

FDS OF ANDORA HILLS & GALLOWAY WASHES

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CONTRACT FCD 99-14

for

**FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS AND
GALLOWAY WASHES**

C 69.00.030.5

A285.501

CONTRACT FCD 99-14

Pursuant to the provisions of the Arizona Revised Statutes Section 48-3603, the Board of Directors has the authority to enter into contracts.

The Flood Control District of Maricopa County, Arizona, hereinafter called the "District", is desirous of having certain professional services performed in connection with Contract FCD 99-14 for Floodplain Delineation of the Andora Hills and Galloway Washes (hereinafter called the "Project"), as more fully described in Exhibit A, Scope of Work, and in accordance with Exhibit B, Fee Proposal; and

JE Fuller/Hydrology & Geomorphology, Inc., hereinafter called "Consultant", with its principal office located at 5235 South Kyrene Road, Suite 205, Tempe, Arizona 85283, is desirous of performing said services;

THEREFORE, the parties hereto mutually agree as follows:

SECTION I - SERVICES OF THE CONSULTANT

The Consultant, under the general supervision of the Manager, Engineering Division shall prepare studies, reports, surveys, plans, drawings, specifications and cost estimates as are necessary for the Project and according to the directions and designated standards of the District and in accordance with Exhibit A. It is understood and agreed that the District's authorized representative shall be the Manager, Engineering Division or his duly authorized representative, hereinafter called the "Agent" and that he/she shall be the sole contact for administering this contract.

The Consultant shall meet periodically with the Agent so as to keep the District informed of the progress of the work in accordance with the schedule defined in Exhibit A.

The Consultant shall promptly advise the Agent of any factors which may develop during the Project, that would likely result in construction or design costs in excess of budgetary constraints.

SECTION II - PERIOD OF SERVICE

The Consultant shall complete all work per the schedule provided in Exhibit A, Scope of Work **within five hundred (500) calendar days** after receipt of the Notice to Proceed, including 60 days for District reviews and 180 days for FEMA reviews. Should extension of this contract period be necessary, and any such extension(s) continue the date of contract performance for a time period of more than one year from the date of original contract expiration, adjustment(s) of the consultant's fee(s) may, upon agreement by both the District and the Consultant, be made in accordance with the Consumer Price Index for Urban Consumers, Western Division published by the U.S. Department of Labor, Bureau of Labor Statistics, using the published edition coinciding with the initial contract expiration date. Any such fee adjustment shall only apply to the extended contract time period.

SECTION III - PAYMENTS TO THE CONSULTANT

The Consultant shall be paid for work under this Contract a **lump sum fee of one hundred thirty-two thousand eighteen dollars (\$132,018.00)** plus any adjustments that have been approved in writing in accordance with the Maricopa County Procurement Code.

The District shall pay the Consultant upon completion of the work as accepted by the District, except that progress payments may be made as billed by the Consultant based on approved monthly progress reports subject to the limitations set forth in Exhibit A, Scope of Work. Ten percent of all contract payments made on an interim basis shall be retained by the District as insurance of proper performance of the contract or, at the option of the Consultant, a substitute security may be provided by the Consultant in an authorized form pursuant to procedures established by the District. The Consultant is entitled to all interest from any such substitute security.

When the contract is fifty percent (50%) completed, one-half (1/2) of the amount retained will be paid to the Consultant provided the Consultant is making satisfactory progress on the contract and there is no specific cause or claim requiring a greater amount to be retained. After the contract is fifty percent (50%) completed, no more than five percent (5%) of the amount of any subsequent progress payments shall be retained providing the Consultant is making satisfactory progress on the project, except if at any time the District determines satisfactory progress is not being made, ten percent (10%) retention shall be reinstated for all progress payments made under the contract subsequent to the determination.

If the Consultant desires a partial payment in accordance with the above provisions, the Consultant will complete and furnish Attachment No. 1 to this contract, the District-provided Minority/Women-owned Business Enterprise Participation Report, with each request for payment, indicating payment distribution to MBE/WBE firms. The Minority/Women-owned participation for this contract is five percent (5%).

Following approval and acceptance by the District of all work described in Exhibit A but prior to submittal by the District to FEMA, the Consultant shall submit a final invoice and a "Certificate of Substantial Performance" form for release of all monies due the Consultant, except for five percent (5%) retention. Any retention monies shall be paid or substitute security released, as applicable, to the Consultant upon (1) FEMA acceptance/approval of the project and completion of all final work required by the District to receive FEMA acceptance, (2) receipt of a "Certificate of Performance" form, Attachment 2 to this contract, and (3) an invoice for any sums remaining due and payable under this Contract.

SECTION IV - THE DISTRICT'S RESPONSIBILITIES

The District shall furnish the Consultant, at no cost to the Consultant, the following information or services for this Project:

- A. One copy of on-hand maps, records, survey ties, benchmarks or other data pertinent to the Project. This does not, however, relieve the Consultant of the responsibility of searching records for additional information, for requesting specific information or for verification of that information provided. The District does not warrant the accuracy or comprehensiveness of any such information.
- B. All available information and data relative to policies, standards, criteria, and studies, etc. impacting the Project as identified by the Consultant.
- C. Availability of staff for consultation with the Consultant during the performance of studies and plan development in order to identify the problems, needs, and other functional aspects of the Project.
- D. Examination of documents submitted by the Consultant and rendering of decisions pertaining thereto promptly, to avoid unreasonable delay in the progress of the work by the Consultant. The District will keep the Consultant advised concerning the progress of the District's review of work.

SECTION V - AMENDMENTS

This Contract may be amended by mutual written agreement of the District and the Consultant. Any alteration in the scope of work that will result in a substantial change in the nature of the Project so as to materially increase or decrease the contract fee will require negotiation of an amendment to the contract to be executed by the District and the Consultant. No work shall commence on the change until the District has approved the contract amendment and the Consultant has been notified to proceed by the Agent. It is distinctly understood and agreed that no claim for extra work done or materials furnished by the Consultant will be allowed by the District except as provided herein, nor shall the Consultant do any work or furnish any materials not covered by this agreement unless such work is first authorized in writing in accordance with the Maricopa County Procurement Code. Any such work or materials furnished by the Consultant without such written authorization first being given shall be at his own risk, cost, and expense, and he hereby agrees that without such written authorization he will make no claim for compensation for such work or materials furnished.

SECTION VI - RECORDS

Records of the Consultant's payroll expense pertaining to this Project and records of accounts between the District and the Consultant shall be kept on a generally recognized accounting basis and shall be available upon request to the District or its authorized representative for audit during normal business hours. The records shall be subject to audit by appropriate grantor agency if the Project is funded all or in part by a grant.

All Consultant and District procurement records shall be retained for a period of one year and disposed of in accordance with the records retention guidelines and schedules approved by the State of Arizona Department of Library, Archives, and Public Records unless applicable Federal regulations require a longer period.

SECTION VII - PROJECT COMPLETION

If during the course of this contract situations arise which prevent completion within the allotted time, the Agent may grant an extension.

SECTION VIII - TERMINATION

The District may terminate this contract at any time upon reimbursement to the Consultant of expenses, which include reasonable charges for time and material for the percentage of work satisfactorily completed and turned over to the District.

The District reserves the right to postpone, terminate or abandon this Project for the Consultant's failure to complete the Project on time, or failure to comply with the provisions of the contract. The District also reserves the right to terminate any or all parts of this contract for its own convenience as the District may determine at its sole discretion.

The District hereby gives notice that pursuant to A.R.S. Section 38-511 "A" this contract may be canceled without penalty or further obligation within three years after execution if any person significantly involved in initiation, negotiation, securing, drafting, or creating a contract on behalf of the District is, at anytime while the contract or any extension of the contract is in effect, an employer, agent, or any other party to the contract in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract. Cancellation under this section shall be effective when written notice from the Chief Engineer and General Manager is received by all of the parties of the contract. In addition, the District may recoup any fee

for commission paid or due to any person significantly involved in initiation, negotiation, securing, drafting, or creating the contract on behalf of the District from any other party to the contract arising as a result of the Contract.

The Consultant may terminate this contract in the event of nonpayment of fees as specified in Section III, PAYMENTS TO THE CONSULTANT.

SECTION IX - OWNERSHIP OF DOCUMENTS

All original documents including, but not limited to studies, reports, tracings, drawings, physical and computer models, estimates, field notes, investigations, design analyses, calculations, computer software, and specifications, prepared in the performance of this Contract are to be and remain the property of the District and are to be delivered to the Agent before final payment is made to the Consultant. The District reserves the right to reuse the documents as it sees fit. However, the District will not reuse, alter, or modify these documents without noting such alterations, modifications, or intent of their reuse, and will hold the Consultant harmless from any claims arising from the reuse, alteration, or modification of the documents. The Consultant may retain reproducible copies of all such documents delivered to the District.

SECTION X - COMPLIANCE WITH LAWS

The Consultant is required to comply with all Federal, State and local laws, local ordinances and regulations. The Consultant's signature on this contract certifies compliance with the provisions of the I9 requirements of the Immigration Reform and Control Act of 1986 for all personnel that the Consultant and any subconsultants employ to complete this Project. It is understood that the District shall conduct itself in accordance with the provisions of the Maricopa County Procurement Code.

SECTION XI - GENERAL CONSIDERATIONS

- A. Prior to beginning the work, the Consultant shall furnish the District for approval the names of its key employees, and of its sub-consultants and their key employees to be used on this Project. Any subsequent changes are subject to the written approval of the District.

With the exception of the District or the Federal Emergency Management Agency, the Consultant agrees not to accept any clients within the area of the 100-year floodplain for the project, during the period of the Contract, without the expressed written authority from the Chief Engineer and General Manager of the District.

The Consultant in replacing a MBE/WBE subcontractor should attempt to contract with another MBE/WBE.

- B. The failure of either party to enforce any of the provisions of this Contract or to require performance of the other party of any of the provisions hereof shall not be construed to be a waiver of such provisions, nor shall it affect the validity of this Contract or any part thereof, or the right of either party to thereafter enforce each and every provision.
- C. The Consultant shall be responsible for the cost of any additional design, field layout, testing, construction and supervision necessary to correct those errors or omissions attributable to the Consultant and for any

damage incurred by the District as a result of additional construction costs caused by such Consultant errors or omissions.

- D. The fact that the District has accepted or approved the Consultant's work shall in no way relieve the Consultant's responsibility.
- E. It is mutually understood and agreed that this Contract shall be governed by the laws of the State of Arizona, both as to interpretation and performance. Any action at law, suit in equity, or judicial proceeding for the enforcement of this Contract, or any provision thereof, shall be instituted only in the courts of the State of Arizona.

SECTION XII - SUCCESSORS AND ASSIGNS

This Contract shall not be assigned by either party without prior written approval of the other except that the Consultant may use in the performance of this Contract without prior approval of the District, personnel or services of its related entities and affiliated companies as if they were an integral part of the Consultant; and it shall extend to and be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

SECTION XIII - NO KICK-BACK CERTIFICATION

The Consultant warrants that no person has been employed or retained to solicit or secure this Contract upon any agreement or understanding for a commission, percentage, brokerage, or contingent fee; and that no member of the Board of Directors/Supervisors or any employee of the District has any interest, financially or otherwise, in the Consultant firm.

For breach or violation of this warranty, the District shall have the right to annul this Contract without liability, or at its discretion to deduct from the Contract price or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

SECTION XIV - ANTI-DISCRIMINATION PROVISION

The Flood Control District of Maricopa County will endeavor to ensure in every way possible that minority and women-owned business enterprises shall have every opportunity to participate in providing professional services, purchased goods, and contractual services to the Flood Control District of Maricopa County without being discriminated against on the grounds of race, religion, sex, age, disability, or national origin.

The Consultant agrees not to discriminate against any employee or applicant for employment because of race, religion, color, sex, age, disability, or national origin and further agrees not to engage in any unlawful employment practices. The Consultant further agrees to insert the foregoing provisions in all subcontracts hereunder.

SECTION XV - INDEMNIFICATION

For Professional Liability: To the fullest extent permitted by law, the Consultant shall indemnify and hold harmless the District and Maricopa County, their agents, representatives, officers, directors, officials, and employees from and against all claims, damages, losses and expenses (including but not limited to attorney

fees, court costs, expert witness fees, and the cost of appellate proceedings), relating to, arising out of, or alleged to have resulted from the Consultant's negligent errors, omissions, mistakes or acts relating to professional services in the performance of this Contract. The Consultant's duty to indemnify and hold harmless the District and Maricopa County, their agents, representatives, officers, directors, officials, and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use resulting therefrom, caused by any negligent errors, omissions, mistakes or acts related to professional services in the performance of this Contract, including any person for whose errors, omissions, mistakes or negligent acts the Consultant may be legally liable.

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

For all other hazards, liabilities, and exposures: To the fullest extent permitted by law, the Consultant shall defend, indemnify and hold harmless the District and Maricopa County, their agents, representatives, officers, directors, officials and employees from and against all claims, damages, losses and expenses (including but not limited to attorney fees, court costs, expert witness fees, and the cost of appellate proceedings), relating to, arising out of, or resulting from the Consultant's work or services.

Consultant's duty to defend, hold harmless, and indemnify the District and Maricopa County, their agents, representatives, officers, directors, officials and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, injury to, impairment or destruction of property including loss of use resulting therefrom, caused by any act or omission of the Consultant, anyone Consultant directly or indirectly employs or anyone for whose acts Consultant may be liable.

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

SECTION XVI - INSURANCE

General Clauses. The Consultant, at its own expense, shall purchase and maintain the minimum insurance specified below with companies duly licensed, with a current A.M. Best, Inc. rating of B++6, or approved unlicensed by the State of Arizona Department of Insurance.

Additional Insured. The insurance coverage, except Workers' Compensation and Professional Liability, required by this Contract shall name the District, its agents, representatives, officers, directors, officials, and employees as Additional Insureds.

Coverage Term. All insurance required herein shall be maintained in full force and effect until all work or service required to be performed under the terms of the Contract is satisfactorily completed and formally accepted; failure to do so may, at the sole discretion of the District constitute a material breach of this Contract.

Primary Coverage. The Consultant's insurance shall be primary insurance as respects the District, and any insurance or self insurance maintained by the District shall not contribute to it.

Claim Reporting. Any failure to comply with the claim reporting provisions of the policies or any breach of the policy warranty shall not affect coverage afforded under the policies to protect the District.

Waiver. The policies, except Workers' Compensation, shall contain a waiver of transfer rights of recovery (subrogation) against the District, its agents, representatives, directors, officers, and employees for any claims arising out of the Consultant's work or service.

Deductible/Retention. The policies may provide coverage, which contains deductibles or self-insured retention. Such deductible and/or self insured retention shall not be applicable with respect to the coverage provided to the District under such policies. The Consultant shall be solely responsible for the deductible and/or self-insured retention.

Copies of Policies. The District reserves the right to request and to receive, within 10 working days, certified copies of any or all of the above policies and/or endorsements. The District shall not be obligated, however, to review same or to advise Consultant of any deficiencies in such policies and endorsements, and such receipt shall not relieve Consultant from, or be deemed a waiver of the District's right to insist on strict fulfillment of the Consultant's obligations under this Contract.

Commercial General Liability. The Consultant shall maintain Commercial General Liability insurance with a limit of not less than \$1,000,000 for each occurrence with a \$1,000,000 General Aggregate limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products and completed operations and blanket contractual covering, but not limited to, the liability assumed under the indemnification provisions of this Contract which coverage will be at least as broad as the Insurance Service Office, Inc. Policy Form CG 00011093 or any replacements thereof. The Commercial General liability additional insured endorsement will be at least as broad as the Insurance Service Office, Inc. Additional Insured, Form B, CG 20102093, or replacements thereof. Such policy shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, nor any provision that would serve to limit third party action over claims.

Automobile Liability. The Consultant shall maintain Commercial/Business Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than \$1,000,000 each occurrence with respect to the Consultant's any owned, hired, and non-owned vehicles assigned to or used in performance of the Consultant's work or services. Coverage will be at least as broad as coverage code 1, "any auto" (Insurance Services Office, Inc. Policy Form CA 00011293, or any replacements thereof).

Workers' Compensation. The Consultant shall carry Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Consultant's employees engaged in the performance of the work or services; and Employer's liability insurance of not less than \$500,000 for each accident, \$500,000 disease for each employee, and \$500,000 disease policy limit.

In case any work is subcontracted, the Consultant will require the subcontractor to provide Workers' Compensation and Employer's Liability to at least the same extent as required of the Consultant.

Professional Liability. The Consultant retained by the District will maintain Professional Liability insurance covering errors and omissions arising out of the work or services performed by the Consultant or any person employed by the Consultant, with a limit of not less than \$1,000,000 each claim.

Certificates of Insurance

Prior to commencing work or services under this Contract, the Consultant shall furnish the District with a *Certificates of Insurance*, Attachment No. 3, or formal endorsements, issued by the Consultant's insurer(s), as evidence that policies providing the required coverage, conditions and limits required by this Contract are in full force and effect. Such certificates shall identify this Contract number and title, as well as all other information on Attachment No. 3.

In the event any insurance policy(ies) required by this Contract is(are) written on a "claims made" basis, coverage shall extend for two years past completion and acceptance of the work or services and as evidenced by annual *Certificates of Insurance*. All *Certificates of Insurance* shall be identified with a contract number and title.

Cancellation and Expiration Notice

Insurance evidenced by this Certificate shall not expire, be canceled, or materially changed without thirty (30) days prior written notice to the District. If a policy does expire during the life of the contract, a renewal Certificate must be sent to the District at least fifteen (15) days prior to the expiration date.

.....

IN WITNESS WHEREOF, the parties herein have executed this Contract.

JE FULLER/HYDROLOGY & GEOMORPHOLOGY, INC.

John Fuller
Principal (Signature)

Jonathan Fuller
Printed Name

Principal
Title

Date: 7/30/99

86-0285301
Federal Tax Identification Number

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY:

MS/11/1 8/8/99
Michael S. Ellegood, P.E. Date
Chief Engineer and General Manager

ACCEPTED AND APPROVED:

Auton Brock 9/1/99
Chairman, Board of Directors Date

ATTEST:

John M. Carroll 9/1/99
Clerk of the Board Date

LEGAL REVIEW

Approved as to form and within the powers and authority granted under the laws of the State of Arizona to the Flood Control District of Maricopa County.

Julie M. Simon 8/8/99
General Counsel, District Date

CONTRACT ATTACHMENTS

1. Minority/Women-owned Business Enterprises Program Participation Report
2. Certificate of Performance
3. Certificate of Insurance

Attachment 1

MINORITY/WOMEN-OWNED BUSINESS ENTERPRISES PROGRAM

D/M/WBE PARTICIPATION REPORT
(To be attached with Each Request for Pay)

Date: _____

General Contractor/Prime Consultant: _____
Contact Person: _____
Address: _____
Telephone Number: _____
Fax Number: _____

Project Description: _____
Contract Number: _____
For Pay Period of (indicate dates): _____

D/M/WBE Subcontractor/Subconsultant Name: _____
Contact Person: _____
Address: _____
Telephone Number: _____

Type of Firm: _____
Type of Work performed for this project: _____

Total D/M/WBE Subcontract Amount: \$ _____

Amount Paid to this D/M/WBE
Subcontractor this invoice: \$ _____

Total paid to this Subcontractor to date: \$ _____

Total D/M/WBE Contract Goal this project = ___%

Total D/M/WBE Participation
on this contract to date = ___%

Send to: The Flood Control District of Maricopa County
Contracts Division
2801 West Durango Street
Phoenix, Arizona 85009

Attachment 2

CERTIFICATE OF PERFORMANCE AND PAYMENT OF ALL CLAIMS

ENGINEERING CONTRACT

_____ hereby certifies to the Flood Control District Of Maricopa County
(Name of Signer)
(District) that all lawful claims for labor, rental of equipment, material used, and any other claims by _____
_____ or its subcontractors in connection with the project described in District Contract
FCD _____ for _____ have been paid.

_____ understands that with receipt of payment for previously invoiced amounts plus
any retained monies, that this is a settlement of all claims of every nature and kind against the District
arising out of the performance of the District's Contract FCD ____, relating to the material, equipment,
and work covered in and required by the contract.

The undersigned hereby certifies that to his/her knowledge, no contractual disputes exist in regard to this
contract and that he/she has no knowledge of any pending or potential claims in regard to this contract.

Upon submission of this document and a separate invoice for any retained funds to the District, invoice
processing will be completed within forty-five (45) calendar days.

State of Arizona)
) ss
County of Maricopa)

Signed this ____ day of _____, 199__.

Signature

Title

SUBSCRIBED AND SWORN TO before me this ____ day of _____, 199__.

Notary Public

My Commission Expires: _____

Attachment 3
**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 CERTIFICATE OF INSURANCE**

CONTRACT FCD

PROJECT TITLE :

| | | | |
|--------------------------------------|--|----------|--|
| NAME AND ADDRESS OF INSURANCE AGENCY | INSURANCE COMPANIES AFFORDING COVERAGES | | |
| NAME AND ADDRESS OF INSURED | Company Letter | A | |
| | Company Letter | B | |
| | Company Letter | C | |
| | Company Letter | D | |
| | Company Letter | E | |
| | Company Letter | F | |

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time

| CO. LTR | TYPE OF INSURANCE | POLICY NUMBER | EFFECTIVE DATE (MM/DD/YY) | EXPIRATION DATE (MM/DD/YY) | LIMITS |
|---------|---|--|---------------------------|----------------------------|--|
| | COMMERCIAL GENERAL <input checked="" type="checkbox"/> LIABILITY FORM <input checked="" type="checkbox"/> PREMISES OPERATIONS <input checked="" type="checkbox"/> CONTRACTUAL <input checked="" type="checkbox"/> BROAD FORM PROPERTY DAMAGE <input checked="" type="checkbox"/> EXPLOSION & COLLAPSE <input checked="" type="checkbox"/> PRODUCTS/COMPLETED OPERATIONS HAZARD <input checked="" type="checkbox"/> UNDERGROUND HAZARD <input checked="" type="checkbox"/> INDEPENDENT CONTRACTORS <input checked="" type="checkbox"/> PERSONAL INJURY | | | | GENERAL AGGREGATE \$1,000,000 PRODUCTS/COMPLETED OPERATIONS \$1,000,000 BODILY INJURY AND PROPERTY DAMAGE \$1,000,000 PERSONAL INJURY \$1,000,000 EACH OCCURANCE \$1,000,000 |
| | COMPREHENSIVE AUTO <input checked="" type="checkbox"/> LIABILITY & NON-OWNED | | | | Each Occurrence \$1,000,000 |
| | <input type="checkbox"/> EXCESS LIABILITY | | | | NECESSARY IF UNDERLYING NOT ABOVE MINIMUM |
| | <input checked="" type="checkbox"/> WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY | | | | STATUTORY each accident \$500,000 |
| | <input checked="" type="checkbox"/> ENGINEERS PROFESSIONAL LIABILITY | | | | EACH CLAIM AND ANNUAL AGGREGATE \$1,000,000 |
| | <input checked="" type="checkbox"/> OTHER | The Flood Control District of Maricopa County and Maricopa County are to be named as additional insured. | | | |

Except for Professional Liability Insurance and Workers' Compensation Insurance, the Flood Control District of Maricopa County is added as an additional insured on those types of policies described herein which are required to be furnished by this contract entered into between the insured and the Flood Control District. To the extent provided in this contract, insured shall hold harmless the Flood Control District of Maricopa County from liability arising out of any services provided or duty performed by insured as required by statute, law, purchase order or otherwise required, with the exception of liability for loss or damage resulting from the sole negligence of Flood Control District, its agents, employees or indemnities. It is agreed that any insurance available to the named insured shall be primary of other sources that may be available. It is further agreed that no policy shall expire, be cancelled, or materially changed to affect the coverage available to the District without thirty (30) days written notice to the District. THIS CERTIFICATE IS NOT VALID UNLESS COUNTERSIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE INSURANCE COMPANY.

| | |
|--|--|
| FLOOD CONTROL DISTRICT OF MARICOPA COUNTY 2801 West Durango Street Phoenix, Arizona 85009 | DATE ISSUED _____ AUTHORIZED REPRESENTATIVE _____ |
|--|--|

SCOPE OF WORK

for

**FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS AND
GALLOWAY WASHES**

CONTRACT FCD 99-14

SCOPE OF WORK
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FLOODPLAIN DELINEATION STUDY OF ANDORA HILLS AND GALLOWAY WASHES
FCD 99-14

GENERAL

The project consists of approximately **7.6 river miles** of floodplain delineation covering about 2.8 miles on **Andora Hills Wash**, from the Cave Creek confluence to Carefree Drive at Lazy Burro Road, and 4.8 miles on **Galloway Wash** from the Cave Creek confluence to about 1/8 mile upstream of the Pima Road alignment.

The limits of the contributory watershed are from section 29 of Township 6N Range 4E (on the west) to section 31 of Township 7N Range 5E (on the north) and section 15 of Township 6N Range 5E (on the east), as shown in Exhibit 1. The study requires new topographic strip mapping of approximately 2.5 square miles) at two-foot contour intervals, and the characterization of the hydrologic response of the approximately 20 square mile) watershed using this new topographic mapping and existing sources. In addition, approximately 11 square miles of digital ortho aerial photography will be required in the study watershed. The remaining portions of the watershed will be delineated from existing sources.

The consultant will analyze the watershed hydrology using the Corps of Engineer's HEC-1 computer model. The consultant will carry out floodplain and floodway delineation using the HEC-RAS computer model, if appropriate. The consultant must use sound engineering judgement in the development of the hydrologic and hydraulic models. Model results must be compared to those of earlier studies (which will be provided by the District). The results of the models must be analyzed carefully and refinements made to the input parameters in order to obtain the most realistic results. All work must meet or exceed Arizona Department of Water Resources (ADWR) and Federal Emergency Management Agency (FEMA) requirements for floodplain delineation. The results of this study must be reviewed and accepted by FEMA, prior to the finalization of this contract. All work under this scope of work (SOW) will be completed within **500 calendar days** from the date of Notice to Proceed, including **60 days** for District review and **180 days** for FEMA review.

TASK 1 - COORDINATION

- 1.1** The consultant shall submit a project schedule showing coordination meetings and completion dates for each of the tasks in the scope within **14 days** of Notice To Proceed. The consultant shall update this project schedule when appropriate.
- 1.2** The consultant shall participate in regular coordination meetings (at least **once every four weeks**) with the District's Project Manager and in milestone coordination meetings during the development of the hydrologic and hydraulic models and subsequent analyses. The consultant is responsible for the preparation of the minutes of any meetings. Minutes should be submitted to the District within **5 working days** of meetings. Whenever possible, coordination and milestone meetings should be combined.
- 1.3** The consultant shall submit a quarterly estimation of the projected billing within **14 days** of Notice to Proceed. Thereafter, this estimation will be updated as necessary and submitted to the District's Project Manager at least **10 days** prior to the end of each quarter.

- 1.4 The consultant shall submit monthly progress reports at least **5 working days** before submittal of monthly invoices. The monthly progress report should be no longer than two typed pages. At a minimum, the monthly report must contain the following:
- a. A description of the **work accomplished** by task during the reporting month.
 - b. **Percent (%) completed** for the month and cumulative percent (%) completed for each task.
 - c. A brief description of the **work planned** to be accomplished in the following month.
 - d. A description of any **problems encountered**.
 - e. A highlight of **actions required** to be taken by the District.
- 1.5 The consultant is responsible for placing the legally mandated public announcement(s) at the beginning of the study, notifying the public of the study. The advertisement(s) will be published in a widely circulated newspaper twice, with approximately one week between publications. The advertisement must also appear two times in a local newspaper that serves the area being studied. After the advertisement is run, the consultant will supply the District with the original affidavit of publication from each of the newspapers for each day that the advertisement was published.
- 1.6 The consultant shall notify all property owners individually and obtain any necessary Rights of Entry for the Study Area. The consultant shall furnish the District with a list of the names and addresses of each property owner notified and a sample Right of Entry letter.
- 1.7 The consultant shall meet with officials from the local Public Works Department, if applicable. The purpose of this meeting is to identify local flooding problems and obtain information on current and planned public works projects, channel modifications, storm-drainage systems, development, and corporate boundaries.
- 1.8 The District (with assistance from the consultant) will plan and conduct two public meetings in conjunction with this study. The first meeting will be to inform the public of the **purpose and scope** of the study. The second meeting will be to inform the public of the **study results** and obtain public comment. This meeting will be convened prior to the submittal of the final report to FEMA. The consultant and the District shall be jointly responsible for the preparation of graphic displays for these meetings. One representative from the consultant shall attend **each** of the two meetings. The consultant shall respond to the public's comments and make revisions to the study if necessary, as guided by the District.
- 1.9 Consultant/District Performance Evaluations will be performed. An informal evaluation will be performed at the completion of the hydrologic analysis. A formal evaluation will be performed after project completion and receipt of all deliverables.

TASK 2 - DATA COLLECTION

- 2.1 The consultant shall collect and review pertinent data from the District and other outside sources. Data to be collected will include previous flood hazard reports and hydrology for the Study Area; existing

topographic mapping; historical flooding information; as-built plans for existing structures; FEMA Flood Hazard Boundary Maps and any Letters of Map Amendment and/or Revisions (LOMA/LOMRs), and other pertinent information.

- 2.2 A written report summarizing the data sources used and data collected shall be submitted to the District for information purposes. A preliminary draft of this report is due within **90 days** of Notice to Proceed.

TASK 3 - TOPOGRAPHIC MAPPING

- 3.1 The consultant as part of this contract shall retain an aerial survey subcontractor. The new topographic mapping is expected to cover selected portions of the contributing watersheds of (i) Andora Hills Wash, from its confluence with Cave Creek upstream for about **2.8 river miles** and (ii) Galloway Wash from its confluence with Cave Creek upstream for about **4.8 river miles**. The total area of aerial photography is estimated at **11 square miles**, of which about 2.5 square miles will be used for detailed contour mapping, as described below. Mapping limits for this study are shown in Exhibit 1.
- 3.2 The consultant shall coordinate all the aerial surveying work with the aerial surveying subcontractor to ensure that the specifications of the aerial surveying work are met. The consultant is responsible for ensuring that the topographic mapping covers the entire area of floodplain delineation. Quality control of surveys will be as per FEMA document 37, *Flood Insurance Study Guidelines and Specifications for Study Contractors*, January 1995.
- 3.3 Digital contour and planimetric data developed for this study shall be delivered according to the District's HIS specifications for review and approval prior to finalizing the Hydrology task (Task 5).
- 3.4 **Digital Terrain Models** shall be delivered following the guidelines stated in district's *HIS Data Delivery Specifications*, Rev. 3.1, June 1, 1998.
- 3.5 Topographic strip mapping will be prepared to a 2-foot contour interval, with a scale of 1 inch = 200 feet, with spot elevations and/or 1-foot supplemental contours on all section line and mid-section line roads (except as noted in Exhibit 1). The topographic mapping for the area shown in Exhibit 1 (about **2.5 square miles**), will be prepared at a 2-foot contour interval, while the balance of the of the contributory watershed will be prepared at contour intervals available from existing sources—no new mapping will be required. The District shall provide DEM from USGS 7.5' series at no cost to consultant.
- 3.6 **Ground Control:**
 - a. The consultant shall provide all survey control using **1983 NAD**.
 - b. The consultant shall systematically set panel points and establish horizontal and vertical control throughout the areas to be mapped for use in compilation by the aerial survey contractor. Where readily available, surveys will tie into the State Plane Coordinate System. Field control shall be sufficient to readily allow for compilation of maps by the aerial survey contractor at the desired map scale and contour interval, and will be based on the National Geodetic Vertical Data of 1929 (NGVD). **A conversion factor, including documentation of how it was derived, will be provided by the consultant to allow comparison of NGVD 29 elevations to NAVD 88**

elevations and will be included in the Technical Data Notebook.

- c. The horizontal and vertical control points shall be located and marked by the consultant. The controls for the aerial mapping shall be in sufficient numbers and shall be in locations compatible with the accuracy of the mapping requirements. The controls shall be of at least third order accuracy. Section corners, quarter corners, and mid-section points shall be used for control points wherever possible.
- 3.7 The consultant shall provide permanent non-erasable topographic mylars of the work study drawings. The drawings shall be 24" X 36" in size, with a scale of 1 inch = 200 feet at a contour interval of 2 feet for all mapping except for section lines of roads, which will have a contour interval of 1 foot. A cover sheet will be provided with the project title, date of topographic mapping, and a location map showing geographic range covered by each individual mapping sheet. Each drawing shall include separately floodplain and floodway delineation boundaries. All maps must display a north arrow, scale, section corners and quarter corners, current and proposed streets and highway names, State Plane Coordinate System, major drainage features, corporate boundaries, cross section lines, channel station center line(s), an index map, and a description and elevation of each elevation reference mark (ERM). A note explaining the proper means to convert the NGVD 29 elevations to NAVD 88 elevations shall be included in "NOTES" in the map border. The mapping will have accuracy such that ninety percent (90%) of all contours shall be within one-half contour of the true elevations and the remaining ten-percent (10%) of the contours shall not be in error by more than one contour interval.
- 3.8 Digital Orthophotos shall be provided per Flood Control District Digital Orthophotos Guidelines dated June 9, 1999, attached.
- a. Digital Orthophotos covering the new detailed topographic mapping area along the washes will be rectified using the new topography, which is specified under Task 3.5.
 - b. Additional Digital Orthophotos covering the areas outside the washes will be rectified using existing USGS DEMs provided by the District, and horizontal control survey provided by the consultant.

TASK 4 - FIELD SURVEY

- 4.1 Prepare topographic mapping to a 2 foot contour interval with a scale of 1 inch = 200 feet, with spot elevations or 1 foot contours on all section line and mid-section line roads, for floodplain/floodway delineation areas as identified in Task 6 (and Exhibit 1), or FEMA criteria, whichever is more stringent. As described above, the topographic mapping for the remaining 15 square miles of watershed, shall be prepared at a contour interval determined by available existing data alone, not from photo interpretation.
- 4.2 **Ground Control for Floodplain Delineations:**
- 4.2.1 All topographic mapping and survey work shall meet or exceed Federal Emergency Management Agency (FEMA) minimum criteria as defined in FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995. This would include, but is not necessarily limited to the establishment of "permanent" elevation reference marks (ERMs);

field control; and verification of profiles by the ground survey profile procedure.

4.2.2 Horizontal and Vertical Control: Systematically set panel points and establish horizontal and vertical control throughout the area to be mapped for use in compilation by the aerial survey contractor. Where readily available, surveys will tie into State Plane Coordinate System 1983 NAD. Field control shall be sufficient, at least one "permanent" point per mile, such point(s) being used as Elevation Reference Marks (ERMs). Surveys will be based on National Geodetic Vertical Datum (NGVD) 1929, per FEMA guidelines. A conversion factor, including documentation of how it was derived, will be provided by the consultant to allow comparison of NGVD 29 elevations to NAVD 88 elevations and will be included in the Technical Data Notebook. "Permanent" survey points shall consist of existing monument, such as brass caps or similar survey monuments. Where additional monument is needed, survey markers conforming to Maricopa Association of Governments (MAG) Uniform Standard Detail for Public Works Construction, detail 120-1, Type C, shall be placed 2" +/- above grade, and topped with a brass cap. Elevation Reference Marks will be labeled on available maps and described in a manner which allow them to be readily located in the field.

4.2.3 All aerial targets are to be removed following completion of the topographic mapping.

4.3 The consultant shall verify the accuracy of the mapping by the procedures called for in FEMA Document 37 or other methods approved by FEMA. This shall include the verification of cross sections used in the floodplain delineation.

4.4 Field surveys of bridges, culverts, and hydraulic structures are to be performed by the consultant when as-built plans are not available or when changes significant to the HEC-RAS modeling, such as sedimentation, have occurred since the date of as-built. This information should be reduced and compiled into an 11"x 17" (maximum size) drawing for inclusion in the final report. The information presented in the drawing should be in a format appropriate for use in the HEC-RAS model. Field surveys of bridges, culverts, hydraulic structures, and routing reaches must also be obtained where necessary for proper hydrologic modeling. It may be necessary to field survey some structures, if the as-built plans are not referenced to the 1929 NGVD.

TASK 5 - HYDROLOGY

5.1 The hydrologic study of the watershed shall be delivered to the District under separate cover from the hydraulic analysis. The consultant shall use the U.S. Army Corps of Engineers computer program HEC-1, 1990 Version 4.0, to develop a hydrologic model for the area. Using appropriate hydrologic judgement, sub-basins are to be identified that provide reasonable depiction of the watershed condition. The sub-basins must be as homogeneous as possible, using watershed area, watershed type (mountainous and flat lands or urban and undeveloped areas), and time of concentration as criteria. Sub-basin breakdowns will be done in sufficient detail to provide peak discharges at structures, major road crossings, each major confluence, and at boundary lines. An appropriate time step and number of ordinates is to be selected that allows for complete calculation of the flood hydrograph without sacrificing resolution of the flood peak. All calculations or assumptions used in developing sub-basin and routing parameters shall be documented and made a part of the appendix for the hydrology report. Field surveys may need to be taken for HEC-1 modeling purposes.

100-year discharge values for Andora Hills Wash will be obtained from the HEC-1 model prepared for the Cave Creek above Carefree Highway Floodplain Delineation Study (FCD 95-28; GVSCE, March 1997). A new HEC-1 model will be prepared for Galloway Wash. Concentration points in the local watershed in the Town of Carefree as shown in Exhibit 2 will be modeled using the rational method per the guidelines in the District's Drainage Design Manual, Volume I-Hydrology, January 1, 1995.

5.2 Four meetings associated with four tasks, and **two field trips** shall be held with the Flood Control District staff at the following milestones:

- a. **One field trip at the start of the project** to scope out the critical points of the watershed and problem areas.
- b. **Meeting number 1:** as soon as basic hydrologic data are gathered and the sub-basins have been delineated. Sample HEC-1 parameter estimations should also be presented and discussed at this meeting. A copy of the draft maps of the sub-basins must be delivered to the District at this meeting.
- c. **Meeting number 2:** after all the parameters have been estimated. A draft copy of the parameters must be delivered to the District at least one week prior to this meeting.
- d. **Meeting number 3:** after the preliminary HEC-1 results have been obtained and a draft report has been prepared. A copy of the draft report and the copy of the HEC-1 on a floppy disc, compatible with the Districts computers, must be delivered two weeks prior to the meeting.
- e. **Meeting number 4:** to review comments by the District. A second field trip may be scheduled for the same day to discuss the results of the HEC-1 model.

5.3 The specific hydrologic techniques to be used in this study are:

- a. **Rainfall Depth:** Point precipitation values shall be determined using the information and procedures described in the *Drainage Design Manual for Maricopa County, Arizona: Volume I - Hydrology*.

Rainfall Distribution: Peak discharges and peak volumes for the **100-year 6-hour** storm shall be estimated using the District's Distribution(s). **Peak discharges** and **peak volumes** for the **100-year 24-hour** storm shall be estimated using the **SCS Type II** rainfall distribution.

- b. **Areal Reduction:** The point precipitation values shall be areally reduced for critical concentration points. Areal reduction for the **6-hour** rainfall duration shall be applied using the curves in the *Drainage Design Manual for Maricopa County, Arizona: Volume I - Hydrology*. NOAA HYDRO-40 shall be used with the **24-hour** rainfall reduction. Copies can be obtained from the District.
- c. **Rainfall Excess:** The **Green and Ampt** methodology shall be utilized for estimation of rainfall

losses. The Lotus spreadsheet and procedures, provided by the District, shall be used to determine composite parameter values for each sub-basin.

- d. Unit Hydrograph: The **Clark** and **S-Graph** methods shall be used following the procedures outlined in the *Drainage Design Manual for Maricopa County, Arizona: Volume I- Hydrology*. The choices in methodology shall be at the discretion of the consultant, with consent from the District.
- e. Time of Concentration and S-Graph Lag Equation: The **Papadakis** method shall be used with the **Clark unit hydrograph**, along with the MCUHP1 computer program, to determine the time of concentration. If this method results in unsuitable times of concentration, other method(s) must be used and compared for the most realistic result. The S-graph lag equation, along with the MCUHP2 computer program, shall be used with the appropriate S-graph (Phoenix Mountain or Phoenix Valley).
- f. Channel Routing: Channel routing shall be accomplished using either the **Muskingum-Cunge** or the **Normal-Depth** option of HEC-1. The choice of methodology shall be at the discretion of the consultant, with consent from the District. Average cross sections shall be developed utilizing available mapping and field reconnaissance data. Sufficient field cross sections shall be taken to ensure that routing reaches are reasonable and representative of field conditions.

The HEC-1 routing parameters for the reaches modeled using HEC-RAS shall be adjusted **after** the HEC-RAS cross sections become available. The resulting velocities and depths, for all reaches, must be assessed to ensure that realistic values are obtained.
- g. Reservoir Routing: Detailed analysis of structures and ponding areas shall be accomplished using the **Modified Puls** reservoir routing option of HEC-1. **Stage versus discharge tables** for hydraulic structures shall be estimated using appropriate hydraulic methodology approved by the District.
- h. Channel Transmission Losses: Attempts shall be made to estimate infiltration losses through channel bottoms based on existing field data or literature. If sufficient data is not available, the final report must acknowledge this, and explain how the peaks and volumes of flow are affected by not including the transmission losses.

5.4 The District shall provide available, appropriate references to facilitate parameter estimation.

5.5 Output of the computer model shall be reviewed to see if the peak rates of flow and discharge volumes are realistic. Flows will be tested for reasonableness using approximate methods, including ADWR regional regression equations, District's unit discharge relationships, and consistency with other hydrologic studies in the vicinity.

5.6 The consultant must make every attempt to recover historic stream gage data and compare actual recorded discharge values with the results obtained by the hydrologic model. Major differences must be discussed in the final report.

5.7 The consultant must obtain the approval of the District at each of the following steps:

- a. Soil maps, watershed boundary maps, and land use maps;
- b. HEC-1 parameter estimation;
- c. HEC-1 flow diagram and input parameters; and
- d. HEC-1 results.

5.8 The Hydrologic Report

5.8.1 The findings of the hydrologic study shall be presented in Section 3 of the Technical Data Notebook and shall be prepared in accordance with *ADWR State Standards Attachment 1-97 (SSA 1-97)*. The report shall be organized as specified by the District, following SSA 1-97 format.

5.8.2 Tables and Figures for the appendices:

- a. Topographic base map(s) showing the sub-basins, routing reaches, time of concentration (t_c), flow paths or lag flow paths, major man-made structures, and references (i.e. street names, Township, Range, Section, etc.) at a scale of 1 inch = 2000 feet.
- b. Soils map(s) at the same scale as the base map.
- c. Land use map(s) at the same scale as above.
- d. Schematic map for the HEC-1 showing the sub-basins (area, t_c), the flow paths, the routing reaches (length, slope, friction, width, velocities, transmission losses, etc.), order of combining the hydrographs, channel, pipe or culvert dimensions (where appropriate).
- e. Pertinent data on all structures (such as spillway elevation, rating curves, etc.).
- f. One set of study maps (i.e. sub-basin boundary maps, flow path maps, soils maps, land use maps) to be folded and delivered in a binder.

5.8.3 HIS submittals pertinent to Task 5, must be reviewed and approved prior to finalizing the Floodplain Delineation Task (Task 6).

Any deviations from this hydrologic scope shall not be undertaken by the consultant without the **specific written concurrence** from the Flood Control District.

TASK 6 - FLOODPLAIN DELINEATION

6.1 Floodplain delineations must be performed using the most recent U.S. Army Corps of Engineers HEC-RAS River Analysis System computer model, Version 2.2, September 1998, or later, and methodology

acceptable to FEMA. This model will simulate the effects of floodplain geomorphology, flow changes, bridges, culverts, hydraulic roughness factors, effective flow limitations, split flows, and other considerations. The consultant shall prepare the study using the guidelines established in FEMA Document 37, *Flood Insurance Study Guidelines and Specification for Study Contractors*, January, 1995, and FIA Document 12, *Appeals, Revisions, and Amendments to Flood Insurance Maps*, January 1990.

- 6.2 The delineation work shall meet requirements for floodplain and floodway delineations as prescribed by FEMA and the Arizona Department of Water Resources.
- 6.3 The delineation study shall be based on the final results of the hydrologic study as directed by the District.
- 6.4 The consultant is to make refinements to the HEC-RAS model based on review of the model results by the District, ADWR, FEMA, and the Technical Evaluation Contractor. The consultant shall review the HEC-RAS model results for reasonableness. Adjustment to the input parameters for obtaining the most realistic results is normal to the scope.
- 6.5 Floodways are to be determined using equal conveyance encroachment method 4 to start with, but only encroachment method 1 will be used in the final analysis. The floodway encroachment is to be as near the one-foot maximum rise in elevation as possible.
- 6.6 The consultant must obtain District approval at each of the following steps:
 - a. Field reconnaissance report and estimation of Manning's "n" values.
 - b. Proposed location and alignment of cross-sections, thalwegs, and channel centerline.
 - c. Floodplain (natural) delineation.
 - d. Floodway delineation using equal conveyance encroachment.
 - e. Floodway delineation using encroachment method 1.
 - f. Final Hydraulics Report.
- 6.7 Field Reconnaissance
 - 6.7.1 The consultant shall conduct a field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values; photographic documentation of floodplain characteristics; determination of channel bank stations; observation of possible overflow areas; inspection of levees or other flood control structures; and measurement of bridge dimensions.
 - 6.7.2 Manning "n" values are to be determined using the methodology in the USGS report, *Estimating Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County*,

Arizona, April 1991. Copies of the report are available through the District.

6.7.3 A draft report on the field reconnaissance shall be submitted to the District for review and approval prior to beginning the HEC-RAS modeling. The report shall present the determination of channel and overbank "n" values using captioned color photographs or color photocopies. The report shall also discuss floodplain conditions affecting the delineation, describe structures and obstructions, and provide color photos or photocopies of major hydraulic structures. Photo locations, structures, and "n" values shall be displayed on reduced scale mapping and included in the Final Report.

6.8 Cross Sections

6.8.1 The location and alignment of cross sections and channel centerline shall be submitted for the District's review and approval prior to digitizing the cross section data. Cross section stationing shall be **from left to right looking downstream** with the thalweg as station 10,000. Cross sections will be spaced approximately every 200 feet, unless geographic or structural constraints dictate otherwise, and shall extend the full width of the area inundated by 100-year floodwaters. Identification of cross sections shall be in river miles, **increasing upstream**. The stationing shall, unless otherwise approved **in writing** by the District, tie into the appropriate river mile of previous FEMA floodplain delineation studies. Cross section orientation may need to be altered after running of HEC-RAS model to ensure that sections are perpendicular to flow in conformity with FEMA criteria.

6.8.2 All cross sections shall be plotted using a pen, laser, or electrostatic plotter. The cross section plots shall show water surface profiles, ineffective flow areas, "n" values, and encroachments, channel stationing and other pertinent information. Each individual plot sheet must contain a legend and a reference map to the entire Study Area, showing the location of the particular sheet. These plots are to be made available at all reviews.

6.8.3 Cross section plots are limited to one plot at the following three stages of work: (a.) a plot of digitized "GR", STCHL, STCHR, thalweg (station 10,000) to be used as a check of input data and for working sections during compilation of the **floodplain model**; (b.) a plot of the cross section for the completed **floodplain run**, which shows the floodplain water surface elevation, ineffective flow areas, "n" value, and encroachments to be used as working sections for development of the **floodway model**; (c.) a plot of the final floodway model cross sections which will show **Type 1 encroachments** and encroached water surface, in addition to data covered in items (a.) and (b.). The cross sections, detailed in (c.), will be submitted in the Final Report.

6.9 Bridges and culverts must be modeled in compliance with HEC-RAS modeling requirements for the selected routine. Where multiple bridges occur, each bridge shall be modeled separately. The HEC-RAS modeling results for bridges, culverts, and other hydraulic structures must be checked by using an independent method approved by the District to analyze these structures.

6.10 Ponding areas identified as floodplains must be analyzed using the HEC-1 model, and the consultant will provide the District with water surface elevations throughout these ponding areas at intervals to be specified during the study. In most such cases, the consultant will be required to delineate

conveyance areas (if any) joining two or more adjacent ponding areas to achieve continuity of flow.

- 6.11 Flood zones must be determined according to FEMA criteria and clearly labeled on the final drawings.
- 6.12 The total area of the floodplain and floodway must be determined for each reach in square miles and acres (hectares).
- 6.13 The findings of the floodplain/floodway delineation study shall be presented in Section 4 of the Technical Data Notebook and shall be prepared in accordance with *ADWR State Standards Attachment I-97 (SSA I-97)*. The report shall be organized as specified by the District standards, following SSA I-97 format.

TASK 7 – CDS/HIS DATA

Digital data will be prepared in conformance with the district's HIS Data Delivery Specifications, Rev. 3.1, June 1, 1998, for the following themes:

| Name | Page No. | Description |
|----------|----------|---|
| NDXPRJ | LP-40 | Shows the map sheet boundaries of the project |
| PRJ | LP-60 | Defines the boundary of the project |
| CARTO | LP-110 | Planimetric features captured but not used by HIS (Fences, tree lines, etc)(if any) |
| CORNERS | LP-210 | Section corners as defined by the PLSS (Public Land Survey System) |
| CTRL | LP-215 | Other control points that are not corners |
| DQ | LP-410 | Data Quality of Data: Scale, date, Vertical Datum, Projection |
| PRJ.REL | LP-430 | Contractor name, Project Name, Project ID |
| FPBLN | LP-520 | Floodway center line |
| FPCTLFCD | LP-523 | Elevation Reference Marks |
| FPSRFFCD | LP-535 | Surface Water Elevation |
| FPXFCD | LP-540 | Cross sections used in HEC 2 |
| FPZNFCD | LP-550 | Floodplain Zones |
| FPZNHZ | LP-560 | Floodplain Hazard Zones |
| FLTY | LP-620 | FCD Project in the area (if any) |
| STRTDTL | LP-660 | Edge of Pavement (if any) |
| ELV | LP-710 | Contours and spot elevations |

| | | |
|---------|--------|---|
| BRIDGE | LP-608 | Bridges, including any headwalls or wing walls |
| CULVERT | LP-612 | Culverts, including any headwalls or wing walls |
| DRNBSN | LP-920 | Drainage basins |
| DRNPTH | LP-930 | Drainage Path |
| RIVER | LP-960 | Washes or streams in the area (if any) |

This is a comprehensive listing of possible features. If there are no features collected under one of the categories mentioned, then the theme does not need to be delivered. Mapping should be done according to the district's *HIS Data Delivery Specifications*, Rev. 3.1, June 1, 1998. Digital data may be provided in CAD format in conformance with the District's *HIS Data Delivery Specifications*, Rev. 3.1, June 1, 1998. }→

The HIS data submittal under Task 7 will be subject to a quality control (QC) check by the District staff. The District makes use of a checklist and a computer program to document and automate the QC process. A hardcopy of the checklist is enclosed with this scope of work. The consultant shall use the checklist to review each HIS data submittal for compliance and deliver a completed copy of the checklist to the district along with the data submittal.

The computerized application that automates the QC process is available upon request at no charge to the Consultant. The Consultant is recommended to make use of the computer application to review the data prior to the HIS submittal. The application is available for Arc/Info on all UNIX platforms.

All required HIS submittals must be reviewed and accepted prior to finalizing the Technical Data Notebook for submittal to FEMA (Task 8.1).

TASK 8 - DELIVERABLES

8.1 FEMA Submittal: The consultant will submit the following items to the District for review by FEMA and any other appropriate governmental agency. All of the following products are considered deliverables for the FEMA submittal:

8.1.1 Original Affidavits of Publication.

8.1.2 Two (2) complete sets of blue-line topographic base maps with the floodplain/floodway delineations shown. All drawings shall be signed and sealed by persons of appropriate professional registration(s). Each registrant shall provide a specific statement as to what service they performed.

8.1.3 Two (2) complete copies of the Technical Data Notebook, including HEC-1 and HEC-RAS input/output files on diskettes. The Technical Data Notebook shall be prepared in accordance with ADWR State Standards Attachment 1-97 (SSA1-97). The notebook shall be organized as specified by the District, following SSA 1-97 format.

- 8.1.4 Two (2) sets of completed FEMA forms shall be submitted in a notebook separate from the Final Report.
- 8.1.5 One (1) copy of the Digital Terrain Model (DTM) shall be submitted following the guidelines stated in the District's *HIS Data Delivery Specifications*, Rev. 3.1, June 1, 1998.
- 8.1.6 Three (3) sets of complete survey notes shall be submitted in a notebook separate from the Final Report.
- 8.1.7 Two (2) copies of the current FIRM panels showing the proposed delineation.
- 8.2 **Final Submittal:** The following products are considered deliverables for the final submittal to the District after FEMA approval is issued:
 - 8.2.1 One (1) complete set of non-erasable topographic mylars of the work study drawings. Sheets shall be 24" X 36" in size and numbered to correspond to the delineation maps.
 - 8.2.2 One (1) complete sets of mylars and four (4) complete sets of sealed blue-line topographic base maps with the floodplain/floodway delineations shown. All drawings shall be signed and sealed by persons of appropriate professional registration(s). Each registrant will provide a specific statement as to what service they performed.
 - 8.2.3 One (1) complete set of transparent overlays of photo-mylars. Sheet size, numbering, and layout shall correspond to the delineation work maps only for area of detailed mapping.
 - 8.2.4 One (1) complete set of 9" X 9" contact prints of the aerial stereo photographs sequentially numbered and catalogued.
 - 8.2.5 Digitized topographic data and floodplain/floodway data in conformance with the District's *HIS data Delivery Specifications*, Rev. 3.1, June 1, 1998.
 - 8.2.6 Four (4) complete copies of the Technical Data Notebook including HEC-1 and HEC-RAS input/output files on diskettes. The Technical Data Notebook shall be prepared in accordance with ADWR State Standards Attachment 1- 97 (SSA 1-97). The notebook shall be organized as specified by the District, following SSA 1-97 format. This submittal of the Technical Data Notebook shall include any correspondence and/or meeting minutes with the reviewing agencies and shall reflect any revisions required by those reviewing agencies. Revisions may include, but are not limited to, modifications to the delineation maps, the HEC-1 model, the HEC-RAS model, and/or the **Final Report**.
 - 8.2.7 Digital orthophotographs, as specified in Task 3.

JUNE 9, 1999
FLOOD CONTROL DISTRICT
DIGITAL ORTHOPHOTOS GUIDELINES

1.0 **AERIAL PHOTOGRAPHY:**

A maximum photo scale of 1:24000 (1"=2000') is to be used for project areas mapped at 1"=400'. All photos will be black and white.

All photogrammetric processes, products, and resultant by-products shall conform to the American Society of Photogrammetry and Remote Sensing (ASPRS), "ASPRS Accuracy Standards for large-Scaled Maps" (ASPRS 1990) Class I standards and specifications.

2.0 **LABEL & TILING:**

A separate CD with the ortho photos is to be delivered. All CD's will be labeled to designate Township, Range and Sections, with photo date and scale.

3.0 **PHOTOGRAMMETRIC SCANNING:**

Each photograph will be scanned such that each dot or pixel has a ground resolution of 2'x2'. If a scale of 1:24000 is used for the photos, then they will be scanned at a resolution of 1000 dots per inch (dpi) to generate the ground resolution of 2' x 2' pixels.

4.0 **ORTHO-PHOTOGRAPHIC RECTIFICATION:**

The scanned photography will be ortho rectified using the mapping and the control used for the project. The Horizontal datum will employ the North American Datum 1983 standards (NAD83) using the Arizona State plane Coordinate system for the central zone.

The images will be trimmed to cover a 1-mile by 1-mile area, with at least 100' of overlap. The data will extend to the edge of the image to allow for clean aerial mosaics. All adjacent tiles, and all join areas within tiles, should edge match.

5.0 **STONE MATCHING:**

Adjacent images will be tone and contrast matched to give the appearance of a continuous page. Localized adjustment of brightness values will be done to reduce tonal differences between join areas.

6.0 **DIGITAL DELIVERABLES:**

All digital images will be stored and delivered on CD-ROM disks. The file format should be TIF with corresponding TFW files registered and rectified per section 4.0.

7.0 **NAMING CONVENTIONS:**

Townships will be indicated with "T" followed by its corresponding number and north or south indicator. Range will be indicated with "R" followed by its corresponding number and east or West indicator. Section will be indicated with corresponding number 1 through 36.

Leading 0's for numbers less than 10. Project Rid to follow.

Example: T01NR01WS03_1634

8.0 **QUALITY CONTROL:**

2 sample images of a TIF and TFW file will be submitted for quality control purposes at the beginning of the project cycle.

Any questions, please contact:

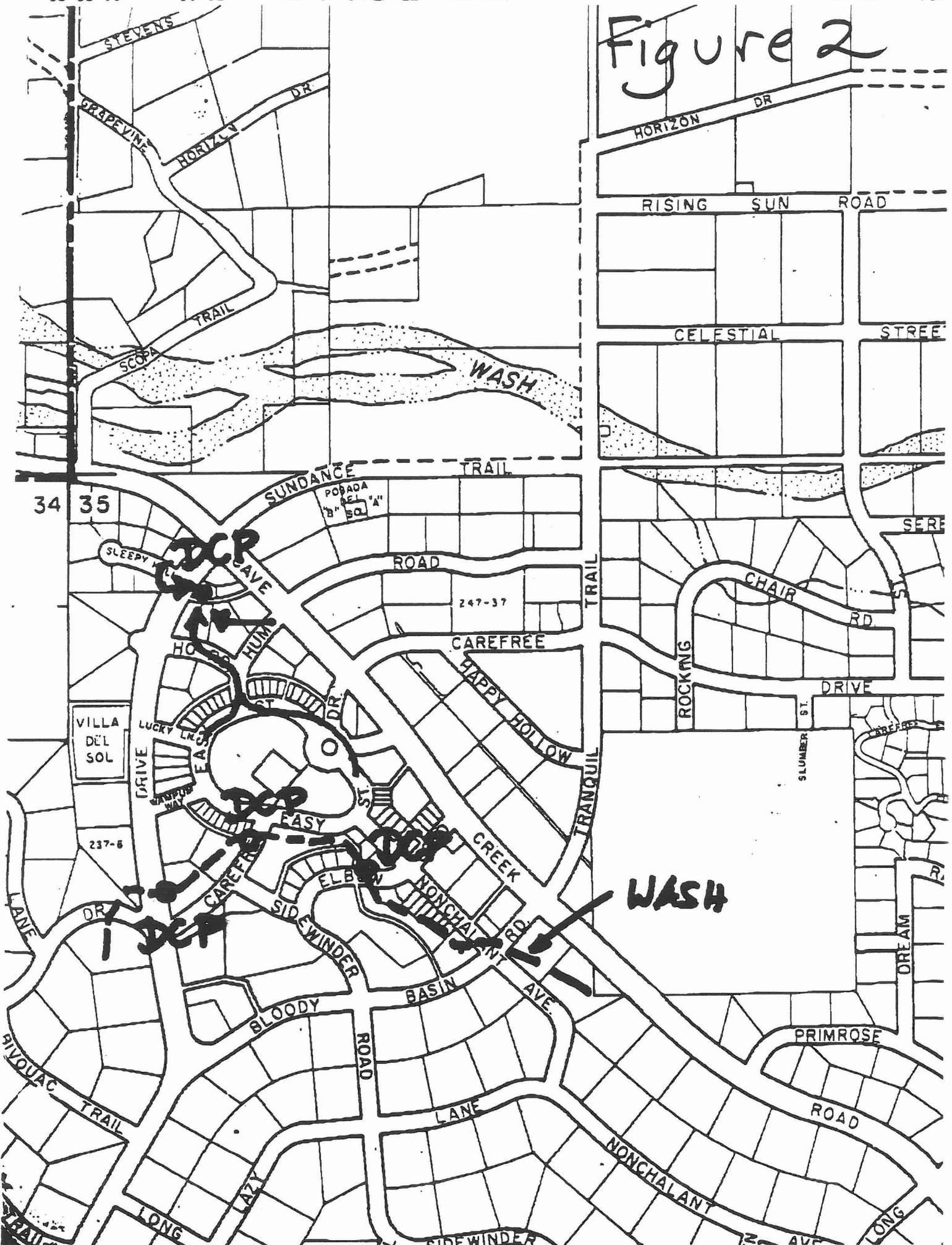
| | | |
|-------------|------------------------|----------|
| Mark Brewer | Database Administrator | 506-2953 |
| Jim Smith | Image Specialist | 506-5190 |

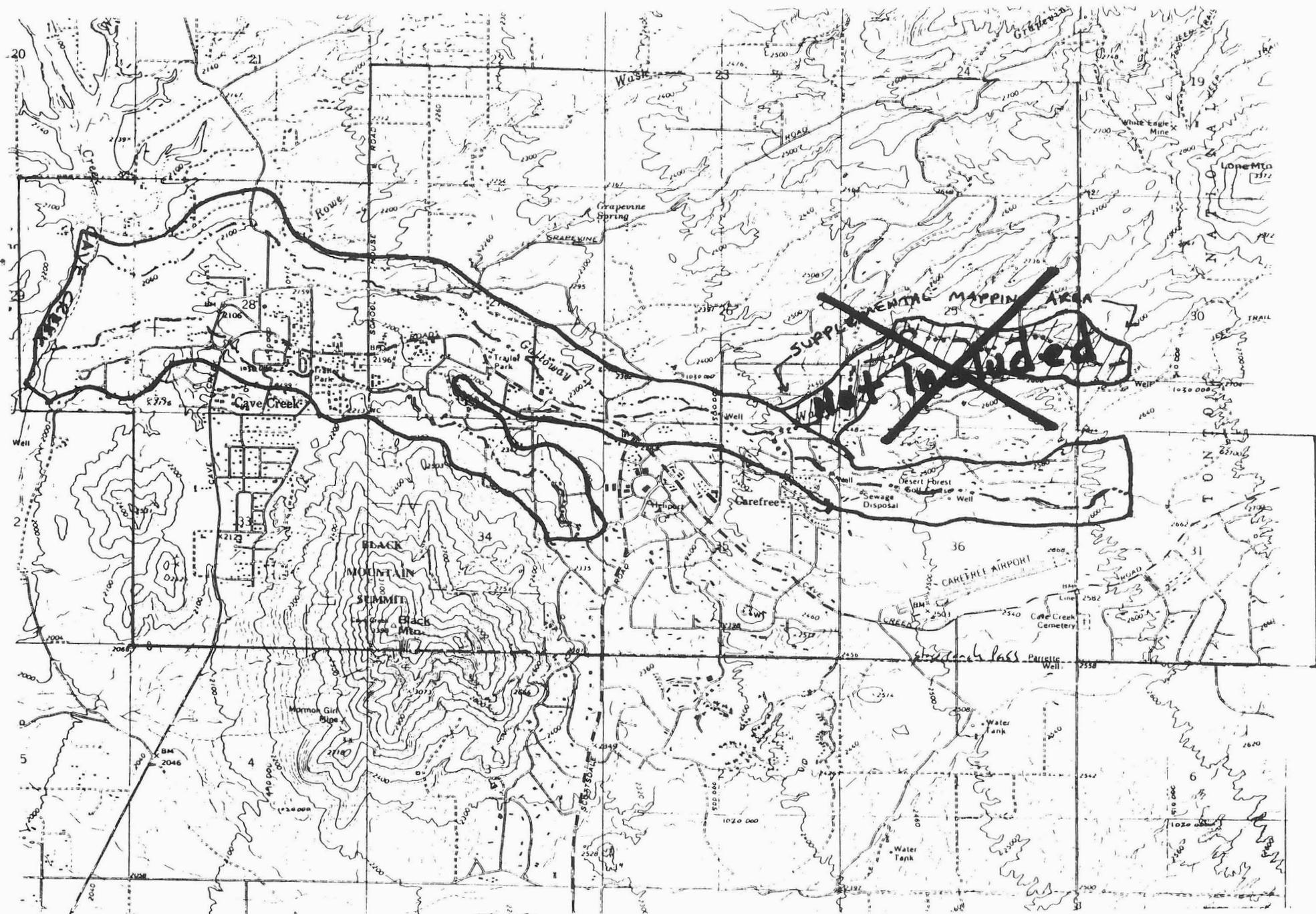
Marta Dent

GIS Supervisor

506-8612

Figure 2





↑ 1:24000 @ 70% REDUCTION
 NORTH (CAVE CK. QUAD)

—— 2 FT CONTOUR INTERVAL
 MAPPING LIMITS

////// SUPPLEMENTAL

--- LIMIT OF ORIGINAL
 GRADING (UNDESIGNED)

--- FLOODPLAIN MAPPING

EXHIBIT 1

FCD 99.14

EXHIBIT A (without supplemental services)
CONSULTANT/SUBCONSULTANT COST PROPOSAL SUMMARY

CONSULTANT/SUBCONSULTANT: JE Fuller/Hydrology & Geomorphology, Inc.

PROJECT NAME Floodplain Delineation Study of Andorra Hills and Galloway Washes

CONTRACT NO.: FCD 99-14

CHANGE ORDER NO.: N/A

DIRECT LABOR:

| Classifications | Manhours | Hourly Rates | Labor Costs |
|------------------|----------|--------------|-------------|
| Project Manager | 202 | \$30.00 | \$6,060 |
| Engineer | 611 | \$24.92 | \$15,226 |
| Tech/CADD | 181 | \$14.00 | \$2,534 |
| Support Services | 102 | \$10.00 | \$1,020 |
| — | 0 | \$0.00 | \$0 |
| — | 0 | \$0.00 | \$0 |

Total Labor \$24,840

OVERHEAD @ 150.00% (of Labor) \$37,280

Subtotal \$62,100

DIRECT AND OUTSIDE EXPENSES

| | | | |
|-------------------|-------------|-------|------|
| Transportation | 635 MILES @ | 0.315 | 200 |
| Reproduction | | | 3800 |
| Postage/Envelopes | | | 700 |
| Legal Advertising | | | 100 |

Subtotal 4800

SUBCONSULTANTS

| Name | Cost |
|--------------------------------------|----------|
| Dibble & Associates | \$21,838 |
| M & B Aerial Mapping, Inc. | \$18,970 |
| A Team Professional Associates, Inc. | \$18,100 |

Subtotal \$58,908

Subtotal Labor \$62,100

Subtotal Expenses \$4,800

Subtotal Subconsultants \$58,908

Subtotal Allowances \$0

Total Consultant Cost \$125,808

Net Fee, Subtotal Labor x 10% \$6,210

TOTAL PROPOSED FEE \$132,018

Bin R. Isom
Signature
Vice President
Title
6/25/99
Date

EXHIBIT B (without supplemental services)
 FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 CONSULTANT/SUBCONSULTANT SCHEDULED PROJECT MANHOURS

CONSULTANT/SUBCONSULTANT NAME: JE Fuller/Hydrology & Geomorphology, Inc.
 PROJECT NAME: Floodplain Delineation Study of Andora Hills and Galloway Washes
 DATE: June 25, 1999

Contract Number: FCD 99-14

| Consultant Manhours | 1999 | | | 2000 | | | | | | | | | 2001 | | | Total Hours | | | |
|---------------------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|------|------|-----|-----|----------------|-----|-----|-----|
| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEPT | OCT | NOV | DEC | | JAN | FEB | MAR |
| Project Manager | 30 | 20 | 6 | 10 | 20 | 20 | 20 | 0 | 4 | 12 | 30 | 20 | 0 | 0 | 0 | 0 | 10 | 0 | 202 |
| Hydrologist | 80 | 80 | 10 | 41 | 80 | 80 | 90 | 40 | 10 | 0 | 40 | 20 | 0 | 0 | 0 | 0 | 40 | 0 | 611 |
| Tech/CADD | 10 | 15 | 10 | 10 | 30 | 30 | 20 | 10 | 10 | 0 | 10 | 11 | 0 | 0 | 0 | 0 | 15 | 0 | 181 |
| Support Services | 25 | 2 | 3 | 0 | 0 | 10 | 15 | 10 | 20 | 0 | | 12 | 0 | 0 | 0 | | 5 | 0 | 102 |

EXHIBIT C (without supplemental work)
 FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 CONSULTANT/SUBCONSULTANT ESTIMATED MANHOURS AND DIRECT LABOR

CONSULTANT/SUBCONSULTANT NAME: JE Fuller/Hydrology & Geomorphology, Inc.

CONTRACT NO.: FCD 99-14

PROJECT NAME: Floodplain Delineation Study of Andorra Hills and Galloway Washes

CHANGE ORDER NO.: N/A

DATE: June 25, 1999

DIRECT LABOR CLASSIFICATIONS

| CONTRACT TASK/PHASE | PROJECT MANAGER \$30.00 | HYDROLOGIST \$24.92 | TECH/ CADD \$14.00 | SUPPORT SERVICES \$10.00 | TOTAL HOURS | | |
|---|-------------------------------|------------------------|--------------------------|--------------------------------|----------------|--------|-----------|
| TASK 1- COORDINATION | | | | | | | |
| 1.1 Project Schedule | | 8 | | | 8 | | |
| 1.2 Coordination Meeting | | 2 | | | 2 | | |
| 1.3 Billing Estimates | | 8 | | | 8 | | |
| 1.4 Monthly Progress Reports | | 10 | | | 10 | | |
| 1.5 Legal Advertising | | 2 | | | 2 | | |
| 1.6 Notify Property Owners | | 2 | | | 2 | | |
| 1.7 Public Works Coordination | | 8 | | | 8 | | |
| 1.8 Public Hearings | | 16 | | | 16 | | |
| TASK 2- DATA COLLECTION | | | | | | | |
| 2.1 Collect & Review Data | 4 | 20 | 6 | | 30 | | |
| 2.2 Data Collection Report | | | | | | | |
| TASK 3- GEOGRAPHIC MAPPING | | | | | | | |
| 3.1 Aerial Mapping Coordination | 8 | 40 | | | 48 | | |
| TASK 4- FIELD SURVEY | | | | | | | |
| TASK 5- HYDROLOGY | | | | | | | |
| 5.1 HEC-1 Modeling | 5 | 40 | 15 | | 60 | | |
| 5.2 Hydrologic Data | | | | | | | |
| 5.5 Output Verification | 4 | 15 | | | 19 | | |
| 5.6 Streamflow Data | | | | | | | |
| 5.8 Hydrologic Report | 4 | 38 | | 3 | 45 | | |
| TASK 6- FLOODPLAIN DELINEATION | | | | | | | |
| 6.4 HEC-2 Refinements | 5 | 25 | | | 30 | | |
| 6.5 Floodplain Data | | | | | | | |
| 6.7 Field Reconnaissance | 8 | 16 | | | 24 | | |
| 6.8 Floodplain Data | | | | | | | |
| 6.9 Bridge & Culvert Modeling | 4 | 25 | 10 | | 39 | | |
| 6.10 Ponding Area Analysis | | | | | | | |
| 6.11 Flood Zone Determination | 2 | 4 | | | 6 | | |
| 6.12 Floodplain Delineation | | | | | | | |
| 6.13 Technical Data Notebook | 10 | 30 | 20 | 32 | 92 | | |
| TASK 7- HIS DATA | | | | | | | |
| TASK 8- DELIVERABLES | | | | | | | |
| 8.1 FEMA Submittal | 30 | 95 | 60 | 25 | 210 | | |
| TOTAL HOURS | 202 | 811 | 181 | 102 | 0 | 0 | 1096 |
| HOURLY RATE | \$30.00 | \$24.92 | \$14.00 | \$10.00 | \$0.00 | \$0.00 | |
| DIRECT LABOR | \$6,060 | \$15,226 | \$2,534 | \$1,020 | \$0 | \$0 | \$24,840 |
| OVERHEAD (PERCENT OF LAB) 1.5 | \$9,090 | \$22,839 | \$3,801 | \$1,530 | \$0 | \$0 | \$37,260 |
| COST (DIR. LABOR + O.H.) | \$15,150 | \$38,065 | \$6,335 | \$2,550 | \$0 | \$0 | \$62,100 |
| EXPENSES | | | | | | | |
| Transportation | 635 MILES @ | | 0.315 /MILE | | | | \$200 |
| Reproduction | TDN, WORK MAPS, REPORTS | | | | | | \$3,800 |
| Postage/Envelopes | | | | | | | \$700 |
| Legal Advertising | | | | | | | \$100 |
| SUBCONSULTANTS | | | | | | | |
| Dibble & Associates | | | | | | | \$21,836 |
| M & B Aerial Mapping, Inc. | | | | | | | \$18,970 |
| A Team Professional Associates, Inc. | | | | | | | \$18,100 |
| SUB-TOTAL | | | | | | | \$4,800 |
| SUB-TOTAL | | | | | | | \$68,908 |
| TOTAL | | | | | | | \$125,808 |
| PROFIT (10% of Direct Labor Plus Overhead) | | | | | | | 6,210 |
| GRAND TOTAL | | | | | | | \$132,018 |

30
 All in
 M&B

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONSULTANT / SUBCONSULTANT COST PROPOSAL SUMMARY

CONSULTANT / SUBCONSULTANT: DIBBLE & ASSOCIATES

PROJECT NAME: ANDORA HILLS WASH FLOODPLAIN DELINEATION

CONTRACT NO.: FCD 99-14

CHANGE ORDER NO.: N/A

DIRECT LABOR:

| Classifications | Manhours | Hourly Rates | Labor Costs |
|-----------------|----------|--------------|-------------|
| Principal | 0 | N/A | \$0.00 |
| Project Manager | 133 | \$28.50 | \$3,790.50 |
| Engineer | 0 | N/A | \$0.00 |
| EIT/CADD | 194 | \$20.27 | \$3,932.38 |
| Administrative | 6 | \$15.18 | \$91.08 |
| Survey Crew | 0 | N/A | \$0.00 |

Total Labor \$7,813.96

OVERHEAD @ 150.92% (of Labor) \$11,792.83

Subtotal \$19,606.79

DIRECT AND OUTSIDE EXPENSES

| | | | |
|-----------------------------------|-------------|--------|----------|
| Transportation | 470 MILES @ | \$0.31 | \$145.70 |
| Reproduction | | | \$124.83 |
| As-built/Utility Drawings Charges | | | \$0.00 |
| Legal Advertising | | | \$0.00 |

Subtotal \$270.53

SUBCONSULTANTS

| <u>Name</u> | | <u>Cost</u> | |
|-------------|---|-------------|--|
| None | | \$0.00 | |
| | 0 | \$0.00 | |
| | 0 | \$0.00 | |
| | | | Subtotal <u>\$0.00</u> |
| | | | Subtotal Labor <u>\$19,606.79</u> |
| | | | Subtotal Expenses <u>\$270.53</u> |
| | | | Subtotal Subconsultants <u>\$0.00</u> |
| | | | Subtotal Allowances <u>\$0.00</u> |
| | | | Total Consultant Cost <u>\$19,877.32</u> |
| | | | Net Fee, Subtotal Labor x 10.00% <u>\$1,960.68</u> |
| | | | TOTAL PROPOSED FEE <u>\$21,838.00</u> |

Richard J. Perry
Signature

President
Title

6.25.99
Date

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONSULTANT / SUBCONSULTANT ESTIMATED MANHOURS AND DIRECT LABOR

CONSULTANT / SUBCONSULTANT NAME: **DIBBLE & ASSOCIATES CONSULTING ENGINEERS**

CONTRACT NO.: FCD 99-14

PROJECT NAME: **ANDORA HILLS WASH FLOODPLAIN DELINEATION**

CHANGE ORDER NO.: N/A

DATE: 25-Jun-99

DIRECT LABOR CLASSIFICATIONS

| CONTRACT TASK/PHASE | PRINCIPAL N/A | PROJECT MANAGER \$28.50 | ENGINEER N/A | EIT/ CADD \$20.27 | ADMIN \$15.18 | SURVEY CREW N/A | TOTAL HOURS | SUBTASK LABOR | TASK LABOR |
|--|------------------|-------------------------------|-----------------|-------------------------|------------------|-----------------------|----------------|------------------|---------------|
| <u>TASK 1- COORDINATION</u> | | | | | | | | | |
| 1.1 Project Schedule | | | | | | | 0 | \$0 | |
| 1.2 Coordination Meetings | | | | | | | 0 | \$0 | |
| 1.3 Billing Estimates | | | | | | | 0 | \$0 | |
| 1.4 Monthly Progress Reports | | | | | | | 0 | \$0 | |
| 1.5 Legal Advertising | | | | | | | 0 | \$0 | |
| 1.6 Notify Property Owners | | | | | | | 0 | \$0 | |
| 1.7 Public Works Coordination | | | | | | | 0 | \$0 | |
| 1.8 Public Meetings | | | | | | | 0 | \$0 | \$0 |
| <u>TASK 2- DATA COLLECTION</u> | | | | | | | | | |
| 2.1 Collect & Review Data | | | | | | | 0 | \$0 | |
| 2.2 Data Collection Report | | | | | | | 0 | \$0 | \$0 |
| <u>TASK 3- TOPOGRAPHIC MAPPING</u> | | | | | | | | | |
| 3.1 Aerial Mapping Coordination | | | | | | | 0 | \$0 | \$0 |
| <u>TASK 4- FIELD SURVEY</u> | | | | | | | | | |
| 4.1 Field Survey Coordination | | | | | | | 0 | \$0 | \$0 |
| <u>TASK 5- HYDROLOGY</u> | | | | | | | | | |
| 5.1 HEC-1 Modeling | | | | | | | 0 | \$0 | |
| <u>TASK 6- FLOODPLAIN DELINEATION</u> | | | | | | | | | |
| 6.1 HEC-RAS Modeling | | 32 | | 50 | | | 82 | \$5,315 | |
| 6.4 HEC-RAS Refinements | | 10 | | 12 | | | 22 | \$1,458 | |
| 6.5 Floodway Determination | | 22 | | 50 | | | 72 | \$4,528 | |
| 6.7 Field Reconnaissance | | 18 | | 24 | | | 42 | \$2,759 | |
| 6.8 Cross-Sections | | 14 | | 24 | | | 38 | \$2,444 | |
| 6.9 Bridge & Culvert Modeling | | 12 | | 24 | | | 36 | \$2,287 | |
| 6.10 Ponding Area Analysis | | | | | | | 0 | \$0 | |
| 6.11 Flood Zone Determination | | 1 | | 4 | | | 5 | \$302 | |
| 6.12 Floodplain/Floodway Area | | | | | | | 0 | \$0 | |
| 6.13 Technical Data Notebook | | 8 | | 4 | 4 | | 16 | \$1,021 | \$20,113 |
| <u>TASK 7- HIS DATA</u> | | | | | | | | | |
| 7.1 HIS Preparation | | | | | | | 0 | \$0 | \$0 |
| <u>TASK 8- DELIVERABLES</u> | | | | | | | | | |
| 8.1 FEMA Submittal | | 12 | | | 2 | | 14 | \$1,028 | |
| 8.2 Final Submittal | | 4 | | 2 | | | 6 | \$427 | \$1,454 |
| TOTAL HOURS | 0 | 133 | 0 | 194 | 6 | 0 | 333 | | |



7206 N. 55th AVE. SUITE 201
 GLENDALE, ARIZONA 85301
 PH. 934-7200 FAX 934-2326

file no.92731-2

June 25, 1999

Jonathon E. Fuller
 JE Fuller/Hydrology & Geomorphology, Inc.
 583 West Magdalena
 Tempe, AZ 85283

RE: Flood mapping for Andora Hills

Dear Jonathan

M&B Aerial Mapping greatly appreciates the opportunity to present the following proposal for aerial photography and digital mapping on the project noted above.

Floodplain Delineation Study Reach

- 1. Fly 1:7200 Black and white stereo photography.
- 2. Supply two sets of contact prints.
- 3. Cost for these services \$1425.00
- 4. Compile DTM data at 1"=200' scale mapping specs and interpolate 2' contours.
- 5. Cost for these services \$12,185.00
- 6. Edit mapping data, and build translators.
- 7. Supply overall AutoCad files to HIS specs.
- 8. Miscellaneous admin hours.
- 9. Cost for these services \$2,290.00

Supplemental Floodplain Delineation Study Reach

- 1. Fly 1:7200 Black and white stereo photography.
- 2. Supply two sets of contact prints.
- 3. Cost for these services \$525.00
- 4. Compile DTM data at 1"=200' scale mapping specs and interpolate 2' contours.
- 5. Cost for these services \$4,850.00
- 6. Edit mapping data, and build translators.
- 7. Supply overall AutoCad files to HIS specs.
- 8. Miscellaneous admin hours.
- 9. Cost for these services \$1,170.00

Ortho Photo's

1. Fly 1:24000 stereo black and white photography.
2. Supply two sets of contact prints.
3. With the use of new mapping data and DEM data supplied by the flood district, we will provide 13 tiles of sections or partial sections in ortho photo format with 2'x2' pixal resolution on CDROM.
4. Cost for these services \$1,750.00

Photo Mylars

1. By using existing 1:24000 photography.
2. Provide photo mylars that match the mapping sheets. (approximately 8 sheets)
3. Cost per photo mylar \$165.00

This overall project will require 38 aerial targets, and we would require a eight or nine week schedule.

All mapping will meet or exceed requirements set by the National Map Accuracy Standards, and is based on the coordinate system supplied by the surveyor.

We will require payment for services rendered net 30 days after delivery unless otherwise specified.

If you have any questions, please call.

Sincerely;

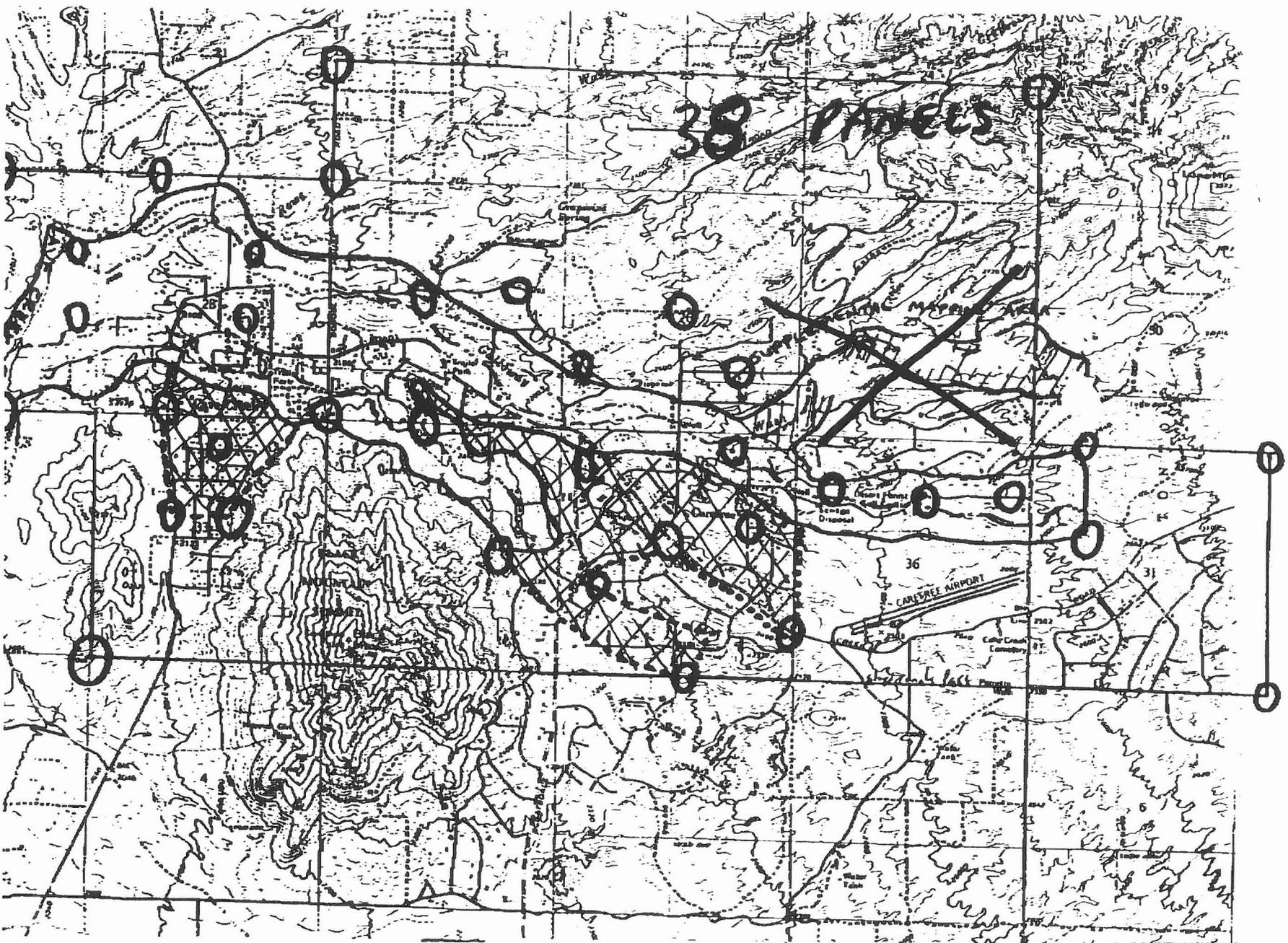


Robert J. Moon/Owner-Operator
M&B Aerial Mapping, LLC

Accepted by;

Jonathon E. Fuller
JE FULLER/HYDR.&GEO., INC.

38 PANELS



↑ 1:24000 @ 70% REDUCTION
 NORTH (CAROLINA QUAD)

—— 2FT CONTOUR INTERVAL
 MAPPING LIMITS

—— LIMIT OF DIGITAL
 ORTHOPHOTOGRAPHY

▨▨▨▨ SUPPLEMENTAL
 MAPPING AREA
 (2FT. C.I.)

--- FLOODPLAIN MAPPING
 REACH

EXHIBIT 1

FCD 99.14

CONSULTANT/SUBCONSULTANT COST PROPOSAL SUMMARY

CONSULTANT/SUBCONSULTANT: M&B AERIAL MAPPING, LLC
 PROJECT NAME: Floodplain Delineation Study of Andorra Hills and Gullaway Wa
 CONTRACT NO.: FCD 98-14
 CHANGE ORDER NO.: N/A

DIRECT LABOR:

| Classifications | Manhours | Hourly Rates | Labor Costs |
|------------------|----------|--------------|-------------|
| Project Manager | 22 | \$25.00 | \$550 |
| Computer | 240 | \$18.00 | \$3,640 |
| Tech/CAD | 62 | \$12.00 | \$744 |
| Support Services | 13 | \$10.00 | \$130 |
| - | 0 | \$0.00 | \$0 |
| - | 0 | \$0.00 | \$0 |

Total Labor \$6,284

OVERHEAD @ 180.00% (of Labor) \$7,898

Subtotal \$13,180

DIRECT AND OUTSIDE EXPENSES
 Photo Meters

1320

Subtotal 1320

| Name | Cost |
|----------------------------------|------------|
| Kennedy Aerial (flying & photos) | \$1,424.00 |
| DMA (ortho's) | \$1,750.00 |

Subtotal \$3,174.00

Subtotal Labor \$13,180.00

Subtotal Expenses \$1,320.00

Subtotal Subconsultants \$3,174.00

Subtotal Allowances \$0.00

Total Consultant Cost \$17,894.00

Net Fee, Subtotal Labor @ 10.00% \$1,318.00

TOTAL PROPOSED FEE \$18,979.00

Robert J. Mon
 Signature

OWNER
 Title

6-28-99
 Date

**EXHIBIT C
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONSULTANT/SUBCONSULTANT ESTIMATED MANHOURS AND DIRECT LABOR**

CONSULTANT/SUBCONSULTANT NAME: M&B AERIAL MAPPING, LLC

CONTRACT NO.: FCO 98-14

PROJECT NAME: Floodplain Delineation Study of Andorra Hills and Galloway Washes

CHANGE ORDER NO.: N/A

DATE: June 26, 1998

DIRECT LABOR CLASSIFICATIONS

| CONTRACT TASK/PHASE | PROJECT MANAGER \$25.00 | COMPILER \$16.00 | TECH/ CADD \$12.00 | SUPPORT SERVICES \$10.00 | | TOTAL HOURS |
|---|-------------------------------|---------------------|--------------------------|--------------------------------|---------------|-----------------|
| TASK 1: OPERATIONAL | | | | | | |
| 1.1 Project Schedule | | | | | | 0 |
| 1.2 Construction Meeting | | | | | | 0 |
| 1.3 Billing Estimates | | | | | | 0 |
| 1.4 Meeting Preparation | | | | | | 0 |
| 1.5 Legal Advertising | | | | | | 0 |
| 1.6 Study Permit/Construction | | | | | | 0 |
| 1.7 Public Works Coordination | | | | | | 0 |
| 1.8 Public Meetings | | | | | | 0 |
| TASK 2: DATA COLLECTION | | | | | | |
| 2.1 Collect & Review Data | | | | | | 0 |
| 2.2 Data Collection | | | | | | 0 |
| TASK 3: TECHNICAL COORDINATION | | | | | | |
| 3.1 Aerial Mapping Coordination | | 14 | | | | 14 |
| TASK 4: FIELD SURVEY | | | | | | |
| 4.1 Field Survey | | | | | | 0 |
| TASK 5: HYDROLOGIC MODELING | | | | | | |
| 5.1 HEC-1 Modeling | | | | | | 0 |
| 5.2 Data Collection | | | | | | 0 |
| 5.3 Output Verification | | | | | | 0 |
| 5.4 Hydrologic Report | | | | | | 0 |
| TASK 6: FLOODPLAIN DELINEATION | | | | | | |
| 6.1 Floodplain Delineation | | | | | | 0 |
| 6.2 Floodplain Delineation | | | | | | 0 |
| 6.3 Floodplain Delineation | | | | | | 0 |
| 6.4 HEC 2 Refinements | | | | | | 0 |
| 6.5 Floodplain Delineation | | | | | | 0 |
| 6.6 Field Reconnaissance | | | | | | 0 |
| 6.7 Bridge & Culvert Modeling | | | | | | 0 |
| 6.8 Floodplain Delineation | | | | | | 0 |
| 6.9 Floodplain Delineation | | | | | | 0 |
| 6.10 Floodplain Delineation | | | | | | 0 |
| 6.11 Floodplain Delineation | | | | | | 0 |
| 6.12 Floodplain Delineation | | | | | | 0 |
| 6.13 Technical Data Notebook | | | | | | 0 |
| TASK 7: HIS DATA | | | | | | |
| 7.1 HIS DATA | | | | | | 0 |
| 7.2 HIS DATA | | | | | | 0 |
| 7.3 HIS DATA | | | | | | 0 |
| 7.4 HIS DATA | | | | | | 0 |
| 7.5 HIS DATA | | | | | | 0 |
| 7.6 HIS DATA | | | | | | 0 |
| 7.7 HIS DATA | | | | | | 0 |
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| 7.11 HIS DATA | | | | | | 0 |
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| 7.96 HIS DATA | | | | | | 0 |
| 7.97 HIS DATA | | | | | | 0 |
| 7.98 HIS DATA | | | | | | 0 |
| 7.99 HIS DATA | | | | | | 0 |
| 7.100 HIS DATA | | | | | | 0 |
| TOTAL HOURS | 22 | 248 | 82 | 13 | 30 | 337 |
| HOURLY RATE | \$25.00 | \$16.00 | \$12.00 | \$10.00 | \$0.00 | \$0.00 |
| DIRECT LABOR | \$550 | \$3,968 | \$,744 | \$130 | \$0 | \$5,292 |
| OVERHEAD (PERCENT OF LAB) | \$625 | \$5,760 | \$1,116 | \$150 | \$0 | \$7,651 |
| COST (DIR LABOR + O.M.) | \$1,175 | \$9,728 | \$1,860 | \$280 | \$0 | \$12,143 |
| EXPENSES | | | | | | |
| Photo Mylar | | | | | | \$1,320 |
| Kennedy Aerial (Flying & photos) | | | | | | \$1,424 |
| DMA (orders) | | | | | | \$1,780 |
| SUB-TOTAL | | | | | | \$14,667 |
| TOTAL | | | | | | \$17,054 |
| PROFIT (10% of Direct Labor Plus Overhead) | | | | | | 1,316 |
| GRAND TOTAL | | | | | | \$18,370 |



1920 WEST PEORIA AVENUE ■ PHOENIX, AZ 85029 ■ TEL (602) 906-0020 ■ FAX (602) 906-0019

1802 W. GRANT AVE., STE. 110-5 ■ TUCSON, AZ 85745 ■ TEL (520) 623-8503 ■ FAX (520) 623-8504

June 25, 1999

Mr. Brooks Dillard
JE Fuller/Hydrology & Geomorphology, Inc.
583 West Magdalena Street
Tempe, AZ 85283
602-752-2124
602-839-2193 fax

Loretta G. Wahl
President/CEO

David A. Rhine, PRLS
Executive Vice President

Stone E. Wahl, PRLS
Executive Vice President

**RE: SURVEY CONTROL for ANDORA HILLS & GALLOWAY WASHES
(FCD 99-14) REVISED PROPOSAL**

Per your RFP on the above referenced project, the following is our estimate for survey services and aerial ground control:

Table 1. Cost Proposal Format

AREA: Floodplain Delineation Study Research
MAP PRODUCT: Survey Control for Task 4
COST for SURVEY = \$ 9310.00 (19 points)

AREA: Supplemental Floodplain Delineation Study Research
MAP PRODUCT: Survey Control for Task 4
COST of SURVEY = \$ 3950.00 (6 points)

AREA: Digital Orthophotography
MAP PRODUCT: Survey Control
COST of SURVEY = \$ 4740.00 (16 points)

AREA: 10 box culvert / bridge location as-builds
MAP PRODUCT: Survey Data Collection Control
COST of SURVEY = \$ 4050.00 (estimate 30 hours)

Should you have any questions, please call me at 906-0020 office or 725-6152 mobile.

Respectfully:

Harold N. "Hal" Epperson PRLS
GIS/Survey Manager

CONSULTANT/SUBCONSULTANT COST PROPOSAL SUMMARY

CONSULTANT/SUBCONSULTANT: A TEAM PROFESSIONAL ASSOCIATES
 PROJECT NAME: Floodplain Delineation Study of Andorra Hills and Galloway Wash
 CONTRACT NO.: FCD 99-14
 CHANGE ORDER NO.: N/A

DIRECT LABOR:

| Classifications | Manhours | Hourly Rates | Labor Costs |
|----------------------------|----------|--------------|-------------|
| Project Manager/RLS | 45 | \$38.58 | \$1,736 |
| GPS Coordinator/Crew Chief | 81 | \$30.40 | \$2,462 |
| GPS Tech III/Survey Tech | 95 | \$20.50 | \$1,948 |
| Office Survey Tech | 18 | \$24.21 | \$436 |
| — | 0 | \$0.00 | \$0 |
| — | 0 | \$0.00 | \$0 |

| | | |
|------------|----------------------------------|-----------------|
| | Total Labor | \$6,582 |
| OVERHEAD @ | 150.00% (of Labor) | \$9,873 |
| | Subtotal | \$16,454 |
| | Net Fee, Subtotal Labor x 10.00% | \$1,645 |
| | TOTAL PROPOSED FEE | \$18,100 |

EXHIBIT C
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONSULTANT/SUBCONSULTANT ESTIMATED MANHOURS AND DIRECT LABOR

CONSULTANT/SUBCONSULTANT NAME: A TEAM PROFESSIONAL ASSOCIATES

CONTRACT NO: FCD 99-14

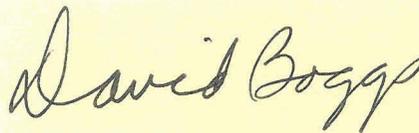
PROJECT NAME: Floodplain Delineation Study of Andorra Hills and Galloway Washes

CHANGE ORDER NO: N/A

DATE: JULY 21, 1999

DIRECT LABOR CLASSIFICATIONS

| CONTRACT TASK/PHASE | PROJECT MANAGER/RLS \$38.58 | GPS Coord/ Crew Chief \$30.40 | GPS Tech/ Survey Tech \$20.50 | Office Survey Tech \$24.21 | | | TOTAL HOURS |
|---|-----------------------------------|-------------------------------------|-------------------------------------|----------------------------------|--------|--------|----------------|
| TASK 1- COORDINATION | | | | | | | |
| 1.1 Project Schedule | | | | | | | 0 |
| 1.2 Coordination Meetings | | | | | | | 0 |
| 1.3 Billing Estimates | | | | | | | 0 |
| 1.4 Monthly Progress Reports | | | | | | | 0 |
| 1.5 Legal Advertising | | | | | | | 0 |
| 1.6 Notify Property Owners | | | | | | | 0 |
| 1.7 Public Works Coordination | | | | | | | 0 |
| 1.8 Public Meetings | | | | | | | 0 |
| TASK 2- DATA COLLECTION | | | | | | | |
| 2.1 Collect & Review Data | | | | | | | 0 |
| 2.2 Data Collection Report | | | | | | | 0 |
| TASK 3- TOPOGRAPHIC MAPPING | | | | | | | |
| 3.1 Aerial Mapping Coordination | | | | | | | 0 |
| 3.2 Data Collection and Editing | | | | | | | 0 |
| TASK 4- FIELD SURVEY | | | | | | | |
| Control for Delineation Study | 30 | 35 | 42 | 12 | | | 119 |
| Control for Orthophotography | 11 | 20 | 30 | 4 | | | 65 |
| 10 Box Cul/Bridge Location As-Builts | 4 | 28 | 23 | 2 | | | 55 |
| TASK 5- HYDROLOGY | | | | | | | |
| 5.1 HEC-1 Modeling | | | | | | | 0 |
| 5.2 Meetings/Field Trips | | | | | | | 0 |
| 5.5 Output Verification | | | | | | | 0 |
| 5.6 Streamgage Data | | | | | | | 0 |
| 5.8 Hydrologic Report | | | | | | | 0 |
| TASK 6- FLOODPLAIN DELINEATION | | | | | | | |
| 6.1 HEC-2 Modeling | | | | | | | 0 |
| 6.4 HEC-2 Refinements | | | | | | | 0 |
| 6.5 Floodway Determination | | | | | | | 0 |
| 6.7 Field Reconnaissance | | | | | | | 0 |
| 6.8 Cross-Sections | | | | | | | 0 |
| 6.9 Bridge & Culvert Modeling | | | | | | | 0 |
| 6.10 Ponding Area Analysis | | | | | | | 0 |
| 6.11 Flood Zone Determination | | | | | | | 0 |
| 6.12 Floodplain/Floodway Area | | | | | | | 0 |
| 6.13 Technical Data Notebook | | | | | | | 0 |
| TASK 7- HIS DATA | | | | | | | |
| 7.1 HIS Preparation | | | | | | | 0 |
| TASK 8- DELIVERABLES | | | | | | | |
| 8.1 FEMA Submittal | | | | | | | 0 |
| 8.2 Final Submittal | | | | | | | 0 |
| TOTAL HOURS | 45 | 81 | 95 | 18 | | | 239 |
| HOURLY RATE | \$38.58 | \$30.40 | \$20.50 | \$24.21 | \$0.00 | \$0.00 | |
| DIRECT LABOR | \$1,736 | \$2,462 | \$1,948 | \$436 | \$0 | \$0 | \$6,582 |
| OVERHEAD (PERCENT OF LAB) | \$2,604 | \$3,694 | \$2,921 | \$654 | \$0 | \$0 | \$9,873 |
| COST (DIR. LABOR + O.H.) | \$4,340 | \$6,156 | \$4,869 | \$1,089 | \$0 | \$0 | \$16,454 |
| SUBCONSULTANTS | | | | | | | |
| SUB-TOTAL | | | | | | | \$0 |
| TOTAL | | | | | | | \$16,454 |
| PROFIT (10% of Direct Labor Plus Overhead) | | | | | | | 1,645 |
| GRAND TOTAL | | | | | | | \$18,100 |



September 8, 1999

Brian R. Iserman, P.E.
Vice President
JE Fuller/Hydrology & Geomorphology, Inc.
5235 S. Kyrene Rd., Suite 205
Tempe, AZ 85283

SUBJECT: Contract FCD 99-14
Andora Hills and Galloway Washes FDS

Congratulations on award of the subject contract. This will confirm the verbal notice to proceed with contract performance on September 3, 1999 and complete the contract requirements within 500 calendar days, for a completion date of January 15, 2001.

A fully executed copy of the contract is enclosed. A review of the insurance coverage for this contract shows that the general liability and automobile liability will expire on October 7, 1999. **A Certificate of Insurance indicating that coverage had been renewed was due 30 days prior to expiration.** We will appreciate your prompt attention to this matter.

The Flood Control District welcomes your participation as a Consultant to the District and we look forward to a mutually beneficial contract agreement. We want to remind you, at this very early stage of award, of the importance we at the District place upon the contract completion date. Maintaining schedule milestones is imperative in meeting the District's planning and future funding goals. Your contract completion date is not only a contractual requirement, but is also a commitment on the part of your firm. Throughout the term of the contract it must be treated with a high degree of importance. We expect and anticipate that this will be the case.

Again, we welcome your participation as a Flood Control District Consultant and look forward to an enjoyable and profitable relationship.

Sincerely,



Dortha Klaahsen
Contracts Specialist

Enclosures

Agenda Activity: Action
 Department: Flood Control District
 Category: Flood Control District
 Contact: David Boggs
 Return to: Dortha Klaahsen
 Location: FLOOD CONTROL OFFICE BLDG

Agenda Number: C-99-00-030-5-00
 Phone: 506-4528
 Phone: 506-4433
 Continued from:

Action Requested:

Award Contract FCD 99-14 to J E Fuller Hydrology & Geomorphology, Inc. for a lump sum fee of \$132,018.00 to provide a Floodplain Delineation Study of Andora Hills and Galloway Washes. The contract will be completed within 500 calendar days from the notice to proceed. The detailed delineation of these two washes is strategically important to both Towns of Carefree and Cave Creek.

Complete description of action requested:

This study provides for delineation of the 100-year floodplain in Andora Hills Wash from its confluence with Cave Creek, upstream 2.8 miles to Carefree Drive at Lazy Burro Road, and Galloway Wash from its confluence with Cave Creek, upstream 4.8 miles to 1/8 mile west of Pima Road. Development is proceeding rapidly in both towns, and the previous studies have been inadequate to regulate new development due to the fact that they lack sufficient detail and have become outdated by recent drainage modifications. The Consultant will prepare new hydrology, aerial photography, and detailed topographic mapping in areas adjacent to Galloway and Andora Hills Washes, including computer-simulation of the geographic extent of flooding for the 100-year flood. The study results will be used to regulate development, ensure adequate drainage easements are maintained, minimize flood damages to new and existing structures, and identify needs for capital improvements to remediate any existing flooding threats. The services are being procured under Maricopa County Procurement Code, Article 5, Para 504.D.5. The study area covers both Districts 2 and 3, in nearly equal proportions.

Expenditure Impact by FY(s):

FY 99/00 - \$100,000.00 estimated; FY 00/01 - 32,018.00 estimated

| | |
|--|-----|
| Routing: Meeting Date: 09/01/1999 | |
| Legend X=Pending A=Approved R=Rejected | |
| LEGAL | OMB |
| A | A |

70

