CITY OF PHOENIX, ARIZONA
ENGINEERING DEPARTMENT

ST-73283.00

PROJECT SPECIFICATIONS AND CONTRACT DOCUMENTS

DETENTION BASIN NO. 3
16TH STREET WASH, EAST OF CAVE CREEK ROAD

MAYOR	Timothy A. Barrow
COUNCILMEN	Calvin C. Goode
	Rosendo "Rosie" Gutierrez
	Margaret T. Hance
	Gary Peter Klahr
	H.L. "Jerry" Lewkowitz
	Jim Weeks
CITY MANAGER	John B. Wentz
CITY ENGINEER AND SUPERINTENDENT OF STREETS	J. E. Attebery

S E A L

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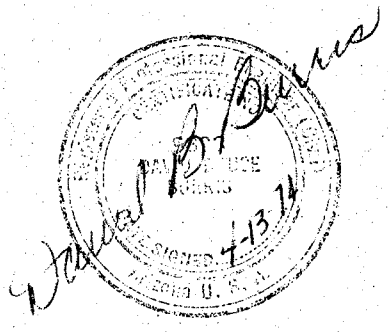

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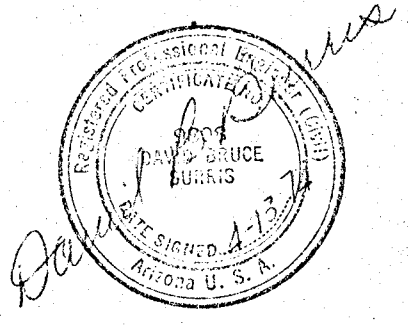

SEAL

CALL FOR BIDS

Sealed bids will be received at the office of the City Engineer, Room 700, Municipal Building, 251 West Washington, Phoenix, Arizona, 85003, until 2:00 p.m. Tuesday, January 7, 1975 for a Bond Issue/Budget Project No. ST-73283.00 for DETENTION BASIN NO. 3 16TH STREET WASH, EAST OF CAVE CREEK ROAD. Construction of an earthfill floodwater detention dam with reinforced concrete pipe outlet, landscaping, irrigation, and appurtenent facilities.

Prospective bidders may examine and/or purchase plans, special provisions, and proposal pamphlets at the City Engineer's office. These documents may be purchased for $ 10.00 per set.

Pursuant to City of Phoenix Ordinance G-1327, to provide for nondiscrimination in employment by City construction contractors, a prime contractor must complete and submit a Bidder's Certification with his proposal. This certification requires the contractor to submit a written Affirmative Action Plan for review and approval by the City and an Employer Information Report, prior to award of contract.

The proposal, 5 percent proposal guarantee, and bidders' certification shall be submitted in a sealed envelope, the outside, lower right-hand corner of which shall be marked as follows:

Bid of _____, Contractor

For _____

City of Phoenix, Project No. ST-73283.00

Proposals will be opened and read publicly, in Room 731, at the time and date stated above.

The general prevailing rate of per diem wages, as determined by and on file with the Industrial Commission of Arizona, shall be paid for each craft or type of workman needed to perform the contract.

The Council of the City of Phoenix reserves the right to award the contract to the lowest and/or best responsible bidder, or all bids will be rejected, as soon as practicable after the date of opening bids.

JOHN B. WENTZ
City Manager

By _____
J. E. Attebery, P.E.
City Engineer

Published: Arizona Weekly Gazette
December 17, 1974

Distribution:
City Clerk - Original and 1
City Manager - 1
Engineering - 2
Press - 5

Project No. ST-73283.00

INFORMATION FOR BIDDERS

.01 GENERAL

No refunds will be made for the return of plans and/or specifications by prospective bidders--either before or after the bid opening date.

.02 SUBMITTING BIDS

(a) The bidder must hold an appropriate contractors' license(s) issued by the Arizona State Registrar of Contractors, qualifying him to do the work.

(b) This project is subject to City of Phoenix Ordinance G-1327 pertaining to Equal Employment Opportunity. A bidder will not be eligible for award of this contract under the Invitation for Bids unless such bidder submits as a part of his bid the Part IV Certification on page BC-4.

(c) The bidder shall submit his proposal on the form(s) contained in this project specification book. Do not remove proposal forms from the book.

.03 STANDARD SPECIFICATIONS AND DETAILS

Except as otherwise required in these specifications, construction of this project shall be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and City of Phoenix Standard Details, latest revision, which may be obtained at the office of the City Engineer, Room 700, 251 West Washington, Phoenix, Arizona, 85003.

.04 PRE-BID CONFERENCE

A pre-bid conference, to discuss questions that may have arisen regarding this project, will be held on Monday, December 23, 1974 at 10:00 (a.m. xxxxx) in Room 731, Municipal Building, 251 West Washington, Phoenix, Arizona.

BID CONDITIONS

AFFIRMATIVE ACTION REQUIREMENTS

EQUAL EMPLOYMENT OPPORTUNITY

For all City of Phoenix Construction Contracts to be Awarded in the area of Jurisdiction of the Tucson and Phoenix Building and Construction Trades Council.

I The provisions of these bid conditions are such that no contractor, subcontractor or supplier to either, will be eligible for award of a contract or order for work or materials in excess of $10,000 on a City of Phoenix project unless they have submitted a written affirmative action plan embodying both (1) goals and timetables of minority manpower utilization* and (2) specific affirmative action steps directed at increasing minority manpower utilization. Both the goals and timetables, and the affirmative action steps must be taken in good faith to attempt to meet the requirements of this section and as set forth below for all trades which are to be utilized on the project.

II **Goals and Timetables.** The plan must set forth, as minimum, the following ranges of goals for minority manpower utilization in each trade which is to be used:

From 12/1/73	until	11/30/74	20% – 25%
From 12/1/74	until	11/30/75	25% – 30%

In the event that under a contract which is subject to these Bid Conditions any work is performed in a year later than the latest year for which acceptable goals of minority manpower utilization have been determined herein, the goals for 1974-75 shall be applicable to such work.

The percentage goals of minority manpower utilization above are expressed in terms of manhours of training and employment as a proportion of the total manhours to be worked by the contractor's, subcontractor's or suppliers entire work force in that trade on all projects in the Tucson-Phoenix area during the performance of its contract or subcontract. The manhours for minority work and training must be substantially uniform throughout the length of the contract, on all projects and for each of the trades. Further, the transfer of minority employees or trainees from employer-to-employer or from project-to-project for the sole purpose of meeting the contractor's, subcontractor's or suppliers goal shall be a violation of these conditions. In reaching the goals of minority manpower utilization, every effort shall be made to find and employ qualified journeymen. Provided, however, and pursuant to the requirements of Department of Labor regulations, 29 CFR 5a, apprentices or trainees shall be employed on all projects subject to the requirements of these Bid Conditions and, where feasible, 25 percent of apprentices or trainees employed on each project shall be in their first year of apprenticeship or training.

* "Minority" means a person of the following ethnic groups: Spanish surnamed American, Negro, Oriental and American Indian.

In order that the nonworking training hours of trainees may be counted in meeting the goal, such trainees must be employed by the contractor during the training period, the contractor must have made a commitment to employ the trainees at the completion of their training subject to the availability of employment opportunities and the trainees must be trained pursuant to established training programs which must be the equivalent of the training programs now or hereafter provided for in the Arizona Plan with respect to the nature, extent, and duration of training offered.

A contractor or subcontractor shall be deemed to be in compliance with the terms and requirements by the employment and training of minorities in the appropriate percentage of his aggregate work force in the Tucson-Phoenix area for each trade for which it is committed to a goal.

However, no contractor, subcontractor or supplier shall be found to be in noncompliance solely on account of its failure to meet its goals within its timetables, but each shall be given the opportunity to demonstrate that it has instituted all of the specific affitmative action steps specified below and has made every good faith effort to make these steps work toward the attainment of its goals within its timetables, all to the purpose of expanding minority manpower utilization on all of its projects in the Tucson-Phoenix area.

In all cases, the compliance of a contractor, subcontractor or supplier will be determined in accordance with its respective obligations under the terms of these Bid Conditions.

All contractors and subcontractors performing or to perform work on projects subject to these Bid Conditions hereby agree to inform their subcontractors and suppliers of their respective obligations under the terms and requirements of these Bid Conditions, including the provisions relating to goals of minority employment and training.

It shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral, failed to refer minority employees.

III Specific Affirmative Action Steps. Contractors, subcontractors and their suppliers must engage in affirmative action directed at increasing minority manpower utilization, which is at least as extensive and as specific as the following steps:

a. The contractor shall notify community organizations that the contractor has employment opportunities available and shall maintain records of the organizations' response.

b. The contractor shall maintain a file of the names and addresses of each minority worker referred to him and what action was taken with respect to each such referred worker, and if the worker was not employed, the reasons therefore. If such worker was not sent to the union hiring hall for referral or if such worker was not employed by the contractor, the contractor's file shall document this and the reasons therefore.

c. The contractor shall promptly notify the City of Phoenix when the union or unions with whom the contractor has a collective bargaining agreement has not referred to the contractor a minority worker sent by the contractor or the contractor has other information that the union referral process has impeded him in his efforts to meet his goal.

d. The contractor shall participate in training programs in the area.

e. The contractor shall disseminate his EEO policy within his own organization by including it in any policy manual; by publicizing it in company newspapers, annual reports, etc., by conducting staff, employee and union representatives' meetings to explain and discuss the policy; by posting of the policy; and by the specific review of the policy with minority employees.

f. The contractor shall disseminate his EEO policy externally by informing and discussing it with all recruitment sources; by advertising in news media, specifically including minority news media; and by notifying and discussing it with all subcontractors and suppliers.

g. The contractor shall make specific and constant personal (both written and oral) recruitment efforts directed at all minority organizations, schools with minority students, minority recruitment organizations and minority training organizations, within the contractor's recruitment area.

h. The contractor shall make specific efforts to encourage present minority employees to recruit their friends and relatives.

i. The contractor shall validate all man specifications, selection requirements, tests, etc.

j. The contractor shall make every effort to promote after-school, summer and vacation employment to minority youth.

k. The contractor shall develop on-the-job training opportunities and participate and assist in any association or employer-group training programs relevant to the contractor's employee needs.

l. The contractor shall continually inventory and evaluate all minority personnel for promotion opportunities and encourage minority employees to seek such opportunities.

m. The contractor shall make sure that seniority practices, job classifications, etc., do not have a discriminatory effect.

n. The contractor shall make certain that all facilities and company activities are non-segregated.

o. The contractor shall continually monitor all personnel activities to ensure that his EEO policy is being carried out.

p. The contractor shall solicit bids for subcontracts from available minority subcontractors engaged in the trades covered by the Bid Conditions, including circulation of minority contractor associations.

In no event may a contractor or subcontractor and their suppliers utilize goals, timetables, or affirmative action steps required by these Bid Conditions in such a manner as to cause or result in discrimination against any person on account of race, color, religion, sex, or national origin.

IV Bidder's Certification. A bidder **will not** be eligible for award of a contract in excess of $10,000 under this invitation for Bids unless such bidder has submitted as a part of its bid the following certification, which will be deemed a part of the resulting contract:

BIDDERS' CERTIFICATION

Firm: _____

Address: _____

certifies that:

a. it intends to use the following listed construction trades in the work under the contract _____

_____

_____;

and it will adopt the minimum minority manpower utilization goals and timetables and the specific affirmative action steps contained in these Bid Conditions, for those listed construction trades working in the Tucson-Phoenix area; and

b. it shall submit a written affirmative action plan for review and approval by the City and an employer information report, prior to award, and;

c. it shall submit the written affirmative action plan from each subcontractor and supplier having contracts in excess of $10,000 for review and approval by the City and their employer information report, prior to award of subcontracts.

_____

Signature of authorized representative of bidder

_____

Print Name, Position and Date

V Materiality and Responsiveness. The certification required to be made by the bidder pursuant to these Bid Conditions is material and will be made a part of the bid. Failure to submit the certification will render the bid non-responsive.

VI Compliance and Enforcement. Contractors are responsible for informing their subcontractors (regardless of tier) and suppliers as to their respective obligations under these Bid Conditions. Contractors, subcontractors and suppliers hereby agree to refrain from entering into any contract modification subject to City Ordinance, with a company debarred from, or who is determined not to be a "responsible" bidder for, City of Phoenix construction contracts pursuant to the Ordinance. The contractor, subcontractor or supplier shall carry out such sanctions and penalties for violation of the equal opportunity clause including cancellation, termination and suspension of existing subcontracts as may be imposed or ordered by the City, pursuant to the Ordinance. Any contractor, subcontractor or supplier who shall fail to carry out such sanctions and penalties shall be deemed to be in noncompliance with these Bid Conditions and City Ordinance.

Nothing herein is intended to relieve any contractor, subcontractor or supplier during the term of its contract on this project from compliance with City Ordinances, and the Equal Opportunity Clause of its contract, with respect to matters not covered in these Bid Conditions.

Violation of any substantial requirement by a contractor, subcontractor or supplier covered by these Bid Conditions including the failure of such contractor, subcontractor or supplier to make a good faith effort to meet its fair share of the trade's goals of minority manpower utilization, shall be deemed to be noncompliance by such contractor, subcontractor or supplier with the Equal Opportunity Clause of the contract, and shall be grounds for imposition of the sanctions and penalties provided in Section VII of City Ordinance No. G–1327.

The City shall review its contractors', subcontractors' and suppliers' employment practices during the performance of the contract.

In regard to these Bid Conditions if the contractor, subcontractor or supplier meets its goals or if the contractor, subcontractor or supplier can demonstrate that it has made every good faith effort to meet those goals, the contractor, subcontractor or supplier shall be presumed to be in compliance with the Ordinance, the implementing regulations and its obligations under these Bid Conditions and no formal sanctions or proceedings leading toward sanctions will be instituted unless the City otherwise determines that the contractor, subcontractor or supplier is not providing equal employment opportunities. In judging whether a contractor, subcontractor or supplier has met its goals, the City will consider each contractor's, subcontractor's or supplier's minority manpower utilization and will not take into consideration the minority manpower utilization of its subcontractors. Where the City finds that the contractor, subcontractor or supplier has failed to comply with the requirements of the Ordinance, the implementing regulations and its obligations under these Bid Conditions, the City shall take such action and impose such sanctions as maybe appropriate under the Ordinance. When the City proceeds with such formal action it has the burden of proving that the contractor, subcontractor or supplier has not met the requirements of these Bid Conditions, but the contractor's, subcontractor's or supplier's failure to meet his goals shall shift to him the requirement to come forward with evi-

dence to show that he has met the "good faith" requirements of these Bid Conditions by instituting at least the Specific Affirmative Action steps listed above and by making every good faith effort to make those steps work toward the attainment of its goals within its timetables. The pendency of such formal proceedings shall be taken into consideration by the City in determining whether such contractor, subcontractor or supplier can comply with the requirements of the Ordinance, and is therefore a "responsible prospective contractor".

Contractor's, subcontractor's and supplier's must keep such records and file such reports relating to the provisions of these Bid Conditions as shall be required by the City.

Project No. ST-73283.00

SPECIAL PROVISIONS

.01 GENERAL

In case of a discrepancy or conflict, plans will govern over both Standard Specifications and Standard Details; Special Provisions will govern over Standard Specifications, Standard Details and Plans.

.02 TRAFFIC REGULATIONS

(a) The following shall be considered as major streets:

Cave Creek Road

(b) All traffic and/or traffic control devices on this project shall be provided, maintained and/or controlled as specified in the City of Phoenix Traffic Barricade Manual, 1974 revision.

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

(d) Unless otherwise provided for in the following "Special Traffic Regulations" all traffic on this project shall be regulated as specified in Section VI of the Traffic Barricade Manual.

.03 SPECIAL TRAFFIC REGULATIONS

Cave Creek Road at 17th Place -

Two lanes (one for each direction) shall be maintained open to traffic on Cave Creek Road at all times during construction of the water line connection.

.04 SIGNS FOR PROJECTS

Project construction sign(s) shall be provided in accordance with Standard Detail 13 and installed as directed. The Engineer will provide the information needed to complete the sign.

SPECIAL PROVISIONS

.05 INSPECTION

Inspection by the Engineer shall not be considered as direct control of the individual workman and his work. The direct control shall be solely the responsibility of the Contractor and Contractor's superintendent and foreman.

The Office of the State Water Commission will inspect the construction to insure that the work is being done in compliance with the State Water Engineer's requirements. The approval of the original Plans and Specifications is subject to revisions or amendments by the State Water Engineer if he considers them necessary for the public safety.

(a) All phases of the project such as concrete work, pipe work, etc., shall be under the direct supervision of a foreman or his designated representative on the site who shall have authority to accept instructions, with respect to that particular phase of the project, and take action required to properly carry out the work.

(b) In the event of noncompliance with the above, the Engineer may require the Contractor to stop work on that part of the project until the required supervision is present.

.06 SOIL INVESTIGATION

The results of the soil tests are as follows:

Engineers Testing Laboratories, Inc.

WARNE ASSOCIATES DIVISION
SOIL MECHANICS & FOUNDATION ENGINEERS

J. E. WARNE, P.E.
T. W. THOMAS, P.E.
H. L. MYERS, P.E.
J. G. BENNITT, P.E.
J. P. BOYD P.E.
L. E. SCOTT, P.E.
E. MANGOTICH, P.E.
D. J. HAMS, P.E.
D. N. WAKEFIELD, P.E.
G. K. COPELAND, P.E.
H. E. HARTIG, P.E.
J. C. ROSNER, PH.D., P.E.
E. G. LARSEN, P.E.
P. F. ALLARD, P.E.

2525 E. Indian School Road 264-4781 Phoenix, Arizona 85016
423 South Olsen 622-3663 Tucson, Arizona 85719
20 Mikes Pike 774-4881 Flagstaff, Arizona 86001

22 FEBRUARY 1974

JOHN CAROLLO ENGINEERS
3308 N. 3RD STREET
PHOENIX, ARIZONA

ATTENTION: JOHN SHANNON

PROJECT: FLOOD DETENTION BASIN No. 3
16TH ST. & CAVE CREEK RD.
PHOENIX, ARIZONA

JOB No. 313-899
ADDENDUM No. 1

IN ACCORDANCE WITH THE REQUEST OF MR. DAVID BURRIS, CITY OF PHOENIX, THIS FIRM HAS REVIEWED THE ABOVE REFERENCED SOILS REPORT RELATIVE TO THE REQUIREMENT OF SPECIFYING A MINIMUM DENSITY OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D698 PROCEDURES IN LIEU OF 95% OF ASTM: D1557 AS PRESENTED IN THE ORIGINAL REPORT.

A REVIEW OF THE TEST DATA INDICATES THAT THE SLIGHTLY REDUCED COMPACTION REQUIREMENT (95% OF D698) WOULD RESULT IN THE FOLLOWING CHANGES IN EMBANKMENT CHARACTERISTICS.

1. THE COMPACTED SOILS WOULD EXHIBIT A SLIGHTLY HIGHER PERMEABILITY SINCE SOILS WILL BE LESS DENSE THAN ORIGINALLY SPECIFIED. HOWEVER, THIS SHOULD NOT SIGNIFICANTLY EFFECT THE EMBANKMENT PROVIDED THAT IT IS USED ONLY FOR THE PURPOSE OF TEMPORARY RETENTION OF STORM WATER RUNOFF AND NOT AS A PERMANENT WATER STORAGE FACILITY.
2. ULTIMATE SHEAR STRENGTH OF THE COMPACTED MATERIAL WOULD BE SLIGHTLY LESS THAN THE VALUES OBTAINED IN THE LABORATORY TESTS. HOWEVER, THE EFFECTIVE SHEAR STRENGTH SHOULD BE WITHIN THE DESIGN PARAMETERS AS PRESENTED IN THE ORIGINAL REPORT.

3. DUE TO THE SLIGHT INCREASE IN PERMEABILITY AND SLIGHT DECREASE IN SHEAR STRENGTH, IT IS ANTICIPATED THAT SOME SLOPE MOVEMENT COULD OCCUR IF THE EMBANKMENT WERE TO IMPOUND WATER FOR AN EXTENDED TIME PERIOD, A PHREATIC SURFACE WERE TO DEVELOP (EITHER PARTIALLY OR FULLY), AND THE EMBANKMENT THEN SUBJECTED TO A SUDDEN RESERVOIR DRAW-DOWN CONDITION.

IN ORDER TO MINIMIZE REDUCTION OF SLOPE STABILITY AND TO MAINTAIN A RELATIVELY IMPERVIOUS EMBANKMENT, THE FOLLOWING PROCEDURE IS SUGGESTED.

A. ALL MATERIALS, PLACED WITHIN THE EMBANKMENT ZONE, SHOULD BE COMPACTED IN HORIZONTAL LIFTS NOT EXCEEDING 8 INCHES IN COMPACTED THICKNESS.

B. COMPACTION OF ALL EMBANKMENT MATERIALS SHOULD BE TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM: D698 PROCEDURE AT A MOISTURE CONTENT BETWEEN 2 PERCENT BELOW AND 4 PERCENT ABOVE THE OPTIMUM MOISTURE CONTENT. PREFERABLY, ALL SOILS WOULD BE PLACED AND COMPACTED AT A MOISTURE CONTENT SLIGHTLY ON THE WET SIDE OF OPTIMUM.

C. ALL OTHER RECOMMENDATIONS AND PROCEDURES SHOULD BE ACCOMPLISHED AS PRESENTED IN THE ORIGINAL REPORT.

THE FIRST SENTENCE OF THE SECOND PARAGRAPH OF "POND AREA", PAGE 5, SHOULD BE AMENDED TO READ AS FOLLOWS:

SOILS DERIVED FROM THE POND AREA APPEAR TO BE "SUITABLE" MATERIALS FOR "USE IN" CONSTRUCTION OF THE DAM EMBANKMENT.

FLOOD DETENTION BASIN No. 3
16TH ST. & CAVE CREEK RD.
PHOENIX, ARIZONA
JOB No. 313-899
ADDENDUM No. 1

THIS ADDENDUM SHALL BE ATTACHED TO THE ORIGINAL REPORT AND MADE A PART THEREOF.

RESPECTFULLY SUBMITTED,
WARNE ASSOCIATES DIVISION

Glen K. Copeland

GLEN K. COPELAND, P.E.
/JM 2/22/74
COPIES TO: ADDRESSEE (4)

Engineers Testing Laboratories, Inc.

WARNE ASSOCIATES DIVISION
SOIL MECHANICS & FOUNDATION ENGINEERS

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JOHN CAROLLO ENGINEERS
3308 NORTH 3RD STREET
PHOENIX, ARIZONA

11 DECEMBER 1973

ATTENTION: JOHN SHANNON

PROJECT: FLOOD DETENTION BASIN NO. 3
16TH STREET & CAVE CREEK ROAD
PHOENIX, ARIZONA

JOB NO. 313-899

IN ACCORDANCE WITH YOUR REQUEST, THIS FIRM HAS CONDUCTED A SOIL INVESTIGATION FOR FOUNDATION PURPOSES AT THE SITE OF THE SUBJECT PROJECT.

THE ACCOMPANYING REPORT INCLUDES THE RESULTS OF THE SUBSURFACE EXPLORATION, LABORATORY ANALYSES, AND THE REASONING SUPPORTING THE CONCLUSIONS AND RECOMMENDATIONS CONTAINED THEREIN.

COMPLIMENTARY TO THIS REPORT, THIS FIRM PROVIDES CONTINUING CONSULTATION IN BEHALF OF THE CLIENT. THIS CONSULTATION INCLUDES DISCUSSION RELATIVE TO COMPLIANCE OF FINAL PLANS AND SPECIFICATIONS TO THE INTENT OF THIS REPORT; PARTICIPATION IN THE PRE-CONSTRUCTION CONFERENCE; A SITE VISITATION WITH PERSONNEL FOR ORIENTATION PURPOSES, AND SUBMISSION OF ADDENDA WHERE CLARIFICATION OR MINOR CHANGES ARE REQUIRED.

YOU ARE ENCOURAGED TO AVAIL YOURSELF OF THESE SERVICES AND WE APPRECIATE THE OPPORTUNITY TO WORK WITH YOU.

RESPECTFULLY SUBMITTED,
WARNE ASSOCIATES DIVISION

BY: _____
GLEN K. COPELAND, P.E.

REVIEWED BY: _____
TOM W. THOMAS, P.E.

/BA

COPIES TO: ADDRESSEE (4)

TABLE OF CONTENTS

PART I

REPORT

SCOPE

THIS REPORT PRESENTS THE RESULTS OF A SOIL INVESTIGATION MADE AT NORTH PHOENIX MOUNTAIN FLOOD DETENTION BASIN NO. 3. THE DAMSITE IS LOCATED SOUTH AND EAST OF 16TH STREET AND CAVE CREEK ROAD, PHOENIX, ARIZONA. THE DAM IS INTENDED TO IMPOUND AND REGULATE STORM WATER RUNOFF FROM A PORTION OF THE NORTH PHOENIX MOUNTAIN WATERSHED. THE PURPOSE OF THIS INVESTIGATION IS TO DETERMINE FOUNDATION CONDITIONS AT THE DAM SITE; TO EVALUATE EXCAVATION FACTORS WITHIN THE POND AREA; AND TO TEST AND EVALUATE SUITABILITY OF ON-SITE MATERIALS FOR CONSTRUCTION OF THE DAM.

IT IS UNDERSTOOD THAT THE PRESENT DESIGN CONCEPTS FOR THIS DAM ARE AS FOLLOWS:

DAM EMBANKMENT:

- APPROXIMATE CREST LENGTH..... 770 FEET
- MAXIMUM HEIGHT..... 30 FEET
- CREST WIDTH..... 12 FEET
- DOWNSTREAM SLOPE
  - HOMOGENEOUS EARTH FILL DAM SECTION..... 2:1 (HORZ. TO VERT.
  - LANDSCAPING FILL LINE..... 4:1 (HORZ. TO VERT.
- UPSTREAM SLOPE..... 2:1 (HORZ. TO VERT.

APPROXIMATE POND STORAGE..... NOT DETERMINED

DURATION OF IMPOUNDMENT..... NOT DETERMINED

METHOD OF POND DISCHARGE

PRINCIPAL SPILLWAY IS 27" REINFORCED CONCRETE PIPE THROUGH THE DAM. EMERGENCY SPILLWAY IS AT EAST DAM ABUTMENT. CUT IN THE SPILLWAY AREA RANGES TO A MAXIMUM DEPTH OF APPROXIMATELY 13 FEET. IT IS UNDERSTOOD THAT THE CREST ELEVATION IS APPROXIMATELY 1385 FEET.

INVESTIGATION

FIFTEEN TEST BORINGS WERE DRILLED WITH A ROTARY AUGER DRILLING RIG (CME-75) UTILIZING 6 INCH CONTINUOUS FLIGHT AUGERS AT THE LOCATIONS SHOWN ON THE ACCOMPANY SITE PLAN. IN ADDITION, FIVE BACKHOE TRENCHES WERE EXCAVATED TO FACILITATE SOIL SAMPLING AND TO ALLOW VISUAL

INSPECTION AND CLASSIFICATION OF THE MATERIALS. THE SOILS ENCOUNTERED WERE CONTINUOUSLY EXAMINED, VISUALLY CLASSIFIED AND WHEREVER APPLICABLE, SAMPLED. THE GRAPHICAL LOGS OF THE TEST BORINGS AND BACKHOE TEST PITS ARE INCLUDED IN PART III OF THIS REPORT.

THE INVESTIGATION AT THE "DAM SITE" AND "WEST DIKE" CONSISTED OF 7 AUGER BORINGS AND 3 BACKHOE TRENCHES ALONG THE AXIS OF THE DAM, AND 2 AUGER BORINGS WITHIN THE EMERGENCY SPILLWAY AREA.

IN THE "POND AREA", 6 AUGER BORINGS WERE DRILLED AND 2 BACKHOE PITS WERE EXCAVATED TO DETERMINE TYPE AND CONDITION OF SUBSOILS AND TO ASSESS EXCAVATION FACTORS.

LABORATORY ANALYSES PERFORMED ON SELECTED SOIL SAMPLES CONSISTED OF THE FOLLOWING:

TEST	SAMPLE(S)	PURPOSE
GRADATION AND ATTERBERG LIMITS	REPRESENTATIVE (7)	CLASSIFICATION
MOISTURE-DENSITY RELATIONSHIP	REPRESENTATIVE (1)	OPTIMUM MOISTURE AND MAXIMUM DENSITY
DIRECT SHEAR	REMOLDED SOIL (1)	EMBANKMENT STABILITY
PERMEABILITY	REMOLDED SOIL (3)	EMBANKMENT SEEPAGE
SOLUBLE SALTS	REPRESENTATIVE (5)	CORROSION POTENTIAL ON UNDERGROUND CONCRETE

DUE TO THE LARGE, GRANULAR, CEMENTED NATURE OF SUBSOILS, WIDE SCALE UNDISTURBED FIELD SAMPLING WAS NOT FOSSIBLE. THE RESULTS OF LABORATORY ANALYSES ARE PRESENTED IN PART II OF THIS REPORT.

SITE AND SOIL CONDITIONS

IN GENERAL, SUBSOIL CONDITIONS ACROSS THE SITE ARE RELATIVELY UNIFORM. SURFACE SOILS ARE MEDIUM DENSE TO DENSE CLAYEY SAND AND GRAVEL SOILS OF LOW TO MEDIUM PLASTICITY; CONTAIN SOME COBBLE MATERIAL TO APPROXIMATELY 8 INCH MAXIMUM SIZE; AND EXTEND TO VARIABLE DEPTHS BETWEEN ONE-HALF AND TEN FEET. UNDERLYING THE SURFACE SOILS IS WEATHERED,

THINLY BEDDED, MODERATELY HARD TO HARD SCHIST ROCK. THE THIN BEDS GENERALLY EXHIBIT NEARLY VERTICAL DIP WITH A NORTHEASTERLY STRIKE. WEATHERING OF THE SCHIST IS VARIABLE WITH SOME ROCK OUTCROP SHOWING ONLY MINOR ALTERATION (REFUSAL TO AUGER DRILLING); WHEREAS, OTHER NEARBY ZONES ARE EASILY DRILLED.

THE MOISTURE CONTENTS WERE DESCRIBED AS RANGING FROM DRY TO SLIGHTLY DAMP. NO GROUNDWATER TABLE WAS ENCOUNTERED IN ANY BORING OR TEST PIT.

DISCUSSION OF RESULTS

GENERAL: THE CLAYEY SAND AND GRAVEL SOILS WITHIN THE POND (BORROW) AREA ARE RELATIVELY IMPERMEABLE WHEN COMPACTED TO UNIFORM HIGH DENSITIES AND WILL PROVIDE A RELATIVELY GOOD MATERIAL FOR CONSTRUCTION OF THE DAM SECTION. HOWEVER, IT SHOULD BE ANTICIPATED THAT SOME COBBLE AND BOULDER SITE MATERIAL LARGER THAN 8 INCHES IN SIZE WILL PROBABLY BE ENCOUNTERED. SOME OF THE LARGER BOULDERS, WHICH HAVE UNDERGONE CONSIDERABLE ALTERATION, MAY DEGRADE DURING EXCAVATION, TRANSPORTATION AND PLACEMENT. HOWEVER, A FIELD SCREENING OPERATION MAY BE REQUIRED TO REMOVE OVERSIZE MATERIAL (LARGER THAN 8 INCHES) IF AREAS OF HIGH COBBLE AND GRAVEL CONTENT ARE ENCOUNTERED. ADDITIONALLY, THE SCREENING OPERATION WOULD MECHANICALLY MIX AND BLEND THE ON-SITE SOILS SUCH THAT A MORE WELL-GRADED MATERIAL WOULD RESULT. THE USE OF MATERIAL DERIVED FROM THE UNDERLYING SCHIST BEDROCK IS NOT RECOMMENDED DUE TO THE GENERAL FLAT, PLATY AND NON-PLASTIC CHARACTERISTICS.

IT IS ESTIMATED THAT SHRINKAGE OF BORROW TO FILL WILL BE APPROXIMATELY 15-20% FOR THE NEAR SURFACE SOILS (0 TO 2 FOOT DEPTH). DEEPER BORROW SOILS COULD EXHIBIT HIGHER SHRINKAGE FACTORS DUE TO THE REMOVAL OF OVERSIZE COBBLE AND BOULDER MATERIAL.

DAM STRUCTURE: IT IS RECOMMENDED THAT THE FOLLOWING PROCEDURE BE UTILIZED FOR SUBGRADE PREPARATION AND PLACEMENT AND COMPACTION OF DAM EMBANKMENT MATERIALS.

1. STRIP AND REMOVE ALL LOOSE SOIL, VEGETATION, FILL, DEBRIS, ETC. FROM THE DAM SITE. PARTICULAR ATTENTION SHOULD BE PAID TO THE REMOVAL OF THE CLEANER SAND AND GRAVEL SOILS IN THE BOTTOM OF THE EXISTING WASH.

2. REMOVE AND STOCKPILE CLAYEY SAND AND GRAVEL SURFACE AND SUB-SOIL TO A MINIMUM DEPTH OF ONE FOOT. BENCHING OF HILLSIDE SLOPES SHOULD BE PROVIDED SO THAT PLACEMENT AND COMPACTION OF EMBANKMENT MATERIALS ARE UPON LEVEL BASES. ROCK OUTCROPS OR RIDGES SHOULD BE LEVELED TO PROVIDE EVEN BEARING OF FILL SOILS.

3. EXPOSED SUBGRADE SOILS SHOULD BE SCARIFIED, MOISTENED AND COMPACTED TO A MINIMUM DEPTH OF 8 INCHES.

4. PLACE AND COMPACT ON-SITE SOILS OR STOCKPILED SOILS IN HORIZONTAL LIFTS NOT EXCEEDING 8 INCHES IN COMPACTED THICKNESS. FILL SOILS SHOULD BE FREE OF COBBLES OR BOULDERS LARGER THAN 8 INCHES.

5. PARTICULAR CARE SHOULD BE TAKEN TO ACHIEVE UNIFORM HIGH DENSITIES OF FILL SOILS AROUND AND ADJACENT TO THE 27 INCH REINFORCED CONCRETE PIPE WHICH SERVES AS THE PRINCIPAL SPILLWAY. LOOSE SOILS IN THIS AREA WOULD TEND TO ALLOW SEEPAGE CONDITIONS TO DEVELOP IF THE POND WERE MAINTAINED IN A FULL CONDITION FOR AN EXTENDED PERIOD OF TIME AND COULD RESULT IN PIPING OF SOIL AROUND THE OUTLET PIPE.

ALL COMPACTION SHOULD BE TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM: D1557 PROCEDURES. COMPACTION SHOULD BE ACCOMPLISHED AT OR ABOVE THE OPTIMUM MOISTURE CONTENT TO PROVIDE A STRUCTURE WITH MORE FLEXIBILITY THAN WOULD BE ASSOCIATED WITH SOILS COMPACTED AT A LOW MOISTURE CONTENT. EVEN WITH THIS PROCEDURE, TENSION CRACKING, WHICH IS A PHENOMENON ASSOCIATED WITH EARTH DAMS, COULD DEVELOP IN THE STRUCTURE. THE CRACKS THEMSELVES ARE USUALLY NOT CAUSE FOR ALARM, PARTICULARLY FOR DETENTION BASINS; BUT IF ALLOWED TO EXIST WILL BE SUBJECT TO PROGRESSIVE EROSION.

SLOPE STABILITY SHOULD BE ANALYZED BASED ON THE FOLLOWING STRENGTH PARAMETERS:

EFFECTIVE ANGLE OF INTERNAL FRICTION.....35°

EFFECTIVE COHESION.....150 PSF

UTILIZING THESE PARAMETERS, THE PROPOSED 2:1 SLOPES EXHIBIT A FACTOR OF SAFETY OF APPROXIMATELY 1.5. REDUCED FACTORS OF SAFETY WOULD RESULT IF THE BASIN/DAM SITE WERE TO PERMANENTLY STORE WATER SUCH THAT A PHREATIC SURFACE COULD DEVELOP WITHIN THE DAM EMBANKMENT.

IT IS UNDERSTOOD THAT THE DOWNSTREAM SLOPE IS TO BE FLATTENED TO A 4:1 SLOPE (HORIZONTAL TO VERTICAL) FOR LANDSCAPING PURPOSES. ALL EXCESS, OVERSIZE COBBLES AND BOULDERS, DERIVED DURING EXCAVATION OF BORROW MATERIALS, COULD BE UTILIZED AS FILL MATERIAL WITHIN THE INTERIOR ZONE OF THE LANDSCAPE FILL AREA AND EXTERIOR TO THE 2:1 DOWNSTREAM DAM SLOPE. ADDITIONALLY, OVERSIZE ROCK COULD BE UTILIZED TO FLATTEN THE UPSTREAM SLOPE AND TO PROVIDE INCREASED SLOPE STABILITY AGAINST SUDDEN RESERVOIR DRAW-DOWN CONDITIONS.

EMERGENCY SPILLWAY AREA: THE SPILLWAY AREA WILL REQUIRE CUTS RANGING TO A MAXIMUM DEPTH OF APPROXIMATELY 13 FEET. EXCAVATION CAN PROBABLY BE ACCOMPLISHED WITH HEAVY DUTY CRAWLER TRACTORS EQUIPPED WITH SINGLE RIPPER TEETH. SOME BLASTING MAY BE REQUIRED IN LOCALIZED AREAS WHERE THE MORE MASSIVE SCHIST BEDROCK OUTCROPPINGS OR LOCALIZED ZONES OF HEAVY CALCITE CEMENTATION ARE ENCOUNTERED.

PROVISION SHOULD BE MADE FOR DIVERSION OF EMERGENCY SPILLWAY RUNOFF AWAY FROM THE DOWNSTREAM TOE OF DAM. TOE EROSION COULD RESULT IN LOSS OF STABILITY OF THE DOWNSTREAM SLOPE.

POND AREA: EXCAVATION WITHIN NEAR SURFACE SOILS (1 TO 3 FEET IN DEPTH) SHOULD BE READILY ACCOMPLISHED BY CRAWLER TRACTORS. RIPPING AND/OR BLASTING MAY BE REQUIRED IN SUBSOILS WHERE HEAVY ZONES OF CALCITE CEMENTATION OR BEDROCK ARE ENCOUNTERED.

SOILS DERIVED FROM THE POND AREA APPEAR TO BE ADEQUATE MATERIALS FOR CONSTRUCTION OF THE DAM EMBANKMENT. HOWEVER, THE BORROW SOILS

SHOULD BE BLENDED WHENEVER POSSIBLE TO PROVIDE A MORE WELL GRADED FILL MATERIAL. ROCK OVERSIZE (8 INCHES OR LARGER) SHOULD BE REMOVED PRIOR TO PLACEMENT WITHIN THE DAM SECTION.

THE EXPOSED SUBSOILS AT FINISHED POND LEVEL ARE CLAYEY GRAVELS WITH LOW TO MEDIUM PLASTICITY FINES AND MODERATE TO HEAVY CEMENTATION. THESE SOILS ARE MEDIUM DENSE AND WOULD BE SOMEWHAT PERMEABLE. HOWEVER, THIS SHOULD BE NO PROBLEM SINCE THE BASIN IS NOT INTENDED TO PERMANENTLY STORE WATER.

PART II

RESULTS OF LABORATORY ANALYSES

TABULATION OF TEST RESULTS

Job No. 313-899

Project FLOOD DETENTION BASIN No. 3 Date 12-11-73

Location 16TH ST. & CAVE CREEK ROAD Requested by GKC/ETL

Material SOIL

Submitted by PDU/ETL Date

HOLE NO.	STATION	DEPTH	UNIFIED CLASS.	LL	PI	SIEVE ANALYSIS – ACCUM. % PASSING											LAB. NO.
						200	100	40	16	10	4	1/4	3/8	3/4	1	1 1/2	
1	SEE SITE PLAN	0'-2'	SM-SC	25	4	11	14	19	30	41	60	68	77	92	100		
2	"	4'-6'	SC	43	16	20	24	32	44	53	69	74	84	90	100		
7	"	0'-2'	SC	30	13	39	45	52	61	66	78	82	91	97	100		
8	"	4'-6'	SM-SC	26	5	20	24	33	46	53	70	74	84	100			
PIT A	"	0'-2'	SM-SC	30	6	35	42	52	62	69	82	86	93	100			
PIT C	"	0'-2'	SC	31	9	22	26	33	42	50	67	73	83	100			
PIT D&E COMPOSITE	"	0'-3'	SC	36	15	27	31	38	46	52	65	72	82	95	97	100	

S.P. - 16

DIRECT SHEAR TEST DATA

Lab. No. _____

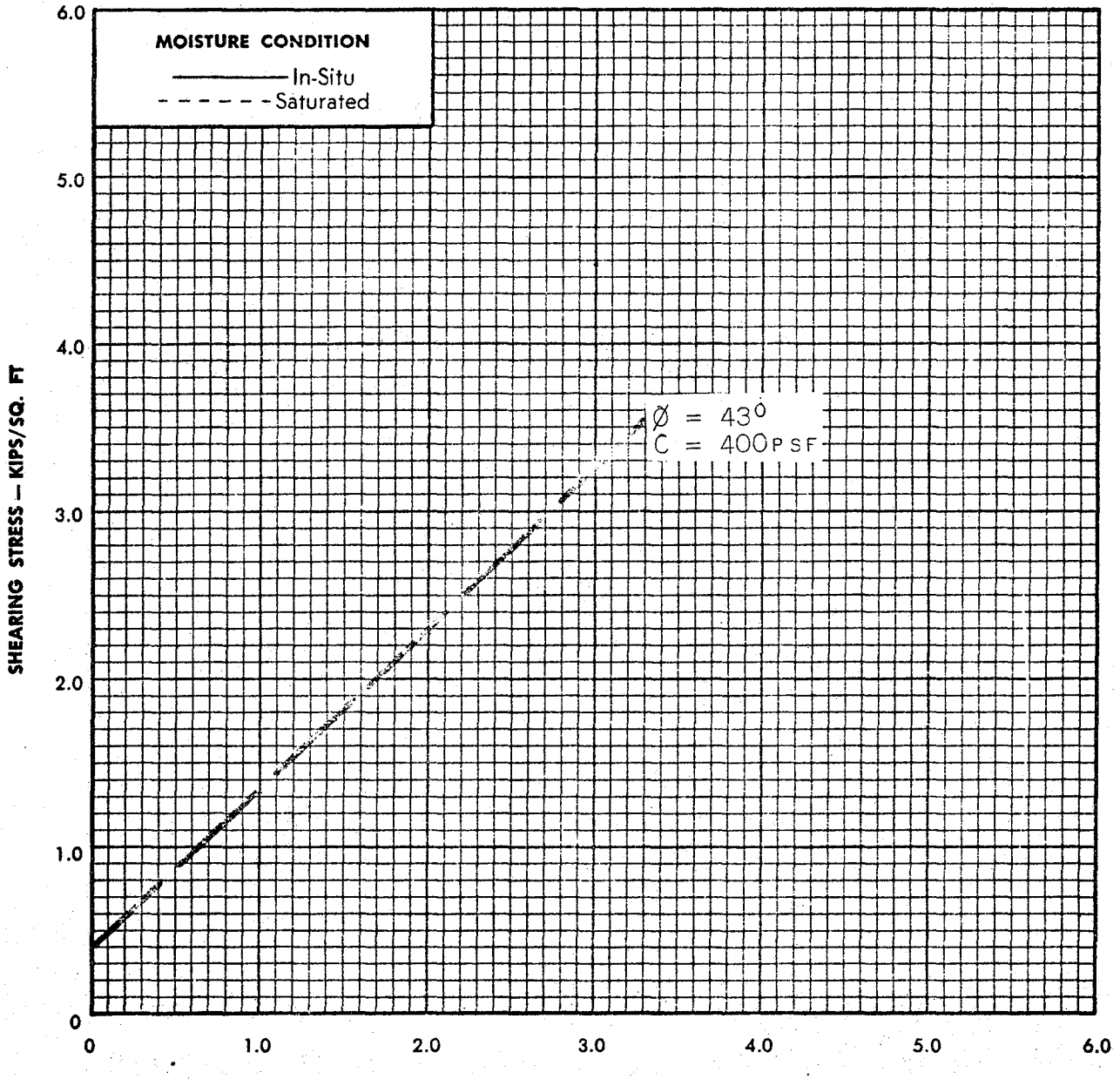
Job No. 313-899

Date 12-11-73

Project FLOOD DETENTION BASIN No. 3 Location 16TH ST. & CAVE CREEK ROAD

Source of Sample TEST PITS C & D

Material COMPOSITE SAMPLE - 121.5PCF DRY DENSITY; 10.4%



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2525 E. Indian School Road 264-4781 Phoenix, Arizona 85016

REPORT ON LABORATORY TESTS

Lab. No. 313-899

Date 12-11-73

Date Rec'd

Project FLOOD DETENTION BASIN NO. 3 Location 16TH ST. & CAVE CREEK ROAD

Source of Sample AS NOTED

Material SOIL Sampled By PDU/ETL

Submitted By PDU/ETL Requested By GKC/ETL

Tested SOLUBLE SALTS AND SULFATES

TEST RESULTS

Test Boring	Depth	Total Water Soluble Salts	Soluble Sulfates
2	0'-2'	0.04%	--
4	0'-1'	0.03%	--
6	1'-2'	0.24%	0.02%
9	0'-2'	0.06%	--
Composite of pits D and E	0'-2'	0.14%	0.04%

S.P. - 18

MOISTURE-DENSITY RELATIONSHIP CURVE

Lab. No._____

Job No. 313-899

Date 12-10-73

Date Rec'd _____

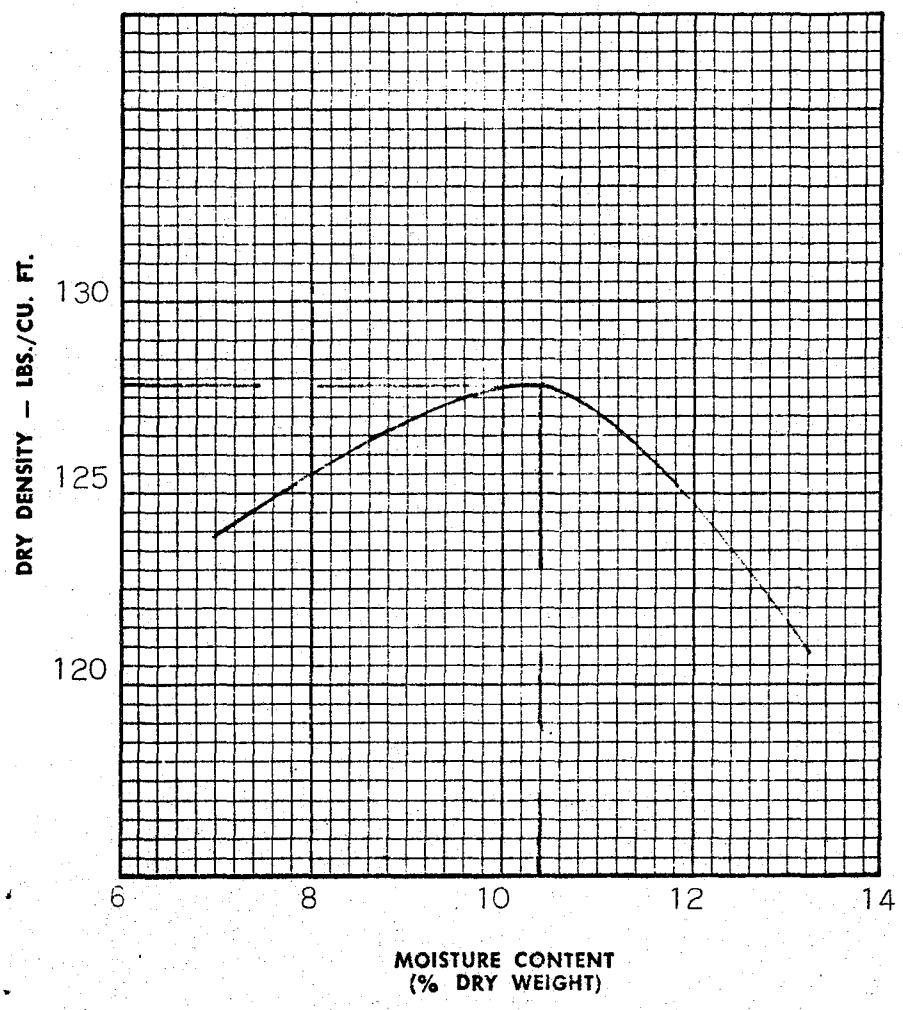
Project FLOOD DETENTION BASIN No. 3 Location 16TH ST. & CAVE CREEK ROAD

Source of Sample COMPOSITE OF PITS E AND E

Material SOIL Sampled By PDU/ETL

Submitted By PDU/ETL Requested By GKC/ETL

Tested ASTM D1557 METHOD A



Max. Dry Density, lbs./cu. ft. 127.9

Optimum Moisture Content, % 10.4

Dia. Mold 4" in.

Height of Mold 4.58 in.

No. of Layers 5

Blows per Layer 25

Wt. of Hammer 10 lbs.

Height of Drop 18 in.

Material Used -#4

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S. P. - 19

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2525 E. Indian School Rd. 264-4781 Phoenix, Arizona 85064
423 S. Olsen 622-3663 Tucson, Arizona 85719
20 Mikes Pike 774-4881 Flagstaff, Arizona 86001

REPORT ON FIELD DENSITY TESTS

Lab/Job No. 313-899

Date 12-11-73

Project: FLOOD DETENTION BASIN NO. 3 **Location:** 16TH ST. & CAVE CREEK ROAD

Type of material: CLAYEY SAND **Source of material:** IN-SITU SOILS

Date	Test No.	Location of Test Hole	Elevation of Test	Depth of Fill
11-6-73	1	TEST PIT D (SEE SITE PLAN)	0" - 6" DEPTH	--
"	2	" "	28" -34" DEPTH	--
"	3	" "	56" -62" DEPTH	--
"	4	" "	84" -90" DEPTH	--
"	5	TEST PIT E "	0"-6" DEPTH	--

Test No.	% Moisture Present in Soil	Optimum Moisture (%)	Dry Density of Soil (lbs./cu. ft.)	Maximum Dry Density (lbs./cu. ft.)	% Compaction of Material in the Field	Comments*
1	4.2	--	117.2	--	--	1
2	4.0	--	104.6	--	--	1
3	3.9	--	121.0	--	--	1
4	3.9	--	119.0	--	--	1
5	4.0	--	116.1	--	--	1

Note: The above maximum dry densities were determined by the N/A method of test.

*Comments
1. Native Subgrade (Fill Area)
2. Native Subgrade (Cut Area)
3. Subbase Fill
4. Backfill
5. Embankment Fill
6. Base Course
7. Below Footing Bottom
8. Above Footing Bottom
9. 95% min. req'd
10. 90% min. req'd
11. 85% min. req'd
A. Test results comply with requirements
B. Recompaction required
C. Rock correction applied to maximum density to determine percent compaction

Remarks:

Copies to:

Respectfully submitted,
ENGINEERS TESTING LABORATORIES, INC.

S. P. - 20

Engineers Testing Laboratories, Inc.

2525 E. Indian School Road 264-4781 Phoenix, Arizona 85016

REPORT ON LABORATORY TESTS

Lab. No. 313-899

Date 12-11-73

Date Rec'd

Project FLOOD DETENTION BASIN No. 3 Location 16TH ST. & CAVE CREEK ROAD

Source of Sample TEST PITS D AND E

Material COMPOSITE SOIL SAMPLE Sampled By PDU/ETL

Submitted By PDU/ETL Requested By GKC/ETL

Tested FALLING HEAD PERMEABILITY

TEST RESULTS

SAMPLE No.	DRY* DENSITY	INITIAL MOISTURE	PERMEABILITY RATE (CM/SEC)
1	121.5PCF	10.4%	1.89×10^{-7}
2	121.5PCF	10.4%	1.91×10^{-7}
3	121.5PCF	10.4%	4.34×10^{-7}

PART III

RESULTS OF FIELD INVESTIGATION

SOIL CLASSIFICATION ASTM: D2487

COARSE-GRAINED SOIL

MORE THAN 50% LARGER THAN 200 SIEVE SIZE

Symbol	Letter	DESCRIPTION	MAJOR DIVISIONS
	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LESS THAN 5% - 200 FINES	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size.
	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LESS THAN 5% - 200 FINES	
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, MORE THAN 12% - 200 FINES	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, MORE THAN 12% - 200 FINES	
	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, LESS THAN 5% - 200 FINES	SANDS More than half of coarse fraction is smaller than No. 4 sieve size.
	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LESS THAN 5% - 200 FINES	
	SM	SILTY SANDS, SAND-SILT MIXTURES MORE THAN 12% - 200 FINES	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES MORE THAN 12% - 200 FINES	

FINE-GRAINED SOIL

MORE THAN 50% SMALLER THAN 200 SIEVE SIZE

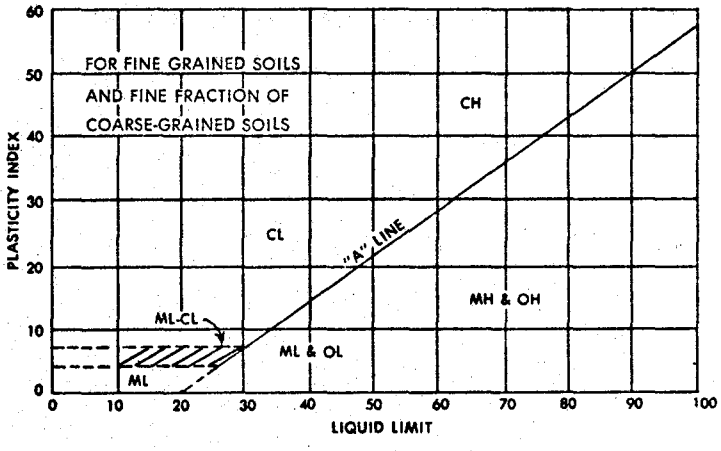
Symbol	Letter	DESCRIPTION	MAJOR DIVISIONS
	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	SILTS AND CLAYS Liquid limit less than 50
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	SILTS AND CLAYS Liquid limit greater than 50
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

NOTE – Soils with 5 to 12 percent minus 200 fines should be classified with dual symbols.

SOIL FRACTIONS

Component	Size Range
Boulders	**Above 12 in.**
Cobbles	**3 in. to 12 in.**
Gravel	**3 in. to No. 4 sieve**
Coarse Gravel	**3 in. to ¾ in.**
Fine gravel	**¾ in. to No. 4 sieve**
Sand	**No. 4 to No. 200**
Coarse	**No. 4 to No. 10**
Medium	**No. 10 to No. 40**
Fine	**No. 40 to No. 200**
Fines (silt or clay)	**Below No. 200 sieve**

PLASTICITY CHART



DEFINITIONS

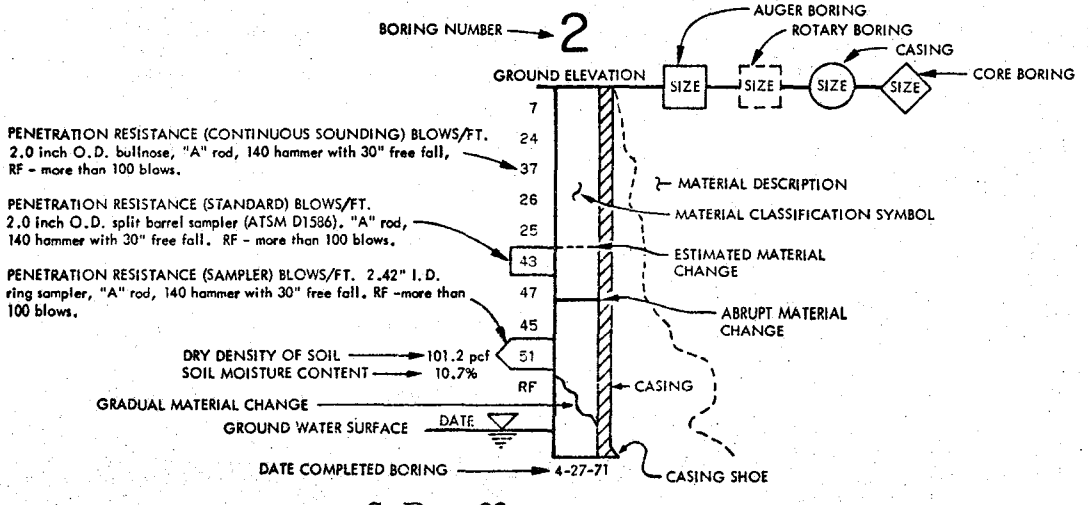
Particle Size

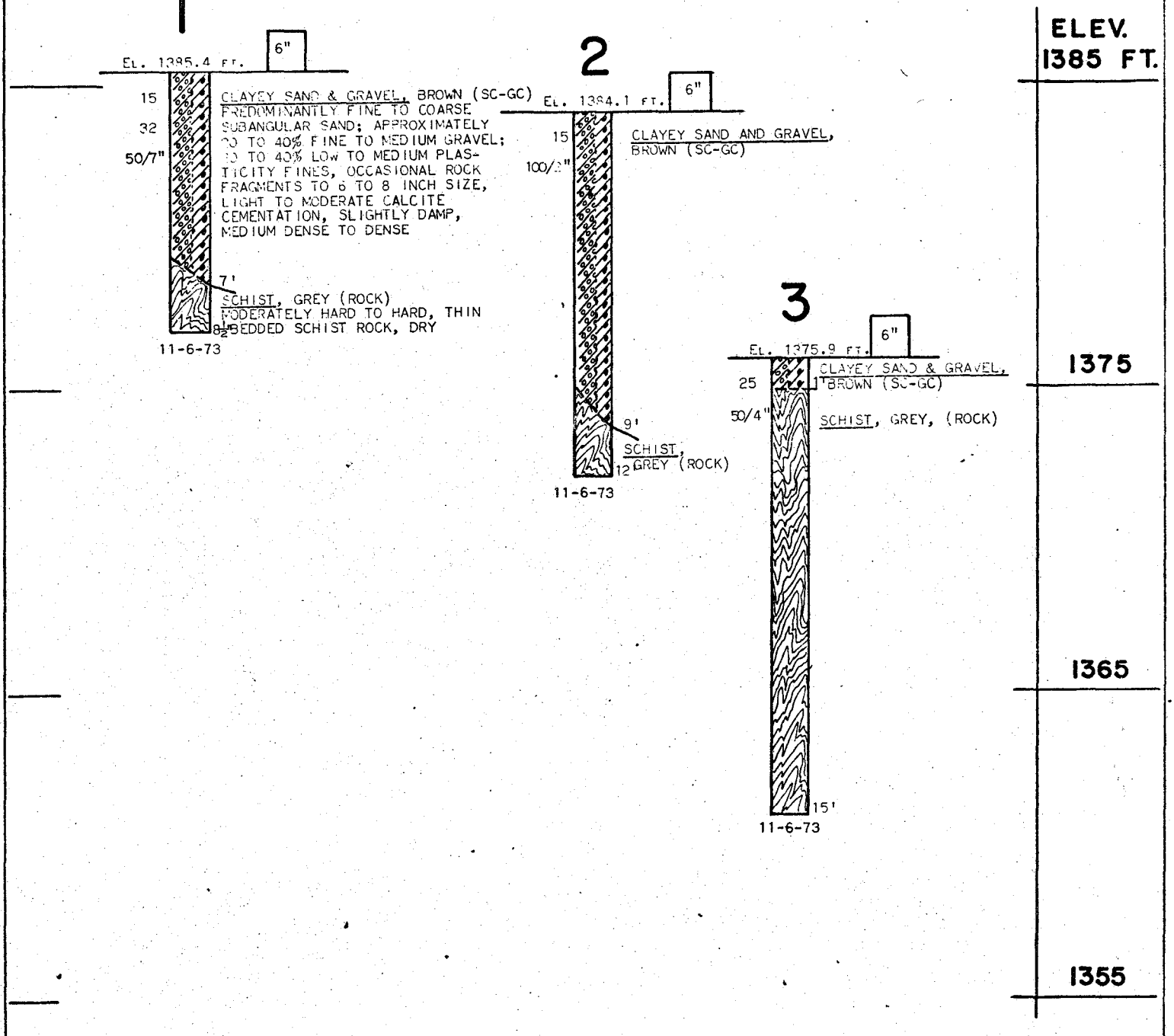
Percentage shown on log denotes visual approximation ±5%.

Soil Classification

Visual unless accompanied by mechanical analysis and Atteberg limits.

LEGEND OF BORING OPERATIONS





SH. 1 of 6

FLOOD DETENTION BASIN NO. 3
JOB NO. 313-899

LEGEND FOR BORING OPERATION APPEARS ON PRECEDING PAGE

S.P. - 21

Engineers Testing Laboratories, Inc.
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ELEV.
1380 FT.

1370

1360

1350

5

EL. 1378.5 FT.

6"

½" CLAYEY SAND & GRAVEL, BROWN (SC-GC)

SCHIST, GREY (ROCK)

7'

11-6-73

4

EL. 1374.4 FT.

6"

12
53
50/6"

CLAYEY SAND & GRAVEL, BROWN (SC-GC) PREDOMINANTLY FINE TO COARSE SUBANGULAR SAND; APPROXIMATELY 20 TO 40% FINE TO MEDIUM GRAVEL; 20 TO 40% LOW TO MEDIUM PLASTICITY FINES, OCCASIONAL ROCK FRAGMENTS TO 6 TO 8 INCH SIZE, LIGHT TO MODERATE CALCITE CEMENTATION, SLIGHTLY DAMP, MEDIUM DENSE TO DENSE

2'

SCHIST, GREY (ROCK) MODERATELY HARD TO HARD, THIN BEDDED SCHIST ROCK, DRY

15'

11-6-73

6

EL. 1366.4 FT.

6"

28
24
40
23
30
25
33
50/6"

CLAYEY SAND & GRAVEL, BROWN (SC-GC)

7½'

SCHIST, GREY (ROCK)

19'

11-6-73

ELEV.
1380 FT.

1370

1360

1350

5

EL. 1378.5 FT.

6"

½' CLAYEY SAND & GRAVEL, BROWN (SC-GC)

SCHIST, GREY (ROCK)

7'

11-6-73

4

EL. 1374.4 FT.

6"

12
53
50/6"

2' CLAYEY SAND & GRAVEL, BROWN (SC-GC) PREDOMINANTLY FINE TO COARSE SUBANGULAR SAND; APPROXIMATELY 20 TO 40% FINE TO MEDIUM GRAVEL; 20 TO 40% LOW TO MEDIUM PLASTICITY FINES, OCCASIONAL ROCK FRAGMENTS TO 6 TO 8 INCH SIZE, LIGHT TO MODERATE CALCITE CEMENTATION, SLIGHTLY DAMP, MEDIUM DENSE TO DENSE

SCHIST, GREY (ROCK) MODERATELY HARD TO HARD, THIN BEDDED SCHIST ROCK, DRY

15'

11-6-73

6

EL. 1366.4 FT.

6"

28
24
40
23
30
25
33
50/6"

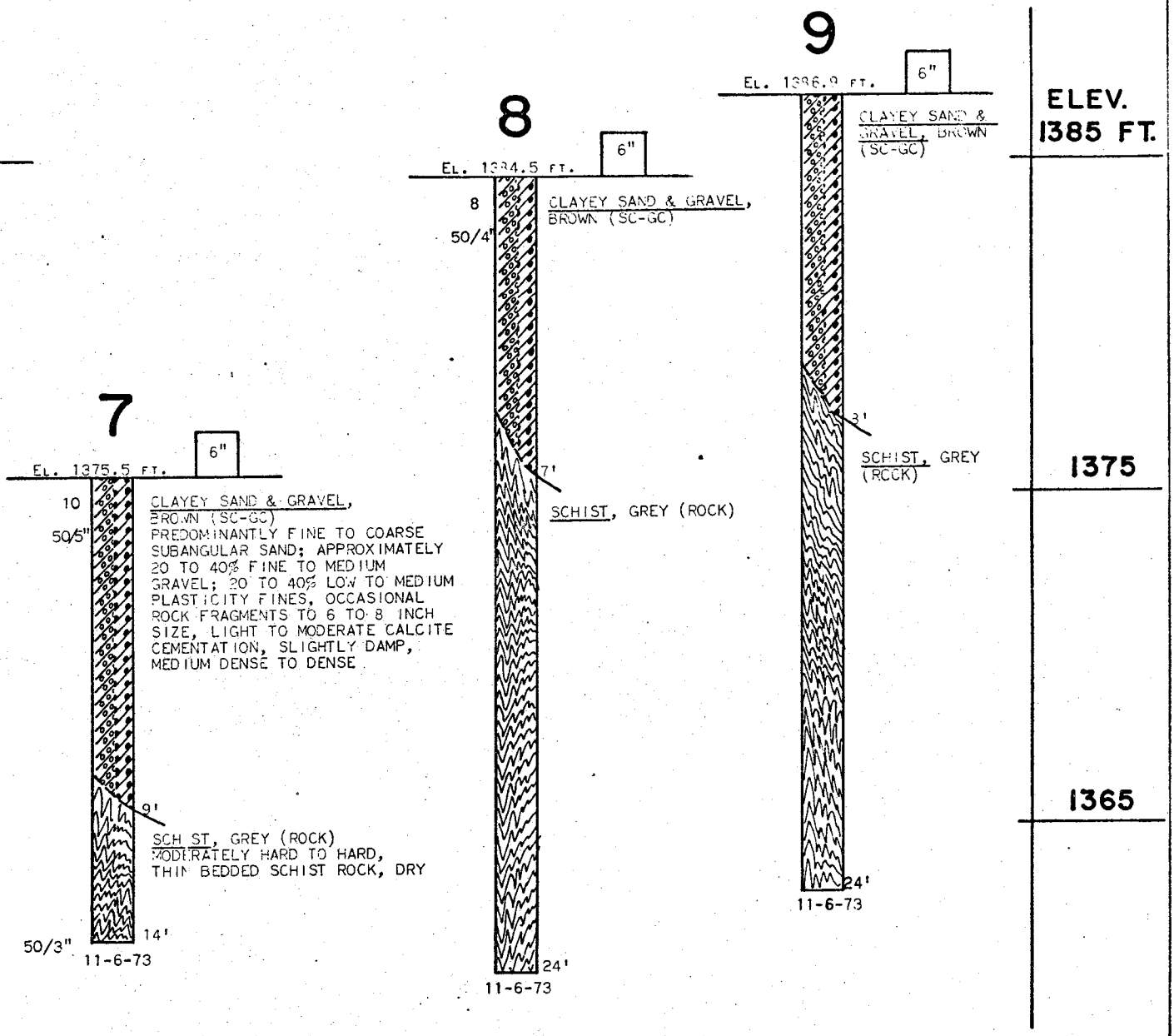
CLAYEY SAND & GRAVEL, BROWN (SC-GC)

7½'

SCHIST, GREY (ROCK)

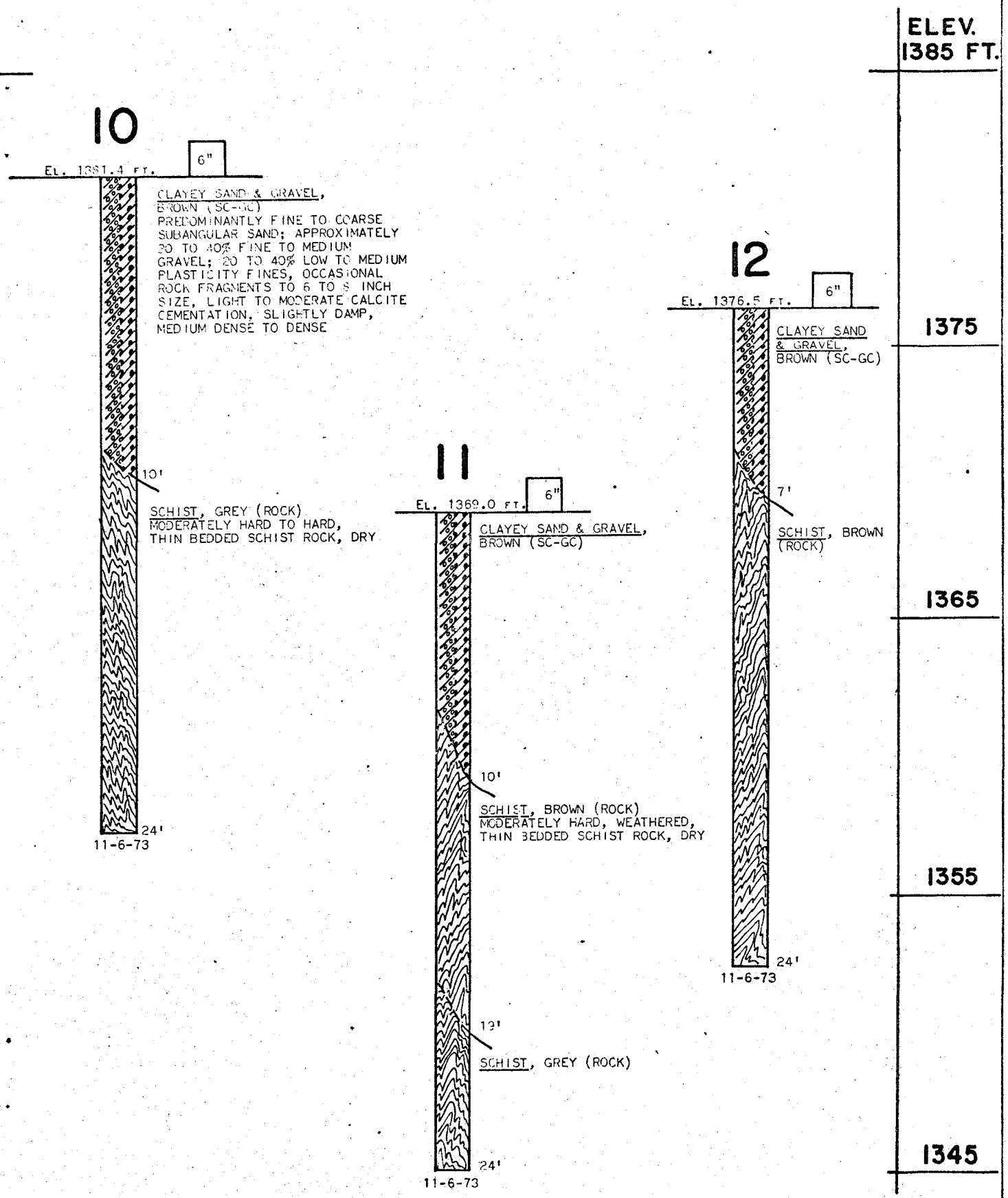
13'

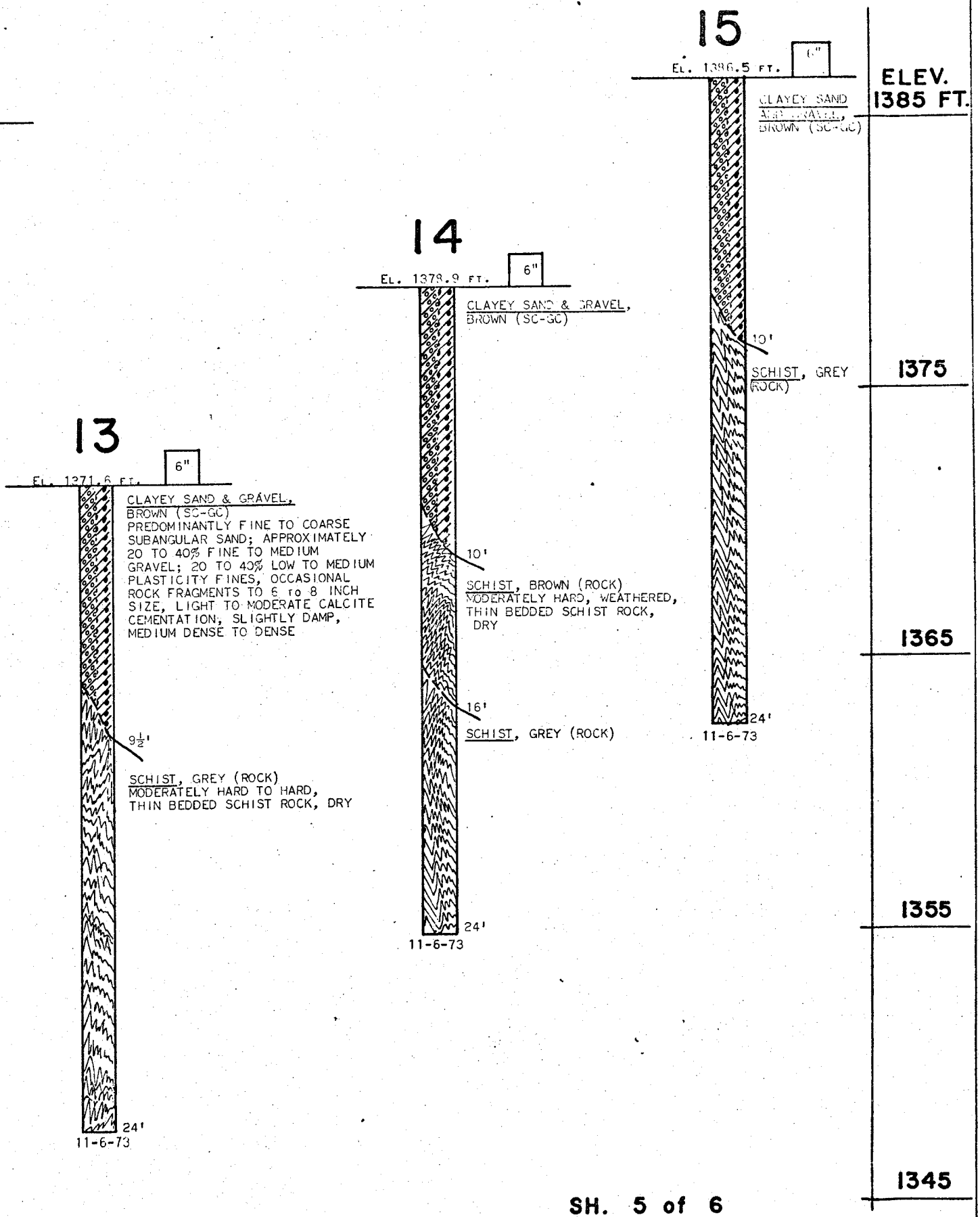
11-6-73



FLOOD DETENTION BASIN NO. 3
JOB NO. 313-899

SH. 3 of 6


ELEV.
1385 FT.
1375
1365
1355
1345
10
EL. 1381.4 FT.
6"
CLAYEY SAND & GRAVEL, BROWN (SC-GC) PREDOMINANTLY FINE TO COARSE SUBANGULAR SAND; APPROXIMATELY 30 TO 40% FINE TO MEDIUM GRAVEL; 20 TO 40% LOW TO MEDIUM PLASTICITY FINES, OCCASIONAL ROCK FRAGMENTS TO 6 TO 8 INCH SIZE, LIGHT TO MODERATE CALCITE CEMENTATION, SLIGHTLY DAMP, MEDIUM DENSE TO DENSE
10'
SCHIST, GREY (ROCK) MODERATELY HARD TO HARD, THIN BEDDED SCHIST ROCK, DRY
24'
11-6-73
11
EL. 1369.0 FT.
6"
CLAYEY SAND & GRAVEL, BROWN (SC-GC)
10'
SCHIST, BROWN (ROCK) MODERATELY HARD, WEATHERED, THIN BEDDED SCHIST ROCK, DRY
13'
SCHIST, GREY (ROCK)
24'
11-6-73
12
EL. 1376.5 FT.
6"
CLAYEY SAND & GRAVEL, BROWN (SC-GC)
7'
SCHIST, BROWN (ROCK)
24'
11-6-73



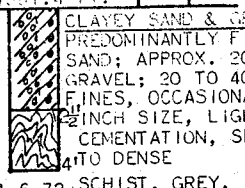
SH. 5 of 6

FLOOD DETENTION BASIN NO. 3
JOB NO. 313-009

Engineers Testing Laboratories, Inc.
WARNE ASSOCIATES DIVISION

PIT A

El. 1381.4 ft.



CLAYEY SAND & GRAVEL, BROWN (SC-GC) PREDOMINANTLY FINE TO COARSE SUBANGULAR SAND; APPROX. 20 TO 40% FINE TO MEDIUM GRAVEL; 20 TO 40% LOW TO MEDIUM PLASTICITY FINES, OCCASIONAL ROCK FRAGMENTS TO 6 TO 8 INCH SIZE, LIGHT TO MODERATE CALCITE CEMENTATION, SLIGHTLY DAMP, MEDIUM DENSE TO DENSE

4'

SCHIST, GREY, (ROCK) MODERATELY HARD TO HARD, THIN BEDDED SCHIST ROCK, DRY

BACKHOE REFUSAL AT 4'

11-6-73

PIT B

El. 1355.9 ft.

CLAYEY SAND & GRAVEL, BROWN (SC-GC)

2'

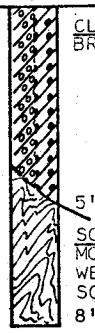
SCHIST, GREY (ROCK)

4' BACKHOE REFUSAL

11-6-73

PIT C

El. 1374.3 ft.



CLAYEY SAND & GRAVEL, BROWN (SC-GC)

5'

SCHIST, BROWN (ROCK) MODERATELY HARD, WEATHERED, THIN BEDDED SCHIST ROCK, DRY

8'

11-6-73

PIT D

El. 1372.9 ft.

CLAYEY SAND & GRAVEL, BROWN (SC-GC)

5'

SCHIST, GREY, (ROCK)

7' BACKHOE REFUSAL

11-6-73

PIT E

El. 1385.6 ft.

CLAYEY SAND & GRAVEL, BROWN (SC-GC)

6½' BACKHOE REFUSAL

11-6-73

ELEV. 1385 FT.

1375

1365

1355

SH. 6 of 6

FLOOD DETENTION BASIN NO. 3
JOB NO. 313-899

.07 SEQUENCE OF WORK

After the dam embankment and a strip 15 feet on each side of the principal spillway outlet pipe has been brought to an elevation 2 feet over the top of the outlet pipe for the entire length of the dam, trench excavation for the outlet pipe shall follow. The outlet pipe shall then be installed, encased, and backfilled, and the pipe entrance and trash rack shall be installed prior to further dam fill. This pipe shall remain unobstructed and the orifice plate shall not be attached while construction of the dam is in progress, to provide emergency drainage. The top grid for the trash rack may be tack welded to side grids and removed to install orifice plate and then replaced and welded as shown on the Plans. The dam embankment shall be completed before the landscaping fill is started.

.08 CLEARING AND GRUBBING

Clearing and grubbing shall consist of removing trees, stumps, brush, roots, rubbish, debris, and other objectionable matter from the fill and borrow area.

.09 STOCKPILING OF TOPSOIL

After clearing and grubbing has been completed, the topsoil for a depth of 8 inches shall be removed from the dam embankment area, landscape fill area, borrow area, and emergency spillway area, and stockpiled so it can be placed on landscape slopes and over all scarred areas.

.10 FOUNDATION FOR DAM

(a) After the clearing and grubbing has been completed, and the top soil removed, all other material beneath the 2:1 slope dam embankment shall be excavated down to hardpan, caliche, or firm rock. All loose material and pockets of segregated granular material shall be removed. Where voids such as pockets, cracks, fissures, etc., are encountered, they shall be excavated, backfilled, and compacted with the same material as required for dam fill to a minimum of 95 percent density as determined according to ASTM D 698 Standard Proctor.

(b) Area each side of the dam embankment area, which will be under fill, other than dam embankment shall be loosened thoroughly by scarifying and/or discing and then compacted to 95 percent density as determined according to ASTM D 698 Standard Proctor.

(c) When the entire area has been prepared for the full length of the dam fill as outlined in paragraphs .10 (a) and (b), and approved by the Resident Engineer, inspection and approval is required by the Arizona Water Commission representative. This may cause a delay in construction until the inspection is completed. After approval by the Arizona Water Commission the foundation shall be moistened and scarified before the first lift is placed.

.11 EMBANKMENT

(a) (1) Material for dam embankment and landscaping fill shall be obtained from stockpiles on site, reservoir area, and emergency spillway excavation. The reservoir area borrow pit shall not be excavated below the principal spillway invert and shall not be excavated above the elevation of the emergency spillway flow line. Removal of fill material obtained from the reservoir area borrow pit shall start adjacent to the toe of the dam above the principal spillway pipe invert and expanded uniformly as required from principal spillway pipe. The finished grade of the borrow area shall be sloped toward the principal spillway pipe and graded to a reasonably smooth finish. The finished surface shall be free of steep or unstable slopes.

(2) All embankments shall be constructed to the lines, grades, and cross-sections shown on the Plans. No deficiency of material from dam embankment section is permissible. Embankments shall be formed of satisfactory materials placed in horizontal layers. The distribution and gradation of materials throughout the dam embankment shall be free from any lenses, pockets, streaks, or layers of material differing substantially from the surrounding material. The foundation shall be moistened and scarified to assure adequate bonding prior to placing the first embankment lift. The dam embankment compaction may be accomplished in any thickness of lift not to exceed 8 inches prior to compaction. The maximum size rock or rock fragments incorporated in the fill shall be two-thirds the lift thickness prior to compaction. During the compaction and filling operations, the abutments at the level of the fill surface, the surface of the fill, and the materials being placed shall be maintained within a moisture content range of between 2 percent below and 4 percent above optimum moisture. After compaction, the surface shall be loosened thoroughly, over the entire length of the lift, by scarifying or discing before applying the next lift to assure an adequate bond between layers. Effective spreading equipment shall be used on each lift to obtain uniform thickness prior to compacting. As the compaction of each layer progresses, continuous leveling and manipulating will be required to assure uniform density.

(3) Embankment, constructed in layers of the depths specified herein, shall be compacted by means of rollers, hauling equipment, mechanical tamping and vibrating equipment or by other suitable means. Equipment shall be routed to distribute travel over the entire area of each layer of material, insofar as is practicable, and separate pieces of equipment shall not follow in the immediate tracks of preceding equipment.

(4) The reservoir and emergency spillway areas will be considered borrow pits. Borrow pits shall be excavated and finally dressed, with maximum elevation equivalent to the spillway elevation, in a manner to prevent the creation of residual hazards or unsightly conditions by reason of steep or unstable slopes.

.11 (a) (5) All materials to be removed that is not used on this project shall be disposed of by the Contractor. This would include such items as trees, stumps, brush, roots, rubbish, debris, and other perishable and objectionable matter. The unsuitable material shall be disposed of at the Skunk Creek Landfill at 3148 West Happy Valley Road. Prior to the hauling and placing of any surplus material at this location, the Contractor shall contact and coordinate this work with the Disposal Superintendent, Sanitation Department (262-7301).

(b) Dam Embankment and Structural Backfill Density

The compacted minimum density of dam embankment and trenches shall be 95 percent of ASTM D 698 Standard Proctor with the percent of density adjusted to compensate for the rock content larger than that which will pass a No. 4 sieve, by the method provided in the City of Phoenix Chart Detail No. 35. If density tests indicate the required density has not been achieved in an area, the material shall be removed, the underlying surface scarified or harrowed, and replaced with material compacted to the required density.

(c) Interruption of Fill

When construction is stopped at any elevation and the surface becomes hard, a new layer of earth shall not be placed until the surface is scarified, moistened and a bond secured that will be equal to that obtained between other horizontal layers.

(d) Structural Backfill

This work shall consist of the required backfill for the headwalls and the pipe trench.

Material shall be placed and spread in layers not more than 4 inches thick after compaction.

The compaction of earth fill for structural backfill shall be same as density required for dam embankment.

The structural backfill shall be hand compacted a minimum of 2 feet above and around all structures or pipe.

(e) Materials for embankment shall be brought to the proper water content in the borrow areas before placement. If excess moisture is present, the material shall be manipulated so as to dry out any moisture in the quantity considered detrimental to the proper compaction of the embankment.

.12 EXCAVATION OF EMERGENCY SPILLWAYS

(a) Special care must be taken to maintain the cross-section lines of the emergency spillway. No deficiency in the width of channel is permissible. The emergency spillway shall be undercut 6 inches and top soil replaced and compacted to a density of not less than 80 percent of ASTM D 698.

Special Provisions, continued

.12 (b) Finished surfaces shall not vary more than 0.2 foot above or 0.5 foot below grade except on the control section of the emergency spillways where the finished surface shall not be more than 0.2 foot below or 0.1 foot above grade. Where natural ground is below grade, no filling is required.

(c) The Contractor must satisfy himself regarding the character and amount of loam, clay, sand, gravel, hardpan, rock, water and all other material to be encountered as well as the character and amount of all work to be performed.

(d) Blasting shall be as per M. A. G. Standard Specification No. 107 as ammended below.

(1) Change the first paragraph of subsection 107.8 to read:

The use of explosives will be permitted only when authorized by the Engineer. The use of the explosives within the City of Phoenix requires a special permit from the Bureau of Fire Prevention. The Contractor shall acquaint himself with the requirements of Ordinance G-1140, City of Phoenix, copies of which may be examined in the office of the City Clerk.

(2) Add the following subsections 107.8 (F) and 107.8 (G):

F. Blasting mats shall be used at all times and shall be in good repair. Steel mats shall not be allowed within 2,000 feet of power lines.

G. Blasting shall be accomplished in such a manner that nearly homes and building will be safe from rocks and other projectiles and the Contractor shall be held responsible for any damage to life and property. The Contractor at the time of firing shall station men along the road at a sufficient distance from the blasting operations to flag down vehicles.

.13 TRASH RACK

(a) This item shall consist of the fabricating and erecting of the trash racks for the inlets of the pipelines.

(b) Structural steel used in trash racks and orifice plate shall conform to ASTM A-36.

(c) The 3-inch diameter steel pipe shall be Black-Standard Schedule 80, Extra Strong according to ASTM A-53.

(d) Welds

Welds shall be in accordance with the standard practices specified in the code for Arc and Gas Welding in Building Construction published by the American Welding Society. Visual inspection of welds will be required.

(e) Workmanship

Workmanship shall be the best standard practice of the trade and performed by mechanics particularly skilled in the type of work required. Work shall be fitted and shop assembled ready for erection whenever possible. Defective workmanship will not be accepted.

.14 CONCRETE ENCASEMENT OF 27-INCH R.G.R.C.P.

(a) Concrete encasement shall be installed as per detail on Sheet 5 of Plans and shall extend through the dam and landscaping fill.

(b) Concrete shall be Class C as per M.A.G. Standard Specification 725 and 505.

(c) The concrete shall cure for 7 days before fill can be placed on the encasement.

.15 PRECAST CONCRETE PIPE

(a) Pipe

Precast concrete pipe shall be made and furnished according to ASTM C 76. The portland cement used in its manufacture shall be Type II, low alkali (AASHO M-85). Where an option is given in the ASTM tables, the manufacturer may use either circular or elliptical reinforcing cages at his discretion. Wall thicknesses may be selected from the ASTM tables. The D-load shall be selected from the following table.

PIPE DIAMETER	D-LOAD	CLASS	NOMINAL LENGTH	TYPE BEDDING
27"	3,000	V	211	Encased
30"	3,000	V	40	Granular
30"	1,100	III	51	Granular
48"	3,000	V	200	Granular
48"	1,100	III	152	Granular

·15 (b) Preliminary Testing

Preliminary testing of pipe and fittings shall be according to Basis (1) of ASTM C-76, and such tests shall be conducted at the Contractor's expense in the presence of the Engineer at the manufacturer's plant or at a City approved testing laboratory.

The design concrete strength requirements may also be used as a basis of acceptance, in addition to ASTM C-76 Basis No. 1, where vertically placed and tamped pipe is involved or where any pipe being manufactured is too long for available "D" load testing equipment.

The required minimum cement content shall comply with that which will give the specified strength within reasonable tolerances, when tested in accordance with City of Phoenix Materials Laboratory procedure.

(c) Pipe Joints

The joints shall be "R-4" or "Modified R-4" Bureau of Reclamation "Through-Bell" type joints using "O" ring rubber gaskets (see attached details). With rubber gasket joints, inside mortaring and outside grouting is not required.

(d) Rubber Gasket Joints

(1) Rubber gasket joints shall be sealed with a continuous ring gasket made of a special composition rubber of such size and cross section as to fill completely the recess provided for it. The gasket shall be the sole element depended upon to make the joint watertight, and shall have smooth surfaces free from pits, blisters, porosity, and other imperfections. The rubber compound shall contain not less than 60 percent by volume of first grade synthetic rubber.

The remainder of the compound shall consist of pulverized fillers free from rubber substitutes, reclaimed rubber and deleterious substances. The compound shall meet the following physical requirements when tested in accordance with appropriate ASTM Specifications:

a. Tensile Strength of the compound shall be at least 2,100 psi, ASTM Designation D-412.

b. Elongation at Rupture shall be at least 400 percent ASTM D-412.

c. Specific Gravity shall be consistent within 0.05 and shall be between 0.95 and 1.45, ASTM Designation D-297.

.15 (d) (1) d. Cold Flow. The percentage of cold flow shall not exceed 20. The cold flow determination shall be made in accordance with Method B, ASTM Designation D-395, with the following exception: The disk shall be one-half inch thick and the diameter shall be that of the rubber gasket.

e. Tensile Strength After Aging. The tensile strength of the compound, after being subjected to an accelerated aging test for 96 hours in air at 158 degrees F, shall not be less than 80 percent of the tensile strength before aging, ASTM D-573.

f. The Contractor shall submit for approval, details of the shape and size of the gasket he proposes to furnish. If required by the Engineer, the Contractor shall also submit test results showing the physical properties of the materials used in the manufacture of gaskets.

(e) Protection of the Joints

The Contractor shall provide necessary protection to insure proper alignment of all new pipelines until backfilling and compaction has been completed.

(f) Leakage Tests

No leakage tests are required and all references thereto in Standard Specifications are hereby deleted.

(g) Care of Pipe and Materials

All pipe and materials shall be manufactured, handled, loaded, shipped, unloaded, and laid in such manner as to be undamaged and in sound condition in the completed work. Particular effort shall be exercised to protect the ends of pipe. Repairs on damaged pipe shall be made to the satisfaction of the Engineer, otherwise they shall not be used in the work and shall be replaced with an equal pipe or special in an acceptable condition. At all times rubber gaskets shall be stored in a cool, dark place until ready for use. The gaskets shall not be exposed to direct sunlight for a time greater than needful for normal installation.

(h) Trench Widths

The minimum trench width for pipe diameters of 30 inches and 48 inches shall be 4 feet wider than the outside diameter of the pipe used. The minimum width shall be measured at the spring line of the pipe.

(i) Fine Grading

For pipe diameters of 30 inches and 48 inches, the bottom of the trench shall be accurately graded to provide uniform bearing and support for each section of the pipe at every point along its' entire length, except for portions of the pipe where it is necessary to

.15 (i) excavate for bells.

The Contractor shall over-excavate the bottom of the trench by at least 4 inches or 1/12 the outside diameter of the pipe, whichever is greater. This overcut shall be filled with granular material as specified in MAG Standard Specification 601.4.4, and fine graded as specified above. This bedding material shall be placed at a uniform density, with minimum possible compaction.

(j) Backfilling and Compaction

The backfill shall be placed with the same criteria set forth in Section 0.11 (a) and (b) Embankment. It is intended that the pipe trench backfill be constructed to the same standards as the dam embankment.

.16 INLET AND OUTLET STRUCTURES

(a) Concrete

Concrete shall be Class A and shall be in accordance with M. A. G. Standard Specifications No. 725 and 505.

(b) Reinforcing Steel

Reinforcing steel shall be in accordance with M. A. G. Standard Specification No. 727.

(c) Rock Rubble Grouted

The stone shall vary in size from 3 inches to 8 inches and shall be uniformly graded. Prior to grouting, the stone shall be flushed with water to wash down the fines. The stone shall be kept wet just ahead of the actual placing of the grout. The grout shall be brought to the place of final deposit by approved means and discharged directly on the stone using a splash plate of metal or wood to prevent displacement of stone directly under the discharge. The flow of grout shall be directed with brooms or other approved baffles to prevent it from following the same channel and to assure that all crevices are filled. Sufficient barring shall be done to loosen tight pockets of stone and otherwise aid the penetration of grout. After completion of the grouting, no workmen or other load shall be permitted on the grouted surface for a period of 24 hours. The grouted surface shall be protected from injurious action by the sun, rain, flowing water and mechanical injury for 24 hours after placing.

Grout shall be composed of cement, sand, air-entraining admixture, and water mixed in the proportions as directed. The cement content requirement per cubic yard of grout is 6.88 sacks. The dry sand requirement per cubic yard is 2,564 pounds. The water content of the mix shall not exceed 8-1/2 gallons per sack of cement. In calculating total water content of the mix, the amount of moisture carried on the surfaces

.16 (c) of aggregate particles shall be included. The mix shall include 6-1/2 ounces of Darex (or approved equal) air-entraining agent per cubic yard. The grout shall be mixed in a concrete mixer in the manner specified for concrete, except that time of mixing shall be increased as necessary to produce a satisfactory mixture, and the grout shall be used in the work within a period of 30 minutes after mixing. Retempering of grout will not be permitted. The consistency of the grout shall be such as to permit gravity flow into the interstices of the rocks with the help of spading, rodding, and brooming.

.17 LANDSCAPING EMBANKMENT

Embankment shall be placed in layers not exceeding 2 feet in depth. Material shall be wet sufficiently to prevent dust during the construction. Landscaping embankment shall be compacted to a density of not less than 80 percent of ASTM D 698. Final one foot plating shall not exceed 80 percent compaction of maximum density as determined by the Engineer.

Stripped overburden and oversize materials from borrow areas shall be used for the construction of the landscaping embankment. The final one foot of cover shall be made up of topsoil. Topsoil shall be free of brush, rock larger than 3 inches in diameter, and debris.

.18 MATERIAL AND LAYOUT DRAWINGS

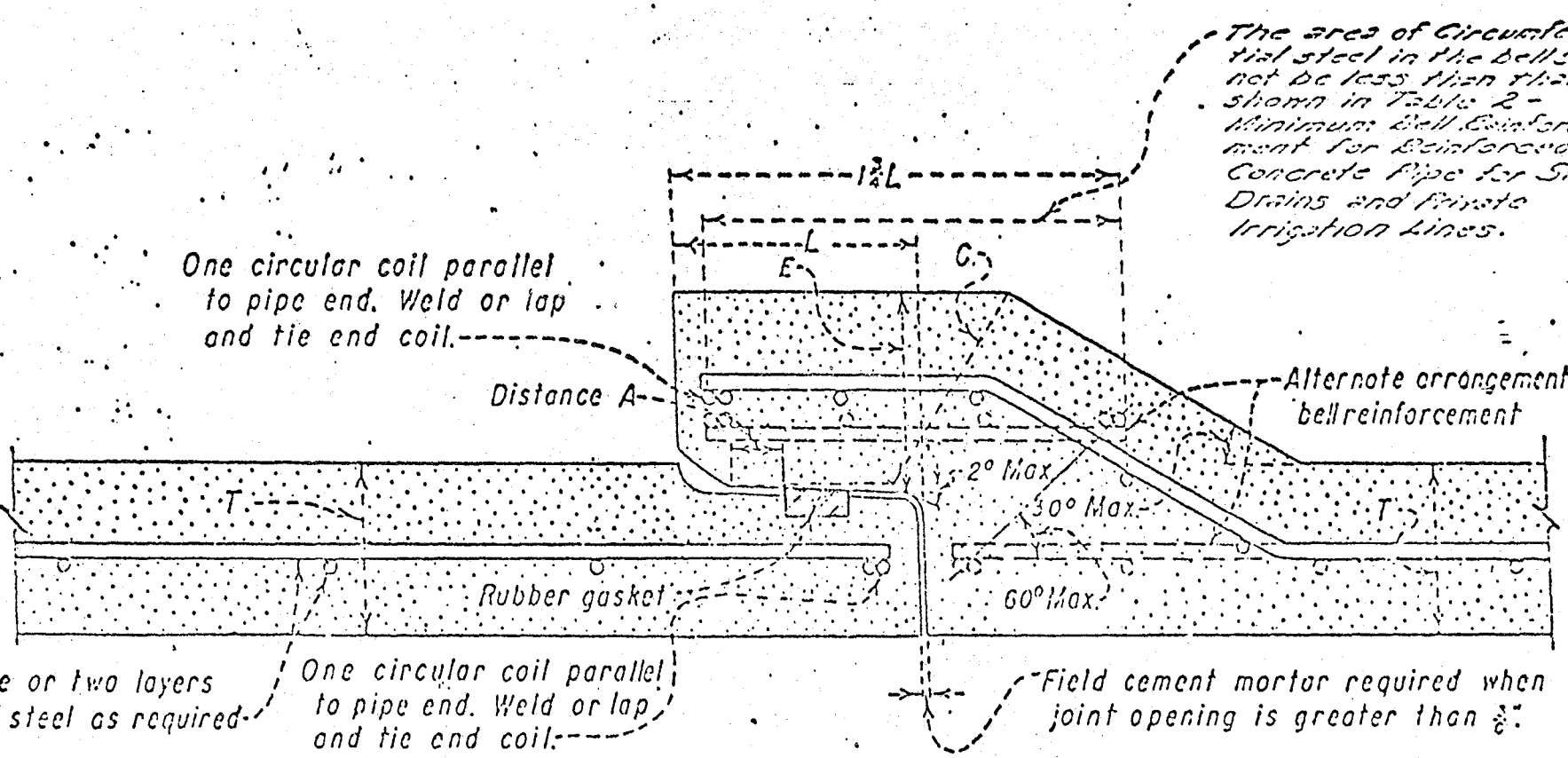
Prior to the manufacture of the pipe, the Contractor shall submit 4 sets of all material and layout drawings to the Engineer for approval and distribution. One set will be returned marked "Approved" or "Approval Recommended Subject to Changes Marked". If drawings are marked "Approved", the Contractor shall submit 5 additional sets of drawings to the Engineer.

Drawings returned to the Contractor with changes noted shall be revised and 9 copies of the revised drawings shall be submitted to the Engineer, of which one copy will be marked "Approved" and returned to the Contractor.

.18 Drawings shall show layout, stationing, laying length of all pipe, D-load, class or gage thickness, detailed drawings of any pipe used to construct a curve, and any other pertinent data. Fabrication drawings shall be submitted for concrete pipe.

"Approval" of drawings means approval for general conformity to Plans and Specifications and in no way relieves the Contractor or the supplier from responsibility for the correctness of the drawings.

Project No. ST-73283.00



THIS DWG. SUPERSEDES 40-D-52398 5757

S.P. - 40

NOTES

D = Internal diameter of pipe.
t = Minimum acceptable pipe wall thickness for class and size of pipe specified.
T = Wall thickness of pipe furnished
E ≥ t
C ≥ 1.2 t

ALWAYS THINK SAFETY

3-12-68 D-[illegible]	BELL STEEL NOTE REVISED
2-15-67 D-[illegible]	BELL STEEL NOTE.
9-17-63 D.-C.A.S.	ADDED ALTERNATE ARRANGEMENT OF BELL REINFORCEMENT.
4-2-63 D-[illegible]	REMOVED NOTE F = 80% T (MIN)
9-[illegible]	CHANGED ARROW FOR DIM.)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
STANDARD DESIGN

PRECAST CONCRETE PIPE JOINT TYPE R-4 -- BELL AND SPIGOT

(PIPE WALL THICKNESS 3" TO 4½" INCL.)

DRAWN E.V.G. SUBMITTED
TRACED L.A.C. RECOMMENDED
CHECKED APPROVED

Table 2

MINIMUM BELL REINFORCEMENT FOR REINFORCED CONCRETE PIPE FOR STORM DRAINS AND PRIVATE IRRIGATION LINES

(U. S. Department of the Interior Bureau of Reclamation Standards 40-D-5808 and 40-D-5809)

12-inch through 108-inch diameter
Concrete, 4,500 psi
Reinforcement, 40,000 psi (yield strength)
Bedding angle, 90 degrees

Column "A" indicates internal diameter of pipe in inches
Column "B" indicates minimum bell reinforcement in square inches to be distributed in 1 3/4 L

"A"	"B"	"A"	"B"
12	0.11	54	0.44
15	0.13	57	0.46
18	0.16	60	0.49
21	0.18	63	0.51
24	0.20	66	0.53
27	0.22	69	0.56
30	0.25	72	0.58
33	0.27	78	0.63
36	0.29	84	0.68
39	0.32	90	0.73
42	0.34	96	0.78
45	0.37	102	0.83
48	0.39	108	0.87
51	0.41		

.19 IRRIGATION SYSTEM

(a) Scope of Work

The work under this item consists of installing a complete automatic underground irrigation system as shown on the drawings and as hereinafter specified, including the furnishing of all labor, plant, equipment, appliances, and materials and in performing all operations in connection with the construction of the watering system. It shall include furnishing and installing all plastic and galvanized steel pipe and fittings, automatic control valves, vacuum breakers, electric controllers, electric wire, irrigation heads, risers, and fittings, and all necessary specialties and accessories, the removal and/or restoration of existing improvements, excavation and backfill, and all other work in accordance with the Plans and Specifications as required for a complete system. The Contractor shall flush all lines clean, and perform all testing to assure that pipe, fittings, and components are free of leaks, that emitters are flowing properly and free of dirt, and that the controls are functioning as required. The Contractor shall take such corrective measures as may be required to assure that the system is clean, free of leaks, and that controls are as required. The system shall be in operation before seeding to the extent that all systems are working under automatic control and that power is operational with system.

(b) General Description

The watering system shall be constructed using the emitters, valves, piping, fittings, controllers, wiring, etc., of sizes and types as shown on the drawings and as called for in these Specifications. The system shall be constructed to grades and conform to areas and locations as shown on the drawings.

Water lines shown on the drawings are essentially diagrammatic. Locations of all irrigation emitters, valves, piping, wiring, etc., shall be established by the Contractor at the time of construction. Spacing of the irrigation emitters are shown on the drawings and shall be exceeded only with permission of the Engineer.

(c) Examination and Verification of Drawings and Site

It shall be the contracting installer's responsibility to report to the Engineer any deviations between mechanical drawings, specifications, and the site. Failure to do so prior to the installing of equipment and resulting in replacing, and/or relocating equipment, shall be done at the Contractor's expense.

(d) Submittals and Approvals

Prior to the ordering of irrigation system components and materials, the Contractor shall submit to the Engineer for approval, a list of the materials and equipment he intends to furnish, showing the

.20 (d) manufacturer's name, model number, size, capacity, and specifications. The Contractor shall not order any materials or equipment until the Engineer has given his written approval that the proposed items are acceptable.

Prior to beginning trench excavation, the Contractor shall lay out the irrigation system for the approval of the Engineer by providing stakes at the locations of backflow prevention units, control valves, pressure mains, lateral lines, and branch lines.

(e) Construction Details

(1) General. The irrigation system shall be constructed in accordance with the details shown on the Plans and these Specifications. All manufactured articles, materials, and equipment shall be installed in accordance with the manufacturer's instructions.

Trenches shall be excavated to a fairly uniform grade and shall be no wider than is necessary for the proper installation of the pipe. The bottom of the trench shall be firm and free from large or sharp rocks.

(2) PVC Pipe. In laying polyvinyl chloride pipe, approximately 4 inches of slack shall be provided for each 100 feet of pipe. Pipe shall be clean prior to installation and shall be maintained in that condition during installation. When pipe laying is not in progress, open end of pipe shall be closed by approved means.

Plastic pipe and fittings shall be free from dirt, dust, and moisture. An even coat of solvent shall be applied with a natural bristle brush to the outside of the pipe. A light but complete coat of solvent shall then be applied to the fitting socket. Another light coat of solvent shall be applied to the pipe making sure that the coated area on the pipe is equal to the depth of the fitting socket. Care shall be taken to prevent the solvent from running through the fitting into the pipe. The pipe shall be quickly inserted into the fitting and turned approximately 1/4 turn and held for approximately 15 seconds. After joining, the excess solvent shall be immediately removed from the pipe.

A minimum of 15 minutes curing time shall be allowed for each welded joint before subjecting the pipe to stresses. Another fitting or pipe section may be installed after approximately 2 minutes if care is exercised so that undue strain is not placed on the previous assembly before the 15 minutes curing time has elapsed.

.20 (e) (2) Where plastic to metal connectors are required, the metal connectors shall be worked first. A non-hardening, non-oil base pipe compound, or liquid teflon shall be used and the joint shall be hand tightened with final tightening not to exceed one turn with a strap wrench.

It is important that joints be absolutely waterproof so that there is no chance for leakage of water and corrosion build-up on the joint.

(3) Flexible Irrigation Hose and Emitters. The flexible irrigation hose shall be field-punched to receive the barbed emitter fitting at the spacings and locations indicated on the Plans. A suitable tool, especially designed for this purpose, shall be used for this punching operation. No holes shall be punched until immediately prior to insertion of the emitter. Flexible hose and emitters shall be clean, free of dirt and other matter which could clog the emitter, during the punching and emitter insertion operations. Except for the emitters, all barbed fittings used with flexible irrigation hose shall be installed with stainless steel hose clamps. All irrigation hose shall be buried as shown on the Plans and stated in these Special Provisions.

(f) Materials

(1) PVC Pipe. PVC pipe furnished shall be the product of a single manufacturer and shall be polyvinyl chloride plastic pipe conforming to the requirements of ASTM D 2241 and ASTM D 1785 for SDR-PR pipe PVC 1120 or PVC 1220. Plastic pipe shall be SDR 26 or heavier.

Plastic pipe fittings shall conform to the requirements of ASTM D 1785 for Schedule 40 PVC 1120 or PVC 1220 and shall bear the National Sanitation Foundation stamp and the schedule marking.

All solvent furnished shall be in accordance with the pipe manufacturer's recommendations and shall be compatible with the pipe and fittings.

Slip fitting socket taper shall be so sized that a dry unsoftened pipe end, conforming to these Specifications, can be inserted no more than half-way into the socket. Plastic saddle and flange fittings will not be permitted.

All pipe shall be continuously and permanently marked with the following information:

> Manufacturer's name or trademark, size, schedule and type of pipe, working pressure at 73 degrees F and National Sanitation Foundation (N. S. F.) approval.

Threaded polyvinyl chloride adapters into which pipe may be solvent welded shall be used where threaded plastic connectors are required.

20 (f) (2) Flexible Irrigation Hose. The flexible irrigation hose for use with emitter shall be manufactured from polyethylene material having stress crush rating of 0/10/10 days, a weld index of 0.65, carbon content of 2.65 percent, density of .934, tensile strength of 1665 pounds and elongation factor of 650 percent. The hose shall have an I.D. of .580 inches and an O.D. of .704 inches. Fittings to be used with the flexible irrigation hose shall be barbed-type with stainless steel hose clamps. Each run of flexible irrigation hose shall be terminated with a capped hose end, 3/4 inch FHT cap x 3/4 inch MHT x .580 Barb. Flexible irrigation hose shall be Browning DH580, and fittings (as required) shall be Browning D501, D506C, and D510, all as manufactured by Reed Irrigation International, 585 Vernon Way, El Cajon, California, or approved equal.

(3) Emitters. Emitters shall be manufactured of polypropylene copolymers having low cold-flow properties with insert type connections. Connections shall not require clamping. The emitter shall be nonadjustable and the flow rate shall be internally maintained by elongated, spiral water channel.

The emitter shall function with a system pressure range of 10 psig minimum to 40 psig maximum, the delivery rate shall be 2 gph at 15 psig. The emitter shall function properly within the specified limits and in any position or altitude as detailed on on the Plans.

The emitter shall not exceed plus or minus 10 percent flow variation at 15 plus or minus 2 psig nor shall it exceed plus or minus 20 percent flow variation at 15 plus or minus 4 psig. The emitter shall be capable of delivering 1.2 gph at 5 psig, 2.0 gph at 15 psig, and 2.8 gph at 25 psig.

Flushing shall be accomplished by manual manipulation as recommended by the manufacturer.

Emitter heads shall be fitted with a cross cap and 4-1/8" O.D. x 24" or 42" long distribution tubes. Emitters shall be underground emitters, Browning DE8-501, with D526 cross cap and DH 125 tubing, all as manufactured by Reed Irrigation International, 585 Vernon Way, El Cajon, California, or approved equal.

(4) Pressure Reducing Valve. Pressure reducing valve shall be self-contained, single-seat, direct-acting, spring-loaded, diaphragm-actuated type. Valve shall be of all bronze construction, stainless steel body seat, composition seat discs, BUNA-N diaphragm with nylon insert, carbon steel springs and with union inlet. Valve shall contain large monel strainer

.20 (f) (4) with separate cleanout plug. The valve shall have replaceable seats and have a renewable type disc and diaphragm. Plugs, diaphragm housing and adjusting screw threads shall be sealed against leaks. Valve shall be provided with a means for adjusting the reduced pressure setting in the field. It shall withstand 200 pounds of initial pressure and have a reduced pressure range of 10 to 35 pounds.

Each pressure reducing valve shall be field adjusted to deliver the required pressures to the emitter system as specified herein.

Pressure reducing valve shall be Watts No. U5LP, as manufactured by Watts Regulator Company, Lawrence, Massachusetts, or approved equal.

The pressure gauge, as detailed, on the downstream side of the pressure reducing valve shall be suitable for use with water, having 2-inch diameter enameled steel case, clear glass crystal, 0-60 psi calibrated face and 1/4 inch I. P. S. connection, Ashcroft Type 1000, or approved equal.

(5) Drip Irrigation Filter. Filter elements shall be of stainless steel screen mesh, staged so that contaminants are collected in 2 different areas with particle size designating the area. The larger primary filter shall be of 150 mesh market grade stainless steel wire cloth with the lesser area element being 180 mesh polished filter. Capacity of the filter shall be 75 gpm.

The stainless mesh shall be supported by a non-corrosive so that it can withstand a pressure differential of 100 psi, but still have 90 percent of its open area available for flow and not blocked by the backing material.

The seals that hold the filter element in place shall be able to withstand a 50 psi differential before there is any bypass of contaminated water.

The filter body shall be of steel and stand vertical with a horizontal 2 inch inlet and a downward vertical outlet. All steel parts shall be electrostatically epoxy treated after sandblasting and pickling.

The closure on the filter body shall be a quick access single handle action, but at the same time have safety devices that will prevent the cover from blowing off in an upward or sideward direction if there is air or water pressure behind it.

There should be ports in the filter body for taking a pressure differential across the elements.

.20 (f) (5) The filter shall be Browning DF 075, as manufactured by Reed Irrigation International, 585 Vernon Way, El Cajon, California, or approved equal.

Pressure gauges as shown on the Plans shall be suitable for use with water, having 2-inch diameter enameled steel case, clear glass crystal, 0-100 psi calibrated face and 1/4 I. P. S. connection Ashcroft Type 1000, or approved equal.

(6) Backflow Preventers. The backflow prevention unit at the filter shall be a pressure type as designated on the Plans for cold water with screwed IPS connections and shall be as shown on the Plans and in the Specifications. Unit shall consist of an approved check valve, vacuum relief, inlet and discharge shutoff valves, and field testing cocks. Nipples and other fittings shall be of red brass. Unit shall be rated to 150 psi working pressure.

Pressure type unit shall be Model 765 as manufactured by Felco, 909 W. Nielson Avenue, Fresno, California, or approved equal.

.21 FENCING

(a) Posts and braces shall be green in color. Posts may have white top.

(b) Line posts shall be "T", "U", "Rail", "Hat", or similar production section, except "Ells" or "Angles" shall weigh, exclusive of anchor, a minimum of 1.3 pounds/foot and shall be punched, knobbed, or corrugated to hold wire firmly in position. Clamps of minimum 11-gauge galvanized wire shall be used to attach fence. Punched, lug-type fasteners are not permitted.

(c) Where anchor is omitted, or post hole is drilled, posts must be set in concrete.

(d) There may be a maximum of 2 splices between strain posts, but not on same wire and no splice shall be placed within 100 feet of a strain or corner.

(e) Post spacing shall be measured along top wire.

(f) All concrete shall be Class A.

(g) Fencing shall be 12-1/2 gauge, galvanized, unbarbed line wire.

(h) Fence shall be installed as per State Highway Department Specification C-12.01 which is attached to these specifications.

.22 SEEDING (Hydraulic)

(a) Description

The work under this item shall consist of hydro-seeding all areas as designated by the Plans and these Specifications. Work under this item must be done after September 15 and before May 15 of the following year. In addition, all areas disturbed during the construction process shall be hydro-seeded.

. 22 (b) Materials

(1) Seed shall be a combination of the following:

Acacia Trineura
Atriplex Semibaccata
Baccharis Sarothroides
Enceua Farinosa
Eragrostis Lehmmaniana
Eschscholzia California
Larrea Divercaria
Lupinus Agustifolia

(2) Chemical fertilizer shall be Ammonium Phosphate 16-20-0, granular, conforming to the requirements of Subsection 725 (D) of the AASHO Standard Specifications.

(3) Wood cellulose fiber mulch shall be natural wood fiber manufactured by a mechanical rubbing action and be heat-processed in such a manner as to contain no growth or germination-inhibiting factors. It shall be dyed green to allow the visual metering of its application.

(4) The mulch shall remain in uniform suspension in water under agitation and shall blend with the water to form a homogenous mixture capable of passing through commercially available hydro-mulching equipment. When sprayed uniformly on the surface of the soil, the fiber shall readily absorb water and allow infiltration to the underlying soil. Water holding capacity by weight shall be not less than 9 to 1.

(5) The fiber mulch shall be supplied in packages having a gross weight not in excess of 100 pounds. Weight specifications of this material shall refer only to air-dry weight of the fiber material. Air-dry weight shall be based on the normal weight standard of the Technical Association of the Pulp and Paper Industry for wood cellulose and is considered equivalent to 10 percent moisture. The mulch shall not be compacted so as to require pulverizing before using.

(6) The processed mulch material shall have characteristics to form a blotter-like ground cover on application, having moisture absorption and percolation properties and the ability to cover and hold grass seed in contact with soil. The wood cellulose fiber mulch material shall be shipped in packages of uniform weight (plus or minus 5 percent) and bearing the name of the manufacturer and the air-dry weight content.

. 22 (b) (7) Suppliers shall certify, upon request of the Engineer, that laboratory and field testing of their product has been accomplished and that it meets the foregoing requirements and intent; or, as an alternate to the above, suppliers shall demonstrate the performance of their product to the satisfaction of the Engineer.

(c) Construction Details

(1) Prior to seed and mulch broadcasting, all areas to be seeded shall be cleared of sticks, debris, and other matter, which may be detrimental to subsequent maintenance operations.

(2) All areas which are excessively eroded shall be restored to an acceptable grade, slope and condition as directed by the Engineer.

(3) After seeding areas are prepared, seed, fertilizer, and wood fiber mulch shall be mixed in a slurry and be applied in a manner that will assure uniform distribution of the materials at the following rate, over the areas designated

Chemical fertilizer	200 pounds per acre
Seed:	
Acacia Trineura	2 pounds per acre
Atriplex Semibaccata	5 pounds per acre
Baccharis Sarothroides	2 pounds per acre
Enceua Farinosa	4 pounds per acre
Eragrostis Lehmmaniana	1 pound per acre
Eschscholzia California	2 pounds per acre
Larrea Divercaria	5 pounds per acre
Lupinus Agustifolia	2 pounds per acre
Wood cellulose fiber	1,600 pounds per acre

(4) Seed, chemical fertilizer, and wood fiber mulch shall be applied to the seeding areas by means of hydraulic-type equipment, which shall provide continuous mixing and agitating action to the mixture of water, seed, fertilizer, and wood fiber mulch, whereby the mixture will be applied through a pressure-spray distribution system providing a continuous, non-fluctuating discharge and delivery of the mixture in the prescribed quantities, uniformly on the specified areas. Due care shall be exercised to prevent drift and displacement of wood fiber, fertilizer, and seed.

(5) If the equipment used and the method of application results in uneven distribution or waste of material, other equipment or methods which will meet the approval of the Engineer shall be substituted.

(6) Care shall be taken during seeding-mulching operations to prevent displacement of soil on the project and to prevent disfigurement or damage to the areas on which mulching is performed. Mulch materials which are deposited in a matted condition, or in clumps, shall be loosened and spread uniformly over the mulching areas.

.22 (d) Method of Measurement

Seeding (hydraulic) will be measured by the acre with measurement on the ground surface over areas seeded and accepted.

(e) Basis of Payment

Payment for this work will be made at the contract price per acre for ITEM - SEEDING (Hydraulic), which price shall be full compensation for the item, complete as described and specified.

.23 FURNISHING AND PLANTING TREES AND SHRUBS

The work under this item consists of furnishing and placing prepared soil, and furnishing and planting trees and shrubs, as indicated on the Plans and in these Specifications. Work under this item must be done after September 15 and before May 15 of the following year.

(a) Prepared Soil Mixture for Trees and Shrubs

(1) Prepared soil mixture shall be composed of 2 parts of native soils to one part of a soil conditioner (forest humus, forest magic, silver spade, or approved equal) by volume, thoroughly mixed to insure uniformity. Native soil shall be natural, fertile, friable soil which possesses the characteristics of representative productive soils in the vicinity, shall not be excessively acid or alkaline, nor contain toxic substances harmful to plant growth, shall be without admixture of subsoil, and be reasonably free of noxious weeds, clay lumps, clods, stones, roots, stumps, and debris of any kind.

(2) Prepared soil area for trees shall be 6 inches larger in all directions than the ball of the tree.

(b) Inspection

All trees and shrubs furnished shall be nursery-grown, well-branched and well-proportioned. Trees are subject to inspection and approval before planting, whereupon all trees found unsuitable in growth or condition, or which are not true to name, shall be removed at the expense of the Contractor and replaced with acceptable trees.

(c) Nomenclature

The scientific and common tree name is specified and conforms generally with name accepted in the nursery trade and "Standarized Plant Names".

.23 (d) Quality and Size of Trees and Shrubs

(1) All trees and shrubs must be of the kinds specified, well established in containers and shall be sound, healthy, vigorous, and free from disease and insect pests.

(2) Trees larger in size than specified may be used, but must be uniform in size. The use of larger trees will not affect the contract price. If larger trees are used, the spread of roots shall be increased proportionately. No trees or shrubs shall be loose in the can.

(e) Container

Trees shall have been gown in cans, for a minimum of 6 months and a maximum of 2 years. They shall have sufficient roots to hold earth together intact after removal from containers, but shall not be root-bound. Trees shall be carefully removed from containers so as to prevent breaking or cracking of earth during the planting process.

(f) Pruning

Pruning shall only consist of removing all dead, damaged or malformed roots, twigs and branches. All pruning cuts over 1/2 inch in diameter shall be treated with an approved tree-wound dressing.

(g) Protection After Delivery

Upon delivery to the site, trees and shrubs shall be planted as soon as possible. Stock shall not be exposed to sun or drying winds during planting operations.

(h) Setting Trees and Shrubs

Trees and shrubs shall be set plumb and rigidly braced in position until the soil has been tamped solidly around the ball or roots. Trees and shrubs shall be backfilled with prepared soil which shall be thoroughly settled by watering and tamping to fill all voids. Two Agra Form, or equal, pellets shall be placed at opposite sides of each tree ball and shrub ball. Pellets shall be placed at one half of the depth of the plant ball. Water-holding basins shall be constructed as per the details shown on the Plans.

(i) Placement of Trees and Shrubs

All trees and shrubs shall be positioned in the field by the landscape architect or Owner's representative.

(j) Clean-Up

All areas covered under this contract shall be cleared of sticks, debris, and other matter which may be detrimental to subsequent maintenance operations.

.23 (k) Maintaining and Watering

All trees, shrubs, and the watering system shall be maintained for a period of 30 days following the date of substantial completion. Substantial completion shall be determined by the Engineer and shall be after all trees, shrubs, seeding, and irrigation has been successfully installed.

(l) Guarantee and Replacement

Trees and shrubs guarantee shall be for 30 days and shall coincide with the maintenance period. At the end of the guarantee period, any trees required under this Specification which are dead or not in satisfactory growing condition, shall be removed from the site and replaced as soon as possible but during a normal planting season. All replaced trees and shrubs shall have a 30 day guarantee following the date of replacement.

(m) Measurement and Payment

(1) Measurement shall be for each tree or shrub, complete in place.

(2) Payment shall be made at the unit price bid for furnishing and planting trees and shrubs.

.24 ELECTRICAL

(a) General

The Contractor shall furnish all labor, materials, and equipment necessary for or incident to the construction and completion of all electrical work indicated on the Plans or specified herein.

All equipment shall be connected in accordance with the manufacturer's specifications and diagrams.

(b) Rules

The latest regulations of the National Electrical Code, Arizona Electrical Code, and the latest IEEE, NEMA, and ANSI standards shall be considered as included in these Specifications and all requirements fully met. Any specific Electrical Code Requirements of the City of Phoenix as applicable to the type of work covered by these Plans and Specifications shall also be complied with. All materials used in carrying out the provisions of these Plans and Specifications shall be new and shall be fully approved by the Underwriters' Laboratories, Inc. (UL), for the class of service for which they are intended.

.24 (c) Electrical Energy

The electrical supply shall be what is commercially known as 60 hertz, 120 volt, 1-phase, 2 wire service.

(d) Service Entrance

The Contractor shall furnish and install a combination metering socket and main circuit breaker in a raintight enclosure mounted on an 8 foot meter pole for underground service. The service entrance fittings, meter socket, and meter pole shall be approved by Arizona Public Service Company prior to installation.

(e) Wire and Cable

All wire shall be soft drawn copper with not less than 97 percent conductivity.

Wire in conduit shall be type THW insulation, No. 14 AWG minimum, rated for 600 volts. Direct burial wire shall be type UF No. 10 AWG, 2 conductor with ground, rated for 600 volts with polyvinyl chloride jacket. Wire shall be as manufactured by Rome Cable Corporation, General Cable Corporation, or approved equal.

All splices shall be encapsulated and moisture proof using 3M Scotchcast type 82-A inline splice kits, or approved equal.

The direct burial cable shall be laid on a 3-inch cushion of sand or approved screened dirt, and covered with a minimum of 5 inches of the same material prior to backfilling as shown on the Plans.

Wire shall be so spliced as to make a perfect mechanical and electrical connection and shall be either soldered and taped or spliced with Minnesota Mining and Manufacturing Company "Scotchlock" electrical spring connectors, or approved equal.

Cable and wire sizes shall be as shown on the Plans.

(f) Conduit

All conduit shall be rigid galvanized steel, of a size not less than shown on the Plans. Long radius bends or fittings of the condulet type shall be used where conduits change direction.

All conduits shall be thoroughly reamed to remove burrs after cuts and threads have been made. All joints shall be made watertight with white lead, and approved bushings or conduit fittings shall be used at all conduit terminals.

.24 (f) Underground conduit shall be installed at a minimum of 24 inches below grade and shall be as specified on the Plans.

(g) Irrigation Controller

An irrigation controller, 12 station with variable station timing up to 60 minutes per station shall be furnished and installed per the Plans. The controller shall be Rain-Bird "Rain Clox" Model RC-12, or approved equal.

The solenoid valves shall be wired as shown on the Plans.

(h) Other Devices

Disconnect switches and other wiring devices shall be as shown on the Plans.

(i) Electric Remote Control Valves

The electric remote control valves, where shown on the drawings, shall be slow acting diaphragm type electric solenoid operated valves of sizes indicated on the drawings. The valves shall be solenoid actuated, hydraulic operation valves of the globe screwed pattern type. The solenoid shall be 24 volt, 60 cycle operation. The solenoid coil shall be completely epoxy encapsulated for positive waterproofing with a stainless steel shunt band. The valve shall be slow opening and closing to avoid damage of surge pressure. The valve body and bonnet shall be constructed of heavy cast bronze with accurately machined valve seat surfaces internal parts and female pipe thread connection. The solenoid valve shall be Rainbird 125FR, or approved equal.

.25 MEASUREMENT AND PAYMENT

(a) Excavation of Embankment Foundation and Stockpiling Topsoil

This item shall consist of clearing and grubbing, stripping and stockpiling topsoil, and designated foundation excavation under the embankment as shown on the plans and described in these specifications. Payment shall be on a lump sum basis for work completed.

(b) Construction of Dam Embankment

This item shall consist of structural dam embankment completed in accordance with the lines and grades shown on the plans and as described in these specifications. Also included in this item are such subsidiary items as moisture and dust control, and grading and shaping borrow areas. Payment shall be on a lump sum basis for work completed.

Special Provisions, continued

.25 (c) Construction of Landscaping Embankment

This item shall consist of landscaping embankment completed in accordance with the lines and grades shown on the plans and as described in these specifications. Payment shall be on a lump sum basis for work completed.

(d) 27 Inch RGRCP

This item shall consist of installation of 27 inch pipe, concrete encasement, inlet and outlet structure, trash rack, and required structural excavation and backfill to the lines, grades and dimensions shown on the plans and described in these specifications. Payment shall be on a lump sum basis for work completed.

(e) 30 Inch RGRCP

This item shall consist of installation of 30 inch pipe, headwall structure, rock rubble (grouted) construction of manhole, and required structural excavation and backfill to the lines, grades and dimensions shown on the plans and described in these specifications. Payment shall be on a lump sum basis for work completed.

(f) 48 Inch RGRCP

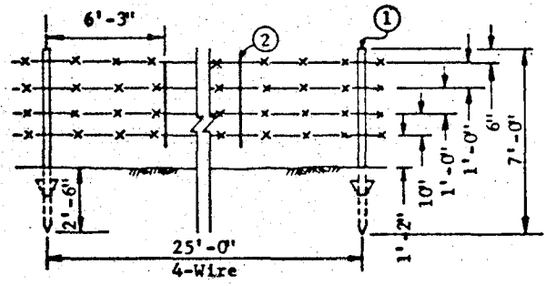
This item shall consist of installation of 48 inch pipe, headwall structure, channel excavation, construction of manhole, and required structural excavation and backfill to the lines, grades and dimensions shown on the plans and described in these specifications. Payments shall be on a lump sum basis for work completed.

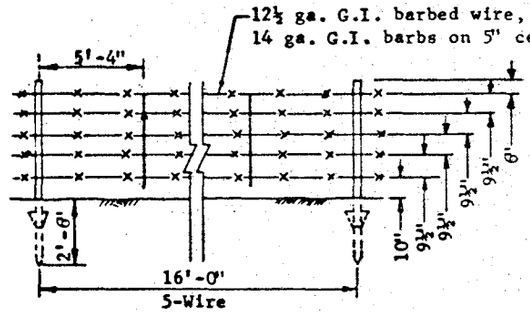
(g) Automatic Drip Irrigation System

This item shall consist of the installation of the automatic drip irrigation system shown on the plans and described in these specifications and shall include excavation and backfill, water and electrical service construction, valves fittings, controls and enclosures. Payment shall be on a lump sum basis for work completed.

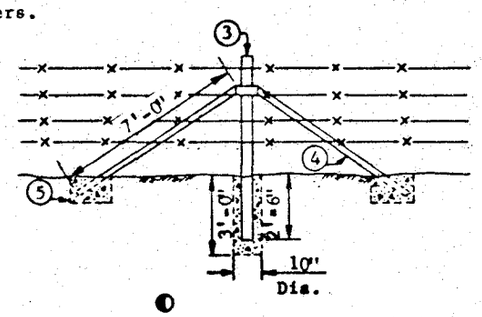
(h) Fencing

This item shall consist of the installation of the required fencing shown on the plans and described in these specifications. Payment shall be on a lump sum basis for work completed.

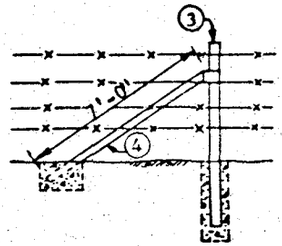




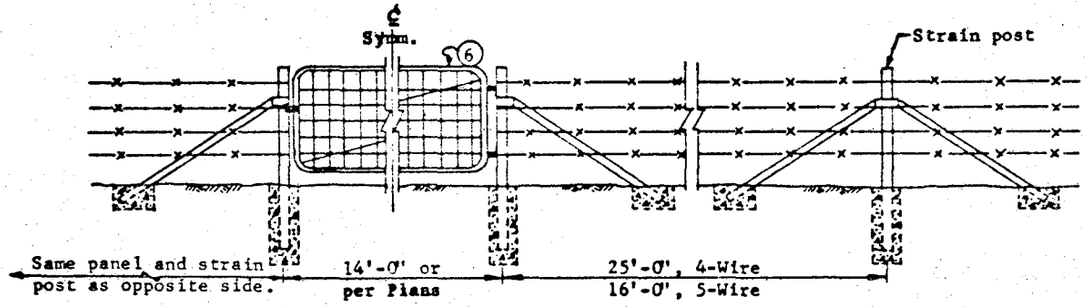
LINE PANELS



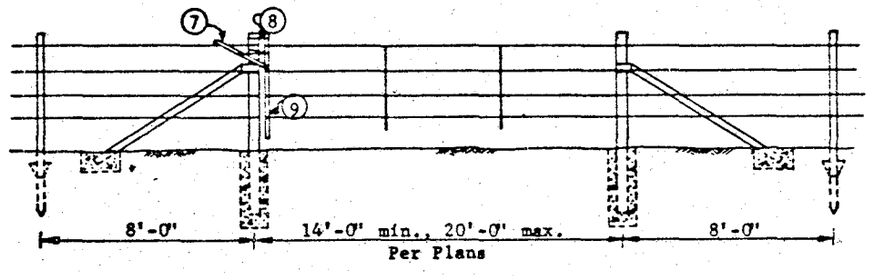
STRAIN POST



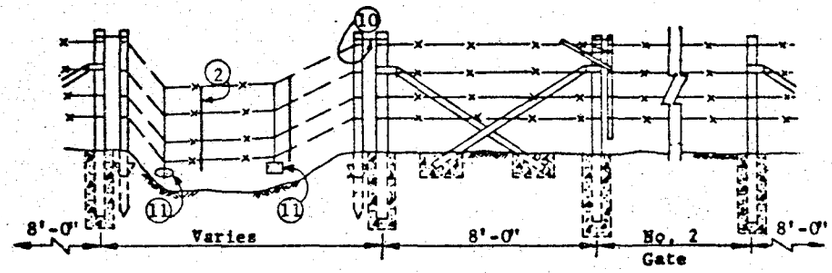
BRACE POST



NO. 1 GATE



NO. 2 GATE



FLOOD GATE

◐ Strain Posts shall be placed at corners, angles exceeding 15° and at intersections. Intersection strain posts shall have a third brace in line with cross fence. In these installations, near line posts shall be placed 8' max. from strain post.

(1) Line Post. "T","U","Rail","Hat" or similar production section. Wt., exclusive of anchor, 1.31b/ft. min. Shall be punched, knobbed or corrugated to hold wire firmly. Wire ties shall be 11 ga galv. wire min.
(2) 9½ ga., galv.,twisted wire stays, 42" long. Space at 5'-4" & 6'-3" int. for 5 & 4 wire fence respectively.
(3) 2½" nom. dia. pipe or 2½"x 2½"x ¼"∠
(4) 2" nom. dia. pipe or 2"x 2"x ¼"∠
(5) 1'-6"x 1'-0"x 1'-0" conc. footing.
(6) 1 3/8" ø tubing. 2-Vertical braces. 1-adjustable diagonal guy. Mesh shape optional with min. 11 ga. line wires and 12½ ga. cross wires. Fully galv.
(7) 2"x2"x2' pry stick. D.F. constr. grade.
(8) Double loops of 9 ga. galv. wire. Top & bottom.
(9) 2"x 2"x 4'-0" D.F. constr. grade.
(10) Single loop. 9 ga. galv. wire.
(11) 30-35 lb. stone sag wt. As alternate, use 7½"x 7½"x 7½" conc. cube with cast in doubled and twisted 9 ga. wire loop hanger.

GENERAL NOTES

Posts and braces shall be green in color. Posts may have white tops. Wood parts of No. 2 gate shall be unpainted.

When line post anchors are omitted or post hole is drilled, posts shall be set in concrete.

On curves, the fence shall be so constructed that the wire tension is against the post and not against the wire ties.

A maximum of two splices is permitted between strain posts but not on the same wire. No splice shall be placed less than 100' from a strain, corner or gate post.

Concrete may be job mix of not less than 5-sacks per C.Y.

Tolerance on distance between ground and bottom wire at any point equals ±4"

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/74
APPROVED FOR DISTRIBUTION	FENCE & GATES, LINE, STEEL POSTS	DRAWING NO C-12.01

ST-73283.00

BOND ISSUE OR BUDGET PROJECT
CITY OF PHOENIX, ARIZONA
ENGINEERING DEPARTMENT

PROPOSAL to the City Engineer of the City of Phoenix.

In compliance with the Advertisement for Bids, by the City Engineer, the undersigned Bidder:

Having examined the contract documents, site of work, and being familiar with the conditions to be met, hereby submits the following Proposal for furnishing the material, equipment, labor and everything necessary for the completion of the work listed and agrees to execute the contract documents and furnish the required bonds and certificates of insurance for the completion of said work, at the locations and for the prices set forth on the inside pages of this form.

Understands that construction of this project shall be in accordance with all applicable Uniform Standard Specifications and Standard Details except as otherwise required by the Project Plans and Special Provisions.

Understands that his proposal shall be submitted with a proposal guarantee of cash, certified check, cashier's check or surety bond for an amount not less than 5 percent of the amount bid.

Agrees that upon receipt of Notice of Award, from the City of Phoenix, he will execute the contract documents.

Work shall be completed within 120 calendar days, beginning with the day following the starting date specified in the Notice to Proceed. The time allowed for completion of the work includes lead time for obtaining the necessary materials and/or equipment.

The Bidder hereby acknowledges receipt of and agrees his porposal is based on the following Addenda.

_____

_____

FOR PROJECT NO. ST-73283.00 **BID SCHEDULE**

PAY ITEM NO.	UNIT AND APPROX. QUANTITIES	DESCRIPTION UNIT BID PRICE IN WORDS	UNIT BID PRICE DOLLARS & CENTS	AMOUNT BID DOLLARS & CENTS
1.	1 Job	Excavation of embankment foundation and stockpiling topsoil For _____ and /100 Dollars per L.S.		
2.	1 Job	Construction of dam embankment For _____ and /100 Dollars per L.S.		
3.	1 Job	Construction of landscaping embankment For _____ and /100 Dollars per L.S.		
4.	1 Job	27 inch RGRCP For _____ and /100 Dollars per L.S.		
5.	1 Job	30 Inch RGRCP For _____ and /100 Dollars per L.S.		
6.	1 Job	48 Inch RGRCP For _____ and /100 Dollars per L.S.		
7.	1 Job	Automatic Drip Irrigation System For _____ and /100 Dollars per L.S.		
8.	1 Job	Fence For _____ and /100 Dollars per L.S.		
9.	7.9 Acre	Hydraulic Seeding For _____ and /100 Dollars per Acre		
10.	44 Ea.	Planting Cercidium Floridum For _____ and /100 Dollars per Ea.		

FOR PROJECT NO. ST-73282.00 **BID SCHEDULE**

PAY ITEM NO.	UNIT AND APPROX. QUANTITIES	DESCRIPTION UNIT BID PRICE IN WORDS	UNIT BID PRICE DOLLARS & CENTS	AMOUNT BID DOLLARS & CENTS
11.	118 Ea.	Planting Cercidium Microphyllum For _____ and /100 Dollars per Ea.		
12.	25 Ea.	Planting Fougueria Splendens For _____ and /100 Dollars per Ea.		
13.		For _____ and /100 Dollars per _____		
14.		For _____ and /100 Dollars per _____		
15.		For _____ and /100 Dollars per _____		
16.		For _____ and /100 Dollars per _____		
17.		For _____ and /100 Dollars per _____		
18.		For _____ and /100 Dollars per _____		
19.		For _____ and /100 Dollars per _____		
20.		For _____ and /100 Dollars per _____		

TOTAL AMOUNT OF BID ITEMS 1 THROUGH 12, INCLUSIVE

THIS PROPOSAL IS SUBMITTED BY_____,

a corporation organized under the laws of the State of_____, a partnership consisting of_____

_____

or individual trading as_____

_____

of the City of_____and is the holder of Arizona State Contractor's License:

Classification_____No._____

Respectfully submitted,

FIRM_____

ADDRESS_____

BY_____
Officer and Title

_____
Date

ATTEST:

_____
Officer and Title

_____
Witness: If Bidder is an Individual