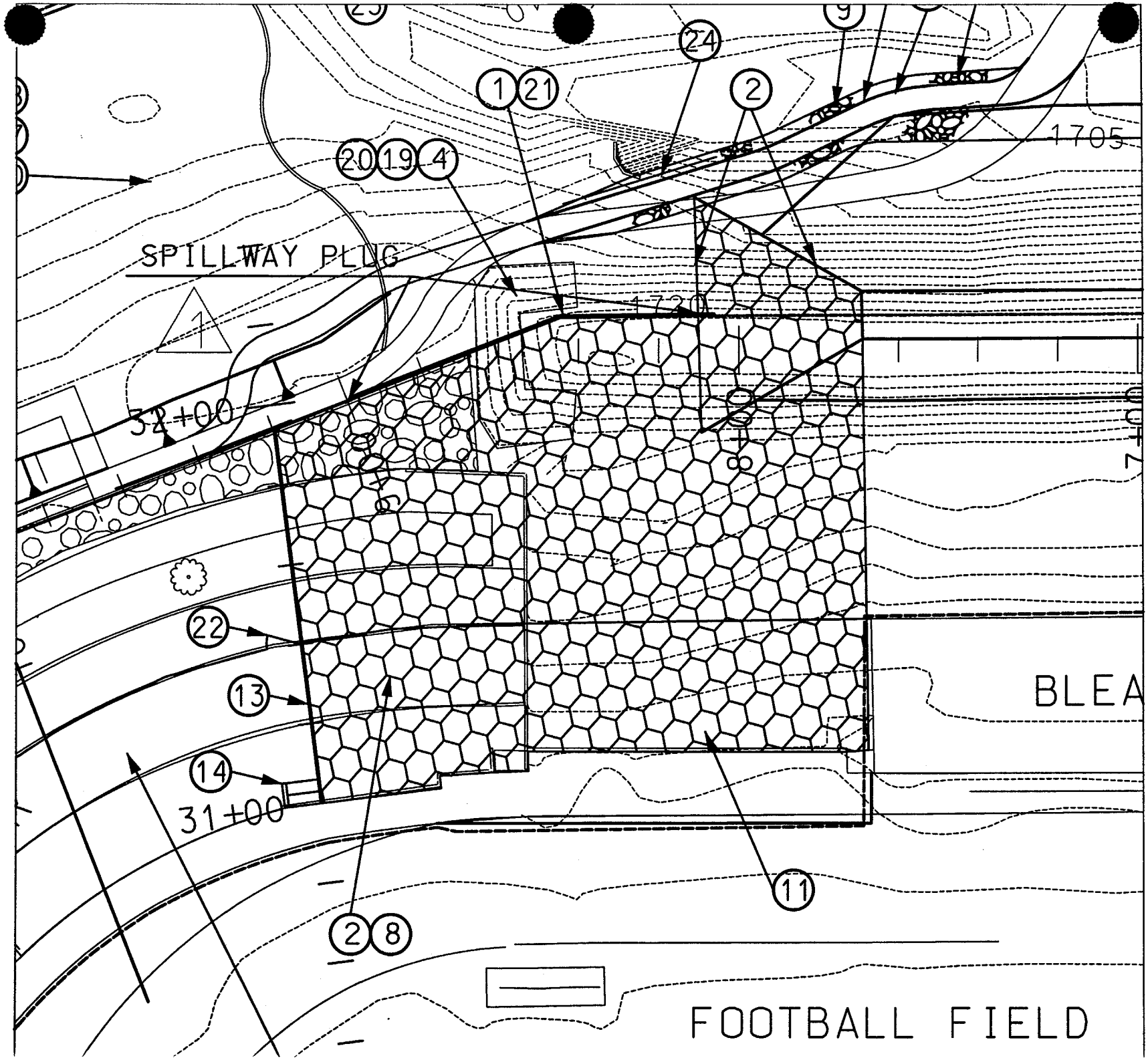
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | MAX | 6.75 | 4630 | 6380 |
| | | | | | MIN | 2.00 | 3110 | 4860 |
| | | | | | NO. | 9 | 9 | 9 |
| | | | | | MEAN | 3.47 | 3740 | 5510 |
| | | | | | SD | 1.49 | 490 | 560 |
| | | | | | COV% | 1.68 | 1910 | 1470 |
| DATE YY-MM-DD | TICKET | PRODUCT CODE | TRUCK NO. | PLANT | SAMPLE | SLMP | 7D STR. | 28D STR. |
| 2000-06-05 | 16634 | 240400 | 152 | 02 | 00C-513 | 3.50 | 3880 | 6130 |
| 2000-06-05 | 16669 | 240400 | 130 | 02 | 00C-514 | 2.50 | 4630 | 6380 |
| 2000-06-06 | 16871 | 240400 | 112 | 02 | 00C-516 | 2.25 | 4290 | 5980 |
| 2000-06-06 | 16913 | 240400 | 140 | 02 | 00C-518 | 6.75 | 3110 | 5480 |
| 2000-06-07 | 17129 | 240400 | 153 | 02 | | 4.50 | 3510 | 4880 |
| 2000-06-07 | 17156 | 240400 | 110 | 02 | | 3.25 | 3830 | 5540 |
| 2000-06-09 | 17646 | 240400 | 120 | 02 | 00C-540 | 4.00 | 3200 | 4860 |
| 2000-06-09 | 17669 | 240400 | 117 | 02 | 00C-541 | 2.50 | 3760 | 5330 |
| 2000-06-09 | 17708 | 240400 | 142 | 02 | 00C-542 | 2.00 | 3450 | 5010 |

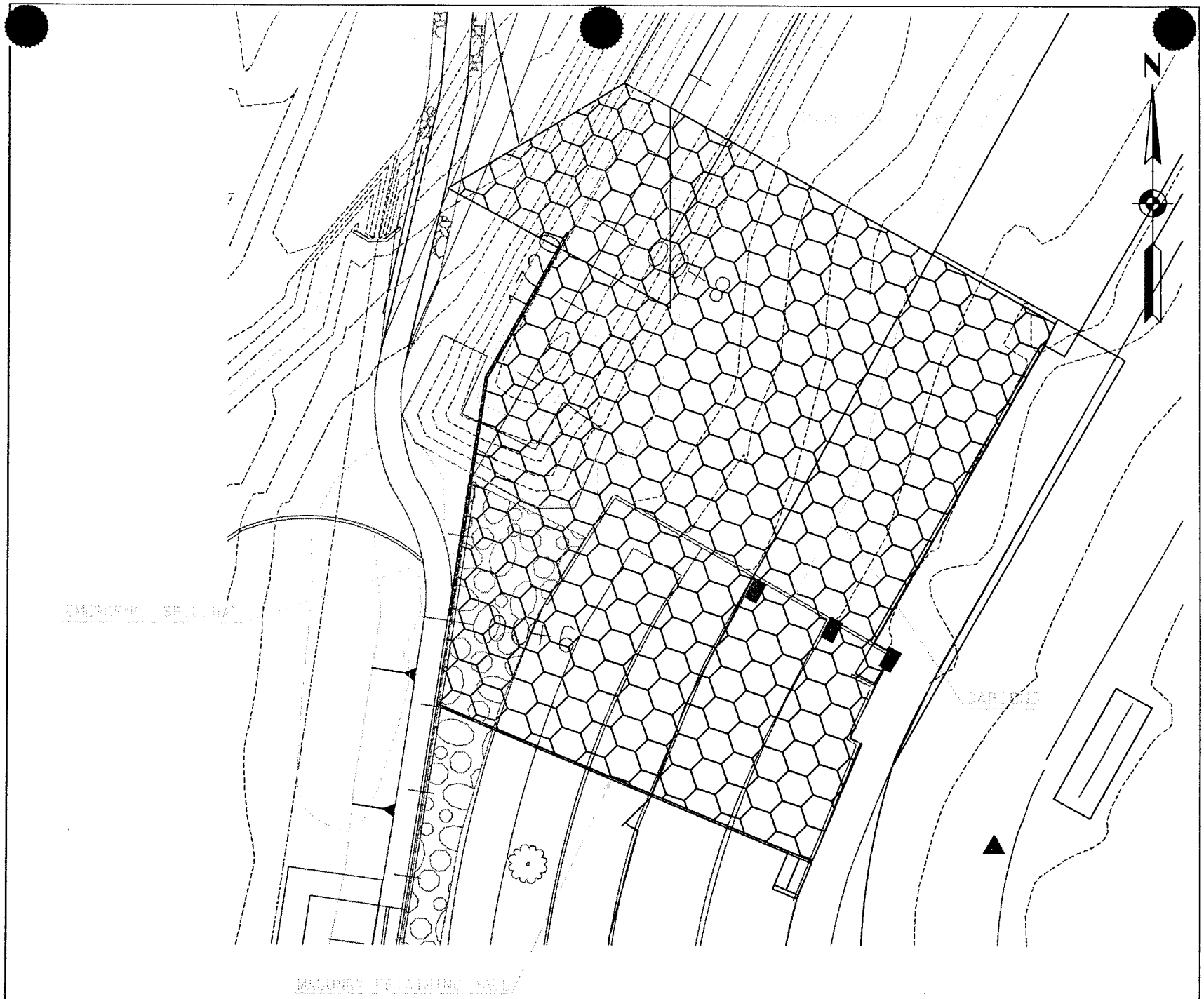
USE 15'

DISTANCE FROM SPILLWAY CUTOFF WALL TO GRADE BREAK



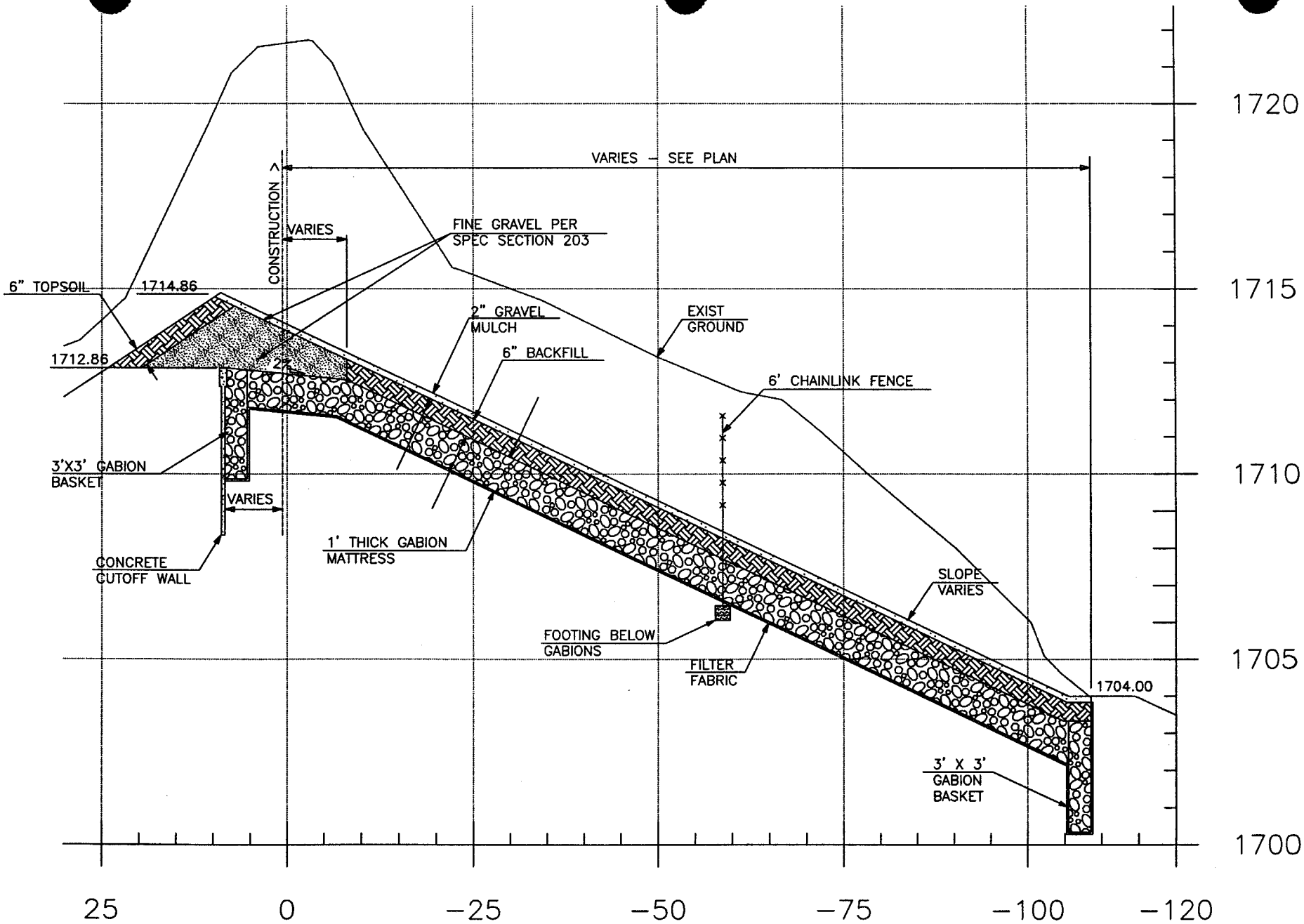

CLARIFICATION ON SPILLWAY GRADINGS


SPILLWAY PLUG
1
32+00
31+00
1720
1705
700
BLEA
FOOTBALL FIELD
1
21
24
2
9
20
19
4
22
13
14
2
8
11




PLAN

1" = 20'




TYPICAL SECTION THROUGH
EMERGENCY SPILLWAY

NOTES:
CONSTRUCT 3'X3' GABION
UNIT ALONG ALL EDGES

NTS

# Fax Transmittal

Gabion Anchors

Stantec

| To: | Attention: | Fax No: |
|---|---|---|
| FCDMC | Shewa Shivaswamy | 480-836-4530 |
| Lumer Const. | Chuck Lumer | 480-497-3698 |
| Hunter Contr. | Larry Samples | 480-892-4932 |

Sender: Chuck Gopperton

Tel. No: 438-2200

Fax No: 431-9562

Date: 24 August, 2000

File: 82000157

**4** page(s) total includes cover sheet

Original will **NOT** follow by mail.

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**Reference: Golden Eagle Park Dam**

AASHTO specs for fence posts (M281-94)

p:\82000157\construction\correspondence\faxes\cvg082400ssclsfax.doc

*Standard Specification*
*for*

# Steel Fence Posts and Assemblies, Hot-Wrought

AASHTO DESIGNATION: M 281-94
(ASTM DESIGNATION: A 702-89)

## 1. SCOPE

**1.1** This specification covers steel fence posts and assemblies manufactured from hot-wrought sections and intended for use in field and line fencing.

**1.2** The posts are available in tee, channel or U, and Y-bar shapes, or angle shapes, and are furnished painted or galvanized, unless otherwise specified.

**1.3** The values stated in inch-pound units are to be regarded as the standard.

## 2. REFERENCED DOCUMENTS

**2.1** *AASHTO Standards:*
- M 111 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- M 183 Structural Steel
- M 232 Zinc Coating (Hot-Dip) on Iron and Steel Products

**2.2** *ASTM Standards:*
- A 29/A 29M Specification for Steel Bars, Carbon and Alloy, Hot Wrought and Cold Finished, General Requirements for
- A 499 Specification for Steel Bars and Shapes. Carbon Rolled from "T" Rails
- A 641 Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- A 700 Practices for Packaging, Marking, and Loading

**2.3** *Federal Standards:*
- FED-STD-123 Marketing for Shipments (Civil Agencies)

**2.4** *Military Standards:*
- MIL-STD-129 Marking for Shipment and Storage
- MIL-STD-163 Steel Mill Products, Preparation for Shipment or Storage

## 3. TERMINOLOGY

**3.1** *Definitions:*

**3.1.1** *Assemblies*—Angle section post components for installation of gates, fence ends or corners, and intermediate bracing.

**3.1.2** *Line Posts*—Posts that support the straight-line body of the fence.

## 4. ORDERING INFORMATION

**4.1** Orders for products under this standard should include the following information:

**4.1.1** Quantity (number of pieces) of line posts, end or gate assemblies, corner or intermediate brace assemblies (It is customary to order line posts in multiples of five of the required length and the required number of end or corner assemblies.),

**4.1.2** Type of section (if a specific section is required) (see Section 6.2 and Figure 1),

**4.1.3** Length or lengths required (Section 7.2),

**4.1.4** Finish: galvanized or painted,

**4.1.5** AASHTO designation and date of issue,

**4.1.6** Anchor plates, if required (Section 6.4.3), and

**4.1.7** Wire fasteners (state weight of zinc coating if other than Class 1) (see Sections 6.6.2 and 6.6.3).

NOTE—A typical ordering description is as follows: 500 line posts; painted 8 ft long; AASHTO M 281 dated ____; omit anchor plates.

## 5. GENERAL REQUIREMENTS

**5.1** Material furnished under this ASTM specification shall conform to the general requirements of the current edition of ASTM A 29/A 29M unless otherwise provided herein.

**TABLE 1 Materials for Line Posts and Assemblies**

| | | Line Posts | | Assemblies | |
|---|---|---|---|---|---|
| Steel | Steel Description | Yield Point, Min, ksi (M Pa) | Tensile Strength, Min, ksi (M Pa) | Yield Point, Min, ksi (M Pa) | Tensile Strength, Min, ksi (M Pa) |
| A | Hot-wrought carbon steel 0.35 percent carbon, min | 40 (275) | 70 (485) | 40 (275) | 70 (485) |
| B | Hot-wrought carbon steel, or hot-wrought rail steel[a] | 50 (345) | 80 (550) | 50 (345) | 80 (550) |
| C | Structural steel[b] | — | — | 36 (250) | 58 (400) |

[a] In accordance with ASTM A 499.
[b] In accordance with AASHTO M 183.

TABLE 2 Brinell Hardness

| Steel | Description | Brinell Hardness, Min | Rockwell B Hardness, Min |
|---|---|---|---|
| A | Hot-wrought carbon steel, 0.35 percent carbon, min | 143 | 79 |
| B | Hot-wrought carbon steel or rail steel[a] | 156 | 83 |
| C | Structural steel[b] | 116 | 68 |

[a] In accordance with ASTM A 499.
[b] In accordance with AASHTO M 183.

## 6. MATERIALS AND MANUFACTURE

**6.1** *Material:*

**6.1.1** Line post shall be fabricated from Steels A or B and assemblies from Steels A, B, or C as specified in Table 1.

**6.1.2** Except as provided in Section 6.1.3, the finished line post and assemblies shall conform to the tensile properties specified in Table 1 for the applicable steel.

**6.1.3** At the manufacturer's option, a Brinell or Rockwell B hardness test may be substituted for the tensile requirements in Table 1. In such cases the material shall conform to the Brinell or Rockwell B hardness specified in Table 2.

**6.2** *Line Post Section:*

**6.2.1** The posts shall be furnished as T, channel or U, or Y sections as illustrated in Figure 1. The cross section of T posts shall approximate $1^3/_8$ in. (34.9 mm) wide, $1^3/_8$ in. deep, and $^1/_8$ in. (3.2 mm) thick. Unless otherwise specified by the purchaser, the line post type is at the manufacturer's option.

**6.2.2** Dimensions may vary slightly in individual design in maintaining the control weight per foot.

**6.3** *Wire Attachments*—Line posts shall have corrugations, knobs, notches, holes, or studs so placed and formed as to engage a substantial number of fence line wires in proper positions.

**6.4** *Anchor Plates:*

**6.4.1** Each line post shall be manufactured with an anchor plate, unless otherwise specified. The anchor plate shall be made from carbon steel and shall be swaged or riveted to the post in such a manner as to prevent displacement when the posts are driven.

**6.4.2** The placement of the anchor plate shall be nominally 14 in. (350 mm), 16 in. (400 mm), or 18 in. (450 mm) from the bottom of the post to the uppermost portion of the anchor plate.

**6.4.3** Anchor plates shall be tapered to facilitate driving, shall have a minimum area of 18 in.$^2$ (11600 mm$^2$), and shall weigh 0.67 lb (0.3 kg) ±5 percent.

**6.4.4** When specified, line posts may be furnished without anchor plates.

**6.5** *Post Assemblies:*

**6.5.1** Uprights shall consist of angles with a nominal size $2^1/_2$ by $2^1/_2$ by $^1/_4$ in. (65 by 65 by 6.4 mm) weighing 4.10 lb/ft (6.1 kg/m) prior to fabrication.

**6.5.2** Braces shall consist of angles with a nominal size 2 by 2 by $^1/_4$ in. (50 by 50 by 6.4 mm) weighing 3.19 lb/ft (4.75 kg/m) prior to fabrication, or an alternative angle of equivalent weight.

**6.5.3** Uprights and braces shall be furnished with the necessary holes and galvanized hardware for the required assembly.

**6.5.4** All assemblies shall be furnished with one upright. End and gate assemblies shall be furnished with one brace, and corner and intermediate braces with two braces.

**6.6** *Wire Fasteners:*

**6.6.1** Unless otherwise specified by the purchaser, each line post shall be provided with not less than five suitable fasteners for attaching fence wire to the posts.

**6.6.2** The fasteners shall be formed from zinc-coated steel wire not less than 0.120 in. (3.05 mm) diameter zinc coated in accordance with ASTM A 641. Class 1 coating shall be furnished unless otherwise specified by the purchaser.

**6.6.3** When line posts are intended for range type western fencing using three line wires, it is satisfactory to provide only three fasteners for each post.

TABLE 3 Nominal Weights of (Raw) Line Posts

| Post Length | | Weight[a] | |
|---|---|---|---|
| ft | m | lb | kg |
| 5 | 1.52 | 7.32 | 3.32 |
| $5^1/_2$ | 1.68 | 7.99 | 3.61 |
| 6 | 1.83 | 8.65 | 3.92 |
| $6^1/_2$ | 1.98 | 9.32 | 4.22 |
| 7 | 2.13 | 9.98 | 4.53 |
| $7^1/_2$ | 2.28 | 10.64 | 4.83 |
| 8 | 2.44 | 11.31 | 5.13 |
| 9 | 2.74 | 12.64 | 5.74 |
| 10 | 3.05 | 13.97 | 6.34 |

[a] Includes weight of anchor plate.

TABLE 4 Nominal Weights of (Raw) Assemblies

| | Length | | Weight[a] | |
|---|---|---|---|---|
| | ft | m | lb | kg |
| Upright and one brace, each (end or gate) | 7 | 2.13 | 51 | 23 |
| Upright and two braces, each (corner of intermediate brace) | 7 | 2.13 | 73 | 33 |
| Upright and one brace, each | 8 | 2.44 | 58 | 26 |
| Upright and two braces, each | 8 | 2.44 | 84 | 38 |
| Upright and one brace, each | 9 | 2.74 | 66 | 30 |
| Upright and two braces, each | 9 | 2.74 | 94 | 43 |

[a] Includes weight of bolts.

## 7. DIMENSIONS, MASS, AND PERMISSIBLE VARIATIONS

**7.1** *Nominal Weights and Tolerances:*

**7.1.1** *Nominal Weight*—Prior to fabrication by punching, drilling, attaching anchors, or finish coating, the line post

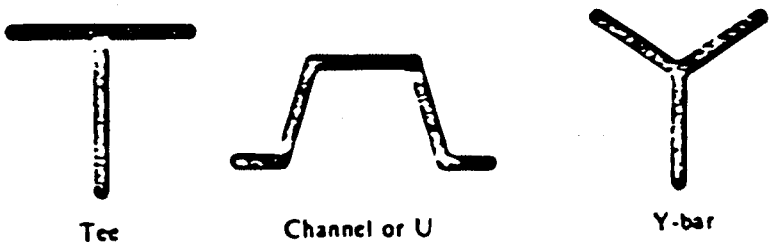



FIGURE 1 Typical Cross Sections of Line Post Types

sections shall have a nominal weight of 1.33 lb/ft (1.98 kg/m) of length.

**7.1.2** The weight of line posts plus anchor plates (if specified), prior to fabrication, drilling, or finish coating shall not vary from nominal weights specified in Table 3 by more than ± 5 percent. Weight shall be determined in lots of five line posts.

**7.1.3** The weight of assembly components prior to fabrication, drilling, or finish coating shall not vary from the nominal weights specified in Table 4 by more than ± 5 percent. Single assembly components shall be used to determine weight.

**7.2** *Standard Lengths and Tolerances:*

**7.2.1** Line posts shall be furnished in standard lengths of 5 to 10 ft (1525 to 3050 mm) inclusive, as specified by the purchaser. Standard length increments are shown in Table 3.

**7.2.2** The length of line posts, uprights, and braces shall not vary from that specified more than −1.0 in. (−25 mm) or +2 in. (50 mm).

**7.2.3** The placement of the anchor plate shall not vary from the nominal by more than ± 3 in. (76 mm).

## 8. WORKMANSHIP, FINISH, AND APPEARANCE

**8.1** Line posts, uprights, and braces shall be furnished painted or galvanized as specified by the purchaser.

**8.2** When specified to be painted, the posts shall be cleaned of all loose scale prior to finishing, and painted with one or more coats, of weather resistant, air drying or baking, paint or enamel.

**8.3** When specified to be galvanized, the posts and post assemblies shall be zinc coated by the hot-dip process in accordance with specification M 111. The assembly hardware (see Section 6.5.3) shall be zinc coated in accordance with specification M 232.

## 9. SAMPLING

**9.1** One item from each lot shall be selected at random for testing. A lot shall consist of all posts or assemblies, or both, of the same length offered for delivery at the same time.

**9.2** The post or assembly selected in accordance with Section 9.1 shall be tested for tensile strength or hardness, weight, and zinc coating, if applicable.

**9.3** For purposes of visual inspection, length determinations, and dimensional examination, one post or assembly from each 400, or a total of seven, or whichever is less, shall be selected at random.

**9.4** Visual inspection shall include examination for such features as excessive bow, camber, twist, or other injurious imperfections in surface or coating. Such imperfections may be considered cause for rejection of individual posts or assemblies.

## 10. INSPECTION

**10.1** Unless otherwise specified in the purchase order or contract, the manufacturer is responsible for the perfomance of all inspection and test requirements specified in this specification. Except as otherwise specified in the purchase order or contract, the manufacturer may use his own or any other suitable facilities for the performance of the inspection and test requirements unless disapproved by the purchaser at the time the order is placed. The purchaser shall have the right to perform any of the inspection and tests set forth in this specification when such inspection and tests are deemed necessary to assure that the material conforms to prescribed requirements.

## 11. REJECTION AND RETESTS

**11.1** Should the post or assembly fail to meet any of the requirements of Section 9.2, the lot size shall become 400. One test shall be selected from each lot, and failure of the test shall result in rejection of that particular lot.

**11.2** Should two or more posts or assemblies fail to meet any of the requirements of Section 9.3, the lot size shall become 400. Seven items shall be examined from each lot for compliance to the requirements of Section 9.3 causing initial failure. If two or more items fail, the entire lot shall be rejected.

**11.3** Any individual post or assembly failing to meet the requirements of Sections 9.2 or 9.3 shall be rejected.

## 12. REJECTION AND REHEARING

**12.1** Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

## 13. CERTIFICATION

**13.1** When specified in the purchase order or contract, a producer's or supplier's certification shall be furnished to the purchaser that the material was manufactured in accordance with this specification and has been found to meet the requirements.

## 14. PACKAGING

**14.1** Line posts shall be bound in bundles of five posts, and by agreement with the purchaser, may be supplied in master bundles containing up to 250 posts.

**14.2** Orders are customarily on piece count rather than on weight of posts or assemblies. The nominal weights establish the basis for weight tolerance and transportation data (see Tables 3 and 4 for nominal weights).

## 15. PACKAGING, MARKING, AND LOADING FOR SHIPMENT

**15.1** Unless otherwise specified, packaging, marking, and loading for shipment shall be in accordance with ASTM A 700.

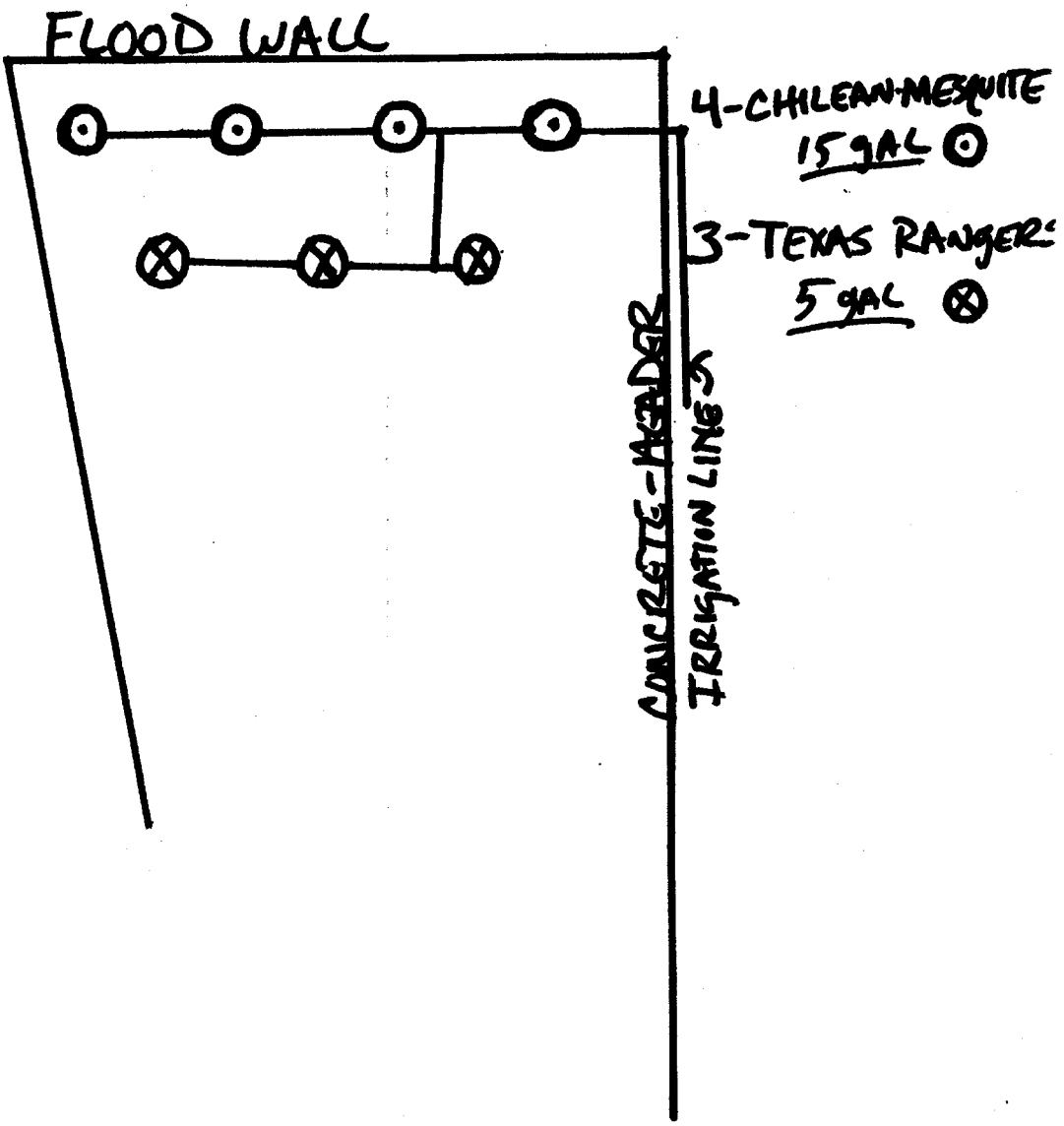
**15.2** When specified in the contract or order, and for direct procurement by or direct shipment to the U.S. Government, when Level A is specified, preservation, packaging, and packing shall be in accordance with Level A requirements of MIL-STD-163.

Don Clark
Jim Leutner

GFPD

10/25/00

(LANDSCAPE PLAN NEAR SOUTH PARKING LOT + FLOOD WALL)



Hunter Contracting Co. A CORPORATION
CONTRACTOR'S LICENSE NO.
A-070961
B-067542
B-4-023057

November 8, 2000

Mr. H.N. "Shewa" Shivaswamy, P.E.
Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009

RE: Golden Eagle Park Dam Modification
Flood Control District of Maricopa county 1999C071
**Seed Substitution**

Hunter Contracting Co. request to modify the specified seed mix per the attached letter.

Thank you for your consideration in this matter. Should you have any questions please contact me at (602)-757-1835.

Sincerely,
HUNTER CONTRACTING CO.

Bob Carlson
Project Manager

701 North Cooper Road • Gilbert, Arizona 85233 • (480) 892-0521 • Fax (480) 892-4932
6930 North Camino Martin • Tucson, Arizona 85741 • (520) 744-0722 • Fax (520) 744-0847

# Revegetation Services

*Revegetation and Turf Establishment*

November 1, 2000

Attn: Mr. Bob Carlson
Hunter Contracting Company
701 N. Cooper Rd.
Gilbert, AZ 85236

Phone no.: (480) 892-0521
Fax no.: (480) 892-4932

***Re: Golden Eagle Park Dam Modifications***
***contract no. FCD 1999C071, PCN no. 670.03.31***
***Reveg job no. 467 / HCC job no. 00-10***

Dear Mr. Carlson:

Our seed supplier has advised us that the seed specie listed below are not available (see attached). They have suggested the noted substitution.

| Specified Seed | Suggested Substitute |
|---|---|
| Sweetbush (Bebbia juncea) | Fourwing saltbush (Atriplex canescens) |

Please contact project owner regarding the approval of substitute seed. All other required seed species specified for this project should be available throughout the project.

Sincerely,

Aaron Patterson

P.O. Box 1480 • Higley, Arizona 85236-1480 • (602) 988-3011 Office • (602) 988-3013 Fax

Golden Eagle - Nov 2000

2100 N.
UT 84043
531-1456

| Type of Seed | Lbs. per Acre |
|---|---|
| Thickspike wheatgrass - *Agropyron dasystachyum* | 3.0 |
| Prairie junegrass - *Koeleria cristata* | 1.0 |
| Bluegramma - *Bouteloua gracilis* | 3.0 |
| Spike muhly - *Muhlenbergia wrightii* | 1.0 |
| Sand dropseed - *Sporobolus cryptandrus* | 0.5 |
| Desert globemallow - *Sphaeralcea ambigua* | 2.0 |
| Needle & thread - *Stipa comata* | 2.0 |
| Total | 12.5 |

2ac

**Table 2 - Type 2 Seed**

| Type of Seed | Lbs. per Acre |
|---|---|
| Blue Palo Verde - *Cercidium floridum* | 3.0 |
| Brittle Bush - *Encelia farinosa* | 4.0 |
| Desert Cassia - *Cassia covesii* | 6.0 |
| Globe Mallow - *Sphaeralcea ambigua* | 3.0 |
| Indian Wheat - *Plantago insularis* | 2.0 |
| Purple Three-Awn - *Aristida purpurea* | 2.0 |
| * Sweetbush - *Bebbia juncea* | 2.0 |
| Sand Dropseed - *Sporobolus cryptandus* | 2.5 |
| Triangle Bursage - *Ambrosia deltoidea* | 6.0 |
| Total | 30.5 |

1ac

**Applying Straw Mulch**

Within 24 hours after each area is planted, straw mulch shall be uniformly applied at the rate of approximately 1½ tons per acre.

Mulch shall be anchored by tacking using a slurry consisting of a minimum of 125 pounds of tackifier, 400 pounds of wood fiber mulch and 700 gallons of water per acre.



* subject to availability. Recommend replacing Sweetbush with Fourwing saltbush (Atriplex canescens). Mix bid using Fourwing saltbush.