CITY OF PHOENIX, ARIZONA

OFFICE OF THE CITY ENGINEER

PROJECT SPECIFICATIONS AND CONTRACT DOCUMENTS

RIVERVIEW DRIVE 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS
PROJECT NO. ST85110072 - 2

MAYOR

GREG STANTON

CITY COUNCIL

DISTRICT NO. 1 – THELDA WILLIAMS
DISTRICT NO. 2 – JIM WARING
DISTRICT NO. 3 – DEBRA STARK
DISTRICT NO. 4 – LAURA PASTOR
DISTRICT NO. 5 – DANIEL VALENZUELA
DISTRICT NO. 6 – SAL DICICCIO
DISTRICT NO. 7 – MICHAEL NOWAKOWSKI
DISTRICT NO. 8 – KATE GALLEGO

CITY MANAGEMENT

CITY MANAGER — ED ZUERCHER
CITY ENGINEER — KINI L. E. KNUDSON, PE

Registered Professional Engineer (Civil)
CERTIFICATE NO.
41941
ANTHONY K.
HUMPHREY
Date Signed 3/14/18
ARIZONA U.S.A.
Expires 3/31/20

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Registered Professional Engineer (Civil)
CERTIFICATE NO
41941
ANTHONY K.
HUMPHREY
Date Signed 3/16/18
ARIZONA U.S.A.
Exp 3/31/20

CALL FOR BIDS

CITY OF PHOENIX
RIVERVIEW DRIVE 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS
DESIGN-BID-BUILD

PROJECT NO. ST85110072-2

BIDS WILL BE DUE: TUESDAY, APRIL 10, 2018 AT 2:00 P.M., PHOENIX TIME
PHOENIX CITY HALL
200 W. WASHINGTON STREET, 6th FLOOR
PHOENIX, AZ. 85003-1611

The City of Phoenix is seeking a qualified construction contractor to perform the project listed below.

SCOPE OF WORK

The Riverview Drive Project consists of constructing roadway improvements from 18th Place to 22nd Street over the existing ADOT Outfall channel. The work includes constructing a new Concrete Box Culvert; Concrete Parapet Walls; Concrete Retaining Walls with Rustication Finish; Concrete Headwalls; Concrete Curb and Curb & Gutter; Concrete Sidewalk; Concrete Driveways; Subgrade Preparation; new Asphaltic Concrete Pavement; 24" Storm Drain Mainline Pipe; 18" Connector Pipe; Catch Basins; Storm Drain Manholes - Per Special Detail; Installation of New LED Street Lights and Poles; Trenching for Underground Street Light Circuits; Architectural Gabion Basket Planters and Gabion Walls; Architectural Decorative Wave Fencing; Hydroseeding; Decomposed Granite; Landscaping and Irrigation System and various other Miscellaneous Items.

The Engineer's Estimate is $2,506,100 to $3,063,012.

A Small Business Enterprise goal of 12% has been established for this project.

PRE-BID MEETING

A pre-bid meeting will be held on Friday, March 23, 2018, at 11:00 a.m., Phoenix time, at Design and Construction Management (DCM), Gecko Conference Room, located at 1034 E. Madison Street, Phoenix, AZ 85034. At this meeting, staff will discuss the scope of work, general contract issues and respond to questions from the attendees. As City staff will not be available to respond to individual inquiries regarding the project scope outside of this pre-bid meeting, it is strongly recommended that interested firms send a representative to the pre-bid meeting.

REQUEST FOR BID PACKET

The bid packet will be available for download on the City of Phoenix Design and Construction Procurement's "Current Opportunities" web page as of Thursday, March 15, 2018. The web address is:

https://www.phoenix.gov/streets/procurement/current-opportunities

Firms receiving a copy of the bid packet through any other means must download the bid packet from the City webpage and register as a plan holder for the project. The plan holder list is available for viewing within the project folder.

GENERAL INFORMATION

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

The City of Phoenix will provide reasonable accommodations for alternate formats of the bid packet by calling Michael Soto III at (602) 256-5692 or calling TTY System (602) 256-4286. Requests will only be honored if made within the first week of the advertising period. Please allow a minimum of seven calendar days for production.

Questions pertaining to process or contract issues should be directed to Michael Soto III at (602) 256 - 5692 or email (preferred) michael.soto@phoenix.gov

Ed Zuercher, City Manager

Kini L. E. Knudson, PE, City Engineer

Published: Arizona Business Gazette
Date: March 15, 2018
Date: March 22, 2018
(District 8)

INFORMATION FOR BIDDERS

1. 102 BIDDING REQUIREMENTS AND CONDITIONS, Add the following to MAG and COP Supplement to MAG Section 102 BIDDING REQUIREMENTS AND CONDITIONS:

INFORMATION FOR BIDDERS

A. QUESTIONS ON PLANS AND SPECIFICATIONS

Neither the Engineer nor the City of Phoenix will be held responsible for any oral instructions. Any changes to the plans and specifications will be in the form of an addendum. All Addenda will be posted online within the project folder at the following website:

https://www.phoenix.gov/streets/procurement/current-opportunities

A Planholder List is available within the project folder on the Street Transportation Department website under "Current Opportunities". The web address is:

https://www.phoenix.gov/streets/procurement/current-opportunities

For additional information prior to submitting your bid, contact:

Plans, Technical/Special Provisions, Proposal or Specifications:
NAME: Michael Soto III, Design and Construction Procurement
ADDRESS: 200 W. Washington Street, 6th Floor, Phoenix, AZ 85003-1611
PHONE: (602) 256-5692 E-MAIL: michael.soto@phoenix.gov

SBE Utilization contact:
Equal Opportunity Department: (602) 262-6790

All questions regarding the plans and specifications must be received (in writing) at a minimum 7 calendar days prior to bid opening. Questions received after that time may not be given any consideration.

B. REQUEST FOR SUBSTITUTIONS

Paragraph A, B, and C of MAG Section 106.4 are deleted and the following paragraphs substituted:

1. The Engineer will consider written request(s), by a prime bidder only, for substitution(s) which is/are considered equivalent to the item(s) specified in the Contract documents. The written request will be considered only if it is received at least twelve (12) calendar days prior to the established bid date. Notification of acceptable substitutions will be made by addendum issued no fewer than 7 calendar days prior to the established bid date. (A.R.S. 34-104)

2. The prime bidder, at his own expense, will furnish the necessary data of substitution and validate that the physical, chemical, and operational qualities of each substitute item is such that this item will fulfill the originally specified required function.

3. The substitution, if approved, will be authorized by a written addendum to the Contract documents and will be made available to all bidders. The bid date and the scheduled completion time will not be affected by any circumstances developing from this substitution.

4. The request will be submitted to Design and Construction Procurement, Attention Michael Soto III,

Sixth Floor, Phoenix City Hall, 200 W. Washington Street, Phoenix, Arizona 85003-1611 or via email to michael.soto@phoenix.gov.

C. BID BOND

Bidders must submit a properly completed proposal guarantee, certified check, cashier's check or on the surety bond provided, for an amount not less than ten (10) percent of the total amount bid included in the proposal as a guarantee that the contractor will enter into a contract to perform the proposal in accordance with the plans and specifications. Surety bonds submitted for this project will be provided by a company which has been rated "A- or better for the prior four quarters" by the A.M. Best Company. *A bid will be deemed non-responsive if not accompanied by this guarantee.*

The surety bond will be executed solely by a surety company or companies holding a certificate of authority to transact surety business in the State of Arizona, issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1. The surety bond will not be executed by an individual surety or sureties even if the requirements of Section 7-101 are satisfied. The City Clerk will return the certified check, cashiers check, or surety bond to the contractors whose proposals are not accepted, and to the successful contractor upon the execution of a satisfactory bond and contract.

When providing a Surety Bond, *failure to provide an "A- or better for the prior four quarters" bond will result in bid rejection.*

D. LIST OF MAJOR SUBCONTRACTORS AND SUPPLIERS & LIST OF ALL SUBCONTRACTORS AND SUPPLIERS

A bid will be deemed non-responsive if not accompanied by a properly completed and signed "List of Major Subcontractors and Suppliers" form.

To assist in eliminating the practice of bid shopping on City construction projects, the bidder will list all Major Subcontractors and Suppliers (including SBE) to whom the bidder intends to contract with that are equal to or greater than 5% of the base bid. The list of major subcontractors and suppliers will be provided on the "List of Major Subcontractors" form. *Failure to properly complete and sign this form will result in bid rejection*. This form is due with the bid.

If substantial evidence exists that bid shopping occurred on this project, the Bidder will be ineligible to bid on City construction projects for a period of one year.

The list of All Subcontractors and Suppliers will be provided on the "List of All Subcontractors and Suppliers" form. *Failure to properly complete and sign this form will result in bid rejection.* This form is due 3 days after bid opening by 5:00 p.m. A bid will be deemed non-responsive if a properly completed and signed "List of All Subcontractors and Suppliers" form is not submitted.

E. BID SUBMITTAL

The properly completed bid documents along with the ten (10) percent bid guarantee will be submitted in a sealed envelope. The outside of the envelope will be marked as follows:

Bid of (Firm's Name, Address and Phone Number)_____
For: RIVERVIEW DRIVE 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS
City of Phoenix Project Number: ST85110072 - 2
Sealed bids will be submitted to the bid box located by the Design and Construction Procurement

Reception Desk located on the Sixth Floor of the Phoenix City Hall Building, 200 W. Washington Street, Phoenix, Arizona, 85003 prior to the time and date specified for bid opening.

F. BID WITHDRAWALS

MAG Section 102-10, Withdrawal or Revision of Proposal, is herby deleted and the following paragraph is submitted:

"No bidder may withdraw or revise a proposal after it has been deposited with the City except as provided in Phoenix City Code Chapter 2, Section 190.2. Proposals, read or unread, will not be returned to the bidders until after determination of award has been made.

G. ADDENDA

Acknowledge all addenda; a bid will be deemed non-responsive if all issued addenda for this project are not acknowledged in writing on Page P. -1.

The City of Phoenix will not be responsible for any oral responses or instructions made by any employees or officers of the City of Phoenix regarding bidding instructions, plans, drawings, specifications or contract documents. A verbal reply to an inquiry does not constitute a modification of the Invitation for Bid (IFB). Any changes to the plans, drawings and specifications will be in the form of an addendum.

It will be the responsibility of the prospective bidder to determine, prior to the submittal of its bid, if any addenda to the project have been issued by the Street Transportation Department Contract Procurement Section. All addenda issued will be acknowledged by the bidder on Page P-1. All addenda (if any) will be available online within each project's folder at the following website:

https://www.phoenix.gov/streets/procurement/current-opportunities

The contractors and/or consultants are responsible for ensuring they have all addenda and/or notifications for all projects they are submitting on. Prospective bidders are strongly encouraged to check the Street Transportation Department Contract Procurement website in order to ascertain if any addenda have been issued for the project.

H. BID SUBMITTAL CHECKLIST

BID SUBMITTAL CHECKLIST

This checklist is provided to remind bidders of several of the required elements of the bid packages. It is not intended to be a comprehensive list of all of the contract documents. Bidders are encouraged to review all of the Bid Instructions to determine compliance therein.

ALL FIRMS SHOULD BE REGISTERED IN THE CITY'S VENDOR MANAGEMENT SYSTEM PRIOR TO SUBMITTING A PROPOSAL. FOR NEW FIRMS - THE CITY WILL SEND AN EMAIL TO YOUR FIRM WITH A VENDOR NUMBER WITHIN TWO DAYS OF SUBMITTING THE REQUEST. THE VENDOR NUMBER NEEDS TO BE INCLUDED ON THE COVER OF THE STATEMENT OF QUALIFICATIONS OR ON THE BID PROPOSAL PACKAGE/ENVELOPE. INFORMATION ON HOW TO REGISTER WITH THE CITY IS AVAILABLE AT:

https://www.phoenix.gov/finance/vendorsreg

- Acknowledge all addenda? (Page P-1)
- Completed all of the Bid Proposal forms? (Pages P-1 to P-10 and P.S.-1)
- Included your Bid Bond (rated A- or better for the prior four quarters) or Guarantee Cashier's Check? (Page S.B.-1)
- Completed SBE Utilization form or a fully documented waiver package? (Page S.B.U.-1)
- Completed List of Major Subcontractors and Suppliers form? (Page L.O.S.-1)
- Completed Letter of Intent to Perform as Subcontractor/Supplier (L.O.I-1)

PLEASE DO NOT SUBMIT THE ENTIRE SPECIFICATION BOOK WHEN SUBMITTING YOUR BID. INCLUDE ONLY THE REQUIRED BIDDING DOCUMENTS.

POST-BID SUBMITTAL CHECKLIST

All bidders wishing to remain in contention for award of the contract must submit completed contracts documents listed below. The documents must be submitted to the Street Transportation Department Contract Procurement Section, 6th Floor, or can be sent by email to michael.soto@phoenix.gov.

- Completed List of All Subcontractors and Suppliers form (L.O.S.-2) (3 days after bid opening by 5:00 p.m.)
- Bidders Disclosure Statement? (Pages B.D.S.-1 to 4) (3 days after bid opening by 5:00 p.m.)
- Submit Affidavit of Identity (if you are a sole proprietor) (Page A.O.I. – 1) (3 days after bid opening by 5:00 p.m.)

I. CANCELLATION OF CONTRACT FOR CONFLICT OF INTEREST

All parties hereto acknowledge that this Agreement is subject to cancellation by the City of Phoenix pursuant to the provisions of Section 38-511, Arizona Revised Statutes.

J. CONTRACTOR'S LICENSE AND PRIVILEGE LICENSE AND CERTIFICATIONS

Prior to bidding on this project, the bidder must possess the correct license to perform the work described in the plans and specifications. Prior to award of the contract, the successful bidder must provide to the Contract Procurement Section its Contractor's License Classification and number, its City of Phoenix Privilege License number and Federal Tax Identification number.

Bidder will submit the Bidder's Disclosure Statement as set forth in Pages B.D.S. - 1 to B.D.S. - 4 within 3 days of bid opening by 5:00 p.m.

Unless provided otherwise in this solicitation, Bidder will be deemed non-responsive and the bid rejected if Bidder fails to possess the proper Contractor's and Business Licenses at the time of bid or fails to submit a substantially completed Bidder's Disclosure Statement as specified above.

K. TAX LIABILITIES; DISCLOSURE OF CONVICTIONS AND BREACH(S) OF CONTRACT

On or before the award of the contract for this project, the successful bidder will: (i) file all applicable tax returns and will make payment for all applicable State of Arizona and Maricopa County Transaction Taxes (ARS Sec. 41-1305) and City of Phoenix Privilege License Taxes (Phoenix City Code Sec.14-415); (ii) disclose any civil fines, penalties or any criminal convictions, other than for traffic related offenses, for violation of federal, state, county or city laws, rules or regulations including, but not limited to, environmental, OSHA, or labor compliance laws (collectively "Laws") by Bidder, Bidder's directors, managing members, responsible corporate officers or party who will be responsible for overseeing and administering this project (collectively "Bidder"); and (iii) disclose any material breach(s) of an agreement with the City of Phoenix, any termination for cause or any litigation involving the City of Phoenix occurring within the past three calendar years. Unless provided otherwise in this solicitation, the successful bidder will be deemed non-responsible and the bid rejected for any of the following: (i) Bidder's civil or criminal conviction, other than for traffic related offenses, for a violation of Laws within the past three calendar years; (ii) liability or culpability resulting in payment of fines or penalties in the cumulative total amount of $100,000 or greater for a violation of "Laws" within the past three calendar years; (iii) material breach of a City of Phoenix agreement, termination for cause or litigation with the City of Phoenix within the past three calendar years; and (iv) Bidder's failure to disclose the information as required by this provision. Further, after award of contract, in addition to any other remedy, Bidder's failure to remit proper taxes to the City of Phoenix may result in the City withholding payment pursuant to Phoenix City Charter Chapter XVIII, Section 14 until all delinquent taxes, interest, and penalties have been paid.

State and Local Transaction Privilege Taxes:

In accordance with applicable state and local law, transaction privilege taxes may be applicable to this transaction. The state and local transaction privilege (sales) tax burden is on the person who is conducting business in Arizona and the City of Phoenix. The legal liability to remit the tax is on the person conducting business in Arizona. Any failure by the Contractor to collect applicable taxes from the City will not relieve the Contractor from its obligation to remit taxes.

It is the responsibility of the prospective bidder to determine any applicable taxes. The City will look at the price or offer submitted and will not deduct, add or alter pricing based on speculation or application of any taxes, nor will the City provide advice or guidance.

If you have questions regarding your tax liability, please seek advice from a tax professional prior to submitting your bid. You may also find information at https://www.phoenix.gov/finance/plt or https://www.azdor.gov/Business.aspx. Once your bid is submitted, the Offer is valid for the time specified in this Solicitation, regardless of mistake or omission of tax liability.

If the City finds over payment of a project due to tax consideration that was not due, the Contractor will be liable to the City for that amount, and by contracting with the City agrees to remit any overpayments back to the City for miscalculations on taxes included in a bid price.

Tax Indemnification:

Contractor will, and require the same of all subcontractors, pay all federal, state and local taxes applicable to its operation and any persons employed by the Contractor. Contractor will, and require the same of all subcontractors, hold the City harmless from any responsibility for taxes, damages and interest, if applicable, contributions required under federal, and/or state and local laws and regulations and any other costs including transaction privilege taxes, unemployment compensation insurance, Social Security and Worker's Compensation.

Tax Responsibility Qualification:
Contractor may be required to establish, to the satisfaction of City, that any and all fees and taxes due to the City or the State of Arizona for any License or Transaction Privilege taxes, Use Taxes or similar excise taxes, are currently paid (except for matters under legal protest).

Contractor agrees to a waiver of the confidentiality provisions contained in the City Finance Code and any similar confidentiality provisions contained in Arizona statutes relative to State Transaction Privilege Taxes or Use Taxes.

Contractor agrees to provide written authorization to the City Finance Department and to the Arizona State Department of Revenue to release tax information relative to Arizona Transaction Privilege Taxes or Arizona Use Taxes in order to assist the Department in evaluating Contractor's qualifications for and compliance with contract for duration of the term of contract.

L. STANDARD SPECIFICATIONS AND DETAILS

Except as otherwise required in these specifications, bid preparation and construction of this project will be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Uniform Standard Details, latest revision, and the City of Phoenix Supplements to the MAG Uniform Standard Specifications and Details, latest revision.

M. PRECEDENCE OF CONTRACT DOCUMENTS

In case of a discrepancy or conflict, the precedence of contract documents is as follows:

1. Change Orders or Supplemental Agreements
2. Addenda
3. Contract Specifications/Special Provisions/Technical Provisions
4. The Plans
5. COP Supplement to MAG Standard Specifications and Details, latest revision
6. MAG Standard Specifications and Details, latest revision

The precedence of any Addenda falls within the category of which it represents.

N. CONFIDENTIALITY OF PLANS & SPECIFICATIONS

Any plans generated for this project must include the following statement in the Title Block on every page: "Per City of Phoenix City Code Chapter 2, Section 2-28, these plans are for official use only and may not be shared with others except as required to fulfill the obligations of Contractor's contract with the City of Phoenix."

O. AUDIT AND RECORDS

Records of the Contractor's direct personnel payroll, bond expenses, and reimbursable expenses pertaining to this Project, and records of accounts between the City and Contractor will be kept on the basis of generally accepted accounting principles and must be made available to the City and its auditors for up to three years following Final Acceptance of the Project.

The City, its authorized representative, and/or any federal agency, reserves the right to audit the Contractor's records to verify the accuracy and appropriateness of all cost and pricing data, including data used to negotiate the Contract and any change orders.

The City reserves the right to decrease Contract price and/or payments made on this Contract and/or request reimbursement from the Contractor following final contract payment on this Contract if, upon audit of the Contractor's records, the audit discloses the Contractor has provided false, misleading, or inaccurate cost and pricing data.

The Contractor will include a similar provision in all of its Agreements with subcontractors and suppliers providing services or supplying materials under the Contract Documents to ensure that the City, its authorized representative, and/or the appropriate federal agency has access to the Subcontractor's and Supplier's records to verify the accuracy of all cost and pricing data.

The City reserves the right to decrease the Contract price and/or payments made on this Contract and/or request reimbursement from the Contractor following final contract payment on this Contract if the above provision is not included in the Subcontractor's and Supplier's contracts, and one or more Subcontractors or Suppliers refuse to allow the City to audit their records to verify the accuracy and appropriateness of cost and pricing data.

If, following an audit of this Contract, the audit discloses the Contractor has provided false, misleading or inaccurate cost and pricing data, and the cost discrepancies exceed 1% of the total Contract billings, the Contractor will be liable for reimbursement of the reasonable, actual cost of the audit.

P. IMMIGRATION REFORM AND CONTROL ACT

Compliance with Federal Laws Required. Contractor understands and acknowledges the applicability of the Immigration Reform and Control Act of 1986 and the Drug Free Workplace Act to it. Contractor agrees to comply with these Federal Laws in performing under this Agreement and to permit City inspection of its personnel records to verify such compliance.

Q. LEGAL WORKER REQUIREMENTS

The City of Phoenix is prohibited by A.R.S. § 41-4401 from awarding a contract to any contractor who fails, or whose subcontractors fail, to comply with A.R.S. § 23-214(A). Therefore, Contractor agrees that:

1. Contractor and each subcontractor it uses warrants their compliance with all federal immigration laws and regulations that relate to their employees and their compliance with § 23-214, subsection A.

2. A breach of a warranty under paragraph 1 will be deemed a material breach of the contract that is subject to penalties up to and including termination of the contract.

3. The City of Phoenix retains the legal right to inspect the papers of any Contractor or subcontractor employee who works on the contract to ensure that the Contractor or subcontractor is complying with the warranty under paragraph 1.

R. CONTRACTOR AND SUBCONTRACTOR WORKER BACKGROUND SCREENING

Background Screening Requirements and Criteria

The City has established levels of risk and associated Background Screening. For Contractor services in the right-of-way, the risk level and Background Screening required is Minimum Risk. The risk level and background screening required for this project is Minimum.

Terms of This Section Applicable to all of Contractor's Contracts and Subcontracts Contractor will include the terms of this Section for Contract Worker Background Screening in all contracts and subcontracts for services furnished under this Agreement including, but not limited to, supervision and oversight services.

(1.) Contract Worker Background Screening

Contractor agrees that all contract workers and subcontractors (collectively "Contract Worker(s)") that Contractor furnishes to the City pursuant to this Agreement will be subject to background and security checks and screening (collectively "Background Screening") at Contractor's sole cost and expense as set forth in this Section. The Background Screening provided by Contractor will comply with all applicable laws, rules and regulations. Contractor further agrees that the Background Screening required in this Section is necessary to preserve and protect public health, safety and welfare. The Background Screening requirements set forth in this Section are the minimum requirements for this Agreement. The City in no way warrants that these minimum requirements are sufficient to protect Contractor from any liabilities that may arise out of Contractor's services under this Agreement or Contractor's failure to comply with this Section. Therefore, in addition to the specific measures set forth below, Contractor and its Contract Workers will take such other reasonable, prudent and necessary measures to further preserve and protect public health, safety and welfare when providing services under this Agreement. The City may, in its sole discretion, accept or reject any or all of the Contract Workers proposed by Contractor to perform work under this Agreement, as well those Contract Workers actually providing services during the term of this Agreement.

Minimum Risk Background Screening requirements include the following:

A Minimum Risk Background Screening will be performed when the Contract Worker: (i) will not have direct access to City facilities or information systems; or (ii) will not work with vulnerable adults or children; or (iii) when access to City facilities is escorted by City workers. The Background Screening for minimum risk will consist of the screening required by Arizona Revised Statutes §§ 41-4401 and following to verify legal Arizona worker status.

Standard Risk and Background Screening requirements include the following:

A Standard Risk Background Screening will be performed when the Contract Worker's work assignment will: (i) require a badge or key for access to City facilities; or (ii) allow any access to sensitive, confidential records, personal identifying information or restricted City information; or (iii) allow unescorted access to City facilities during normal and non-business hours. The Background Screening for this standard risk level will include the Background Screening required for the Minimum Risk level and a background check for real identity/legal name, and will include felony and misdemeanor records from any county in the United States, the state of Arizona, plus any other jurisdiction where the Contract Worker has lived at any time in the preceding seven (7) years from the Contract Worker's proposed date of hire.

Maximum Risk Background Screening requirements include the following:

A Maximum Risk Background Screening will be performed when the Contract Worker's work assignment will: (i) have any contact with vulnerable people such as children, youth, elderly, or individuals with disabilities; or (ii) have any responsibility for the receipt or payment of City funds or control of inventories, assets, or records that are at risk of misappropriation; or (iii) have unescorted access to City data centers, money rooms, or high-value equipment rooms; or (iv) have access to private residences; or (v) have access to Homeland Defense Bureau identified critical infrastructure

sites/facilities. The Background Screening for this maximum risk level will include the Background Screening required for the Standard Risk level, plus a sexual offender search, a credit check, and driving record search for the preceding seven (7) years from the Contract Worker's proposed date of hire. Contract Workers who work directly with children or vulnerable adults are also subject to fingerprint verification through the Arizona Department of Public Safety as mandated by Phoenix City Code, § 2-45.6.

Contractor Certification; City Approval of Maximum Risk Background Screening
By executing this Agreement, Contractor certifies and warrants that Contractor has read the Background Screening requirements and criteria in this Section, understands them and that all Background Screening information furnished to the City is accurate and current. Also, by executing this Agreement, Contractor further certifies and warrants that Contractor has satisfied all such Background Screening requirements for the Minimum Risk and Standard Risk Background Screenings as required. In addition, for Maximum Risk Background Screening, Contractor will furnish for the City's review and approval such Background Screenings for any Contract Worker considered for performing services under this Agreement where human safety or facility security is classified as a Maximum Risk level. The subject Contract Worker will not apply for the appropriate City of Phoenix identification and access badge or keys until Contractor has received the City's written acceptance of the subject Contract Worker's Maximum Risk Background Screening. A Contract Worker rejected for work at a Maximum Risk level under this Agreement will not be proposed to perform work under other City contracts or engagements without City's prior written approval.

(2.) Materiality of Background Screening Requirements; Indemnity
The Background Screening requirements of this Section are material to City's entry into this Agreement and any breach of this Section by Contractor will be deemed a material breach of this Agreement. In addition to the indemnity provisions set forth in Supplementary Conditions Section 7.G of this Agreement, Contractor will defend, indemnify and hold harmless the City for any and all Claims (as defined in Supplementary Conditions Section 7.G arising out of this Background Screening Section including, but not limited to, the disqualification of a Contract Worker by Contractor or the City for failure to satisfy this Section.

(3.) Continuing Duty; Audit
Contractor's obligations and requirements that Contract Workers satisfy this Background Screening Section will continue throughout the entire term of this Agreement. Contractor will notify the City immediately of any change to a Maximum Risk Background Screening of a Contract Worker previously approved by the City. Contractor will maintain all records and documents related to all Background Screenings and the City reserves the right to audit Contractor's compliance with this Section pursuant to Information for Bidders Section 1.M.

S. LAWFUL PRESENCE REQUIREMENT

Pursuant to A.R.S. §§ 1-501 and 1-502, the City of Phoenix is prohibited from awarding a contract to any natural person who cannot establish that such person is lawfully present in the United States. To establish lawful presence, a person must produce qualifying identification and sign a City-provided affidavit affirming that the identification provided is genuine. This requirement will be imposed at the time of contract award. This requirement does not apply to business organizations such as corporations, partnerships or limited liability companies.

T. LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

If practical, the contractor will provide an easily accessible area to serve the construction site that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, metals, and designate an area specifically for construction and demolition waste recycling. The contractor must provide documentation that the materials have been taken to a Maricopa County approved recycling facility.

U. NO ISRAEL BOYCOTT

By entering into this contract, the Engineer/Contractor certifies that they are not currently engaged in, and agrees for the duration of the Contract to not engage in, a boycott of Israel, as defined in the state statute.

V. CITY OF PHOENIX EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENT

1. In order to do business with the City, Contractor must comply with Phoenix City Code, 1969, Chapter 18, Article V, as amended, Equal Employment Opportunity Requirements. Contractor will direct any questions in regard to these requirements to the Equal Opportunity Department, (602) 262-6790.

2. Any Contractor in performing under this contract will not discriminate against any worker, employee or applicant, or any member of the public, because of race, color, religion, sex, national origin, age, or disability nor otherwise commit an unfair employment practice. The Contractor will ensure that applicants are employed, and employees are dealt with during employment without regard to their race, color, religion, sex, national origin, age, or disability and will adhere to a policy to pay equal compensation to men and women who perform jobs that require substantially equal skill, effort, and responsibility, and that are performed within the same establishment under similar working conditions. Such action will include but not be limited to the following: Employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training; including apprenticeship. The Contractor further agrees that this clause will be incorporated in all subcontracts with all labor organizations furnishing skilled, unskilled and union labor, or who may perform any such labor or services in connection with this contract.

   If the Contractor employs more than thirty-five employees, the following language will apply as the last paragraph to the clause above:

   The Contractor further agrees not to discriminate against any worker, employee or applicant, or any member of the public, because of sexual orientation or gender identity or expression and will ensure that applicants are employed, and employees are dealt with during employment without regard to their sexual orientation or gender identity or expression.

3. *Documentation*. Contractor may be required to provide additional documentation to the Equal Opportunity Department affirming that a nondiscriminatory policy is being utilized.

4. *Monitoring*. The Equal Opportunity Department will monitor the employment policies and practices of suppliers and lessees subject to this article as deemed necessary. The Equal Opportunity Department is authorized to conduct on-site compliance reviews of selected firms, which may include an audit of personnel and payroll records, if necessary.

W. PROTEST PROCEDURES

A bidder wishing to file a protest for the subject project will comply with Phoenix City Code Chapter 2, Section 188.

X. DATA CONFIDENTIALITY

As used in the Contract, "data" means all information, whether written or verbal, including plans, photographs, studies, investigations, audits, analyses, samples, reports, calculations, internal memos, meeting minutes, data field notes, work product, proposals, correspondence and any other similar documents or information prepared by, obtained by, or transmitted to the Contractor or its subcontractors in the performance of this Contract.

The parties agree that all data, regardless of form, including originals, images, and reproductions, prepared by, obtained by, or transmitted to the Contractor or its subcontractors in connection with the Contractor's or its subcontractor's performance of this Contract is confidential and proprietary information belonging to the City.

Except as specifically provided in this Contract, the Contractor or its subcontractors will not divulge data to any third party without prior written consent of the City. The Contractor or its subcontractors will not use the data for any purposes except to perform the services required under this Contract. These prohibitions will not apply to the following data provided the Contractor or its subcontractors have first given the required notice to the City:

A. Data which was known to the Contractor or its subcontractors prior to its performance under this Contract unless such data was acquired in connection with work performed for the City;

B. Data which was acquired by the Contractor or its subcontractors in its performance under this Contract and which was disclosed to the Contractor or its subcontractors by a third party, who to the best of the Contractor's or its subcontractor's knowledge and belief, had the legal right to make such disclosure and the Contractor or its subcontractors are not otherwise required to hold such data in confidence; or

C. Data which is required to be disclosed by virtue of law, regulation, or court order, to which the Contractor or its subcontractor's are subject.

In the event the Contractor or its subcontractors are required or requested to disclose data to a third party, or any other information to which the Contractor or its subcontractors became privy as a result of any other contract with the City, the Contractor will first notify the City as set forth in this section of the request or demand for the data. The Contractor or its subcontractors will give the City sufficient facts so that the City can be given an opportunity to first give its consent or take such action that the City may deem appropriate to protect such data or other information from disclosure.

The Contractor, unless prohibited by law, within ten calendar days after completion of services for a third party on real or personal property owned or leased by the City, the Contractor or its subcontractors will promptly deliver, as set forth in this section, a copy of all data to the City. All data will continue to be subject to the confidentiality agreements of this Contract.

The Contractor or its subcontractors assume all liability for maintaining the confidentiality of the data in its possession and agrees to compensate the City if any of the provisions of this section are violated by the Contractor, its employees, agents or subcontractors. Solely for the purposes of seeking injunctive

relief, it is agreed that a breach of this section will be deemed to cause irreparable harm that justifies injunctive relief in court. Contractor agrees that the requirements of this Section will be incorporated into all subcontracts entered into by Contractor. A violation of this Section may result in immediate termination of this Contract without notice.

Personal Identifying Information-Data Security

Personal identifying information, financial account information, or restricted City information, whether electronic format or hard copy, must be secured and protected at all times. At a minimum, Contractor must encrypt and/or password protects electronic files. This includes data saved to laptop computers, computerized devices or removable storage devices.

When personal identifying information, financial account information, or restricted City information, regardless of its format, is no longer necessary, the information must be redacted or destroyed through appropriate and secure methods that ensure the information cannot be viewed, accessed, or reconstructed.

In the event that data collected or obtained by Contractor or its subcontractors in connection with this Contract is believed to have been compromised, Contractor or its subcontractors will immediately notify the Project Manager and City Engineer. Contractor agrees to reimburse the City for any costs incurred by the City to investigate potential breaches of this data and, where applicable, the cost of notifying individuals who may be impacted by the breach.

Contractor agrees that the requirements of this Section will be incorporated into all subcontracts entered into by Contractor. It is further agreed that a violation of this Section will be deemed to cause irreparable harm that justifies injunctive relief in court. A violation of this Section may result in immediate termination of this Contract without notice.

The obligations of Contractor or its subcontractors under this Section will survive the termination of this Contract.

Y. PROJECT MANAGEMENT INFORMATION SYSTEM (PROMIS)

The Street Transportation Department's Design and Construction Management (DCM) Project Manager may determine that use of PROMIS will be required during this contract. The following information provides a guideline for utilization. Any questions related to the requirements of PROMIS should be directed to the DCM Project Manager.

1. The contractor will be required to maintain all project records in electronic format. The City provides an Application Service Provider (ASP) web based project management database which the contractor will be required to utilize in the fulfillment of the contract requirements. Although this electronic platform does not fulfill this requirement in its entirety, the contractor will be required to utilize this platform as the basis for this work.

2. The contractor can expect to use this ASP to process all primary level tri-partite contract documents related to the design or construction phase of the Project including but not limited to: requests for interpretation/information, potential Change Orders, construction meeting minutes, Submittals, Design Professional's supplemental instructions, and Payment Requests.

3. The contractor will be required to process information into electronic digital form. In order to fulfill this requirement, the contractor will provide all necessary equipment to perform the functions necessary to generate, convert, store, maintain, connect to web based ASP and transfer electronic data.

4. The contractor will provide a computerized networked office platform with broadband internet connectivity. Wired or wireless is acceptable. This platform will function well in a web based environment utilizing an internet browser compatible with the City PROMIS ASP system.

PROMIS training will be provided through the City of Phoenix. Contact information will be provided to the firms under contract, to establish the set up with a log-in and password.

CONSTRUCTION TRADE IDENTIFICATION WORKSHEET

PROJECT TITLE: RIVERVIEW DRIVE 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS
PROJECT NO.: ST85110072 - 2

Below is a listing of possible trade areas for this project.
These were the trade areas identified in the goal setting process.
However, the contractor may identify additional trade areas to be used.

Site Preparation/Earthwork/Excavation
Asphalt Paving
Demolition/Wrecking
Manholes
Concrete
Landscape Material/Irrigation System/Granite
Pipeline / Underground Utilities
Hauling
Fencing
Metals: Steel /Aluminum Fabrication/Erection
Street Lighting & Traffic Signal
Surveying & Layout
Traffic Control Devices
Miscellaneous

Only SBE subcontractors certified by the City of Phoenix under Chapter 18, Article VII of the Phoenix City Code are eligible to fulfill the participation goal as stated. A firm's certification must Be current and in force at the date and time of the bid. The most current electronic listing of all Certified SBE firms can be accessed through the Internet at:

https://phoenix.diversitycompliance.com

SBE: 12 %

SUPPLEMENTARY CONDITIONS

1. 103 AWARD AND EXECUTION OF CONTRACT, Add the following to Subsection 103.3 AWARD OF CONTRACT:

Contract award will be made to a responsive and responsible bidder based on the low total base bid or on the low combination of the total base bid and any selected alternate(s), whichever is in the best interest of the City. If unit pricing is required in the proposal, the extensions and additions will be verified to assure correctness. Award will be based on the revised total if any errors are found. Additionally, the Contractor will meet the minimum SBE subcontracting goal set for this contract or have been granted a full or partial waiver of the goal. The City expressly reserves the right to cancel this agreement without recourse or prejudice to Contractor until all parties have executed the agreement in full.

Any bidder that currently contracts with the City must be in good standing for its proposal to be considered responsive. For the purpose of this Invitation to Bid, good standing means compliance with all contractual provisions, including payment of financial obligations.

2. 103 AWARD AND EXECUTION OF CONTRACT, Add the following to Subsection 103.5, REQUIREMENT OF CONTRACT BONDS:

A. PERFORMANCE BOND AND LABOR AND MATERIAL BOND

Prior to the execution of a contract, the successful bidder must provide a performance bond and a labor and material bond, each in an amount equal to the full amount of the contract. Each such bond will be executed by a surety company or companies holding a certificate of authority to transact surety business in the State of Arizona issued by the Director of the Department of Insurance. A copy of the Certificate of Authority will accompany the bonds. The Certificate will have been issued or updated within two years prior to the execution of the Contract. The bonds will be made payable and acceptable to the City of Phoenix. The bonds will be written or countersigned by an authorized representative of the surety who is either a resident of the State of Arizona or whose principal office is maintained in this state, as required by law, and the bonds will have attached thereto a certified copy of Power of Attorney of the signing official. If one Power of Attorney is submitted, it will be for twice the total contract amount. If two Powers of Attorney are submitted, each will be for the total contract amount. Personal or individual bonds are not acceptable. Failure to comply with these provisions will be cause for rejection of the bidder's proposal.

B. BONDING COMPANIES

All bonds submitted for this project will be provided by a company which has been rated “A- or better for the prior four quarters” by the A. M. Best Company. Failure to provide an "A- or better for the prior four quarters” bond will result in bid rejection.

3. 103 AWARD AND EXECUTION OF CONTRACT, Delete Subsection 103.6, CONTRACTOR’S INSURANCE in its entirety and substitute the following:

103.6.1 General:

Contractor and subcontractors must procure insurance against claims that may arise from or relate to performance of the work hereunder by Contractor and its agents, representatives, employees and subconsultants. Contractor and subcontractors must maintain that insurance until all of their obligations have

been discharged, including any warranty periods under this Contract.

These insurance requirements are minimum requirements for this Contract and in no way limit the indemnity covenants contained in this Contract.

The City in no way warrants that the minimum limits stated in this section are sufficient to protect the Contractor from liabilities that might arise out of the performance of the work under this Contract by the Contractor, its agents, representatives, employees, or subcontractors. Contractor is free to purchase such additional insurance as may be determined necessary.

A. MINIMUM SCOPE AND LIMITS OF INSURANCE

Contractor must provide coverage with limits of liability not less than those stated below. An excess liability policy or umbrella liability policy may be used to meet the minimum liability requirements provided that the coverage is written on a "following form" basis:

1. Commercial General Liability – Occurrence Form
   Policy must include bodily injury, property damage, broad form contractual liability and XCU coverage.

General Aggregate/for this Project	$2,000,000/1,000,000
Products – Completed Operations Aggregate	$1,000,000
Personal and Advertising Injury	$1,000,000
Each Occurrence	$1,000,000

   a. The policy must be endorsed to include the following additional insured language: "The City of Phoenix is named as an additional insured with respect to liability arising out of the activities performed by, or on behalf of the Contractor, including completed operations".

2. Automobile Liability
   Bodily injury and property damage coverage for any owned, hired, and non-owned vehicles used in the performance of this Contract.

Combined Single Limit (CSL)	$1,000,000

   a. The policy must be endorsed to include the following additional insured language: "The City of Phoenix is named as an additional insured with respect to liability arising out of the activities performed by, or on behalf of the Contractor, including automobiles owned, leased, hired or borrowed by the Contractor".

3. Worker's Compensation and Employers' Liability

Workers' Compensation	Statutory
Employers' Liability	
Each Accident	$100,000
Disease – Each Employee	$100,000
Disease – Policy Limit	$500,000

a. Policy must contain a waiver of subrogation against the City of Phoenix.

b. This requirement does not apply when a contractor or subcontractor is exempt under A.R.S. §23-902(E), AND when such contractor or subcontractor executes the appropriate sole proprietor waiver form.

B. ADDITIONAL INSURANCE REQUIREMENTS

The policies must include, or be endorsed to include, the following provisions:

1. On insurance policies where the City of Phoenix is named as an additional insured, the City of Phoenix is an additional insured to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Contract.

2. The Contractor's insurance coverage must be primary insurance and non-contributory with respect to all other available sources.

3. With regard to general liability, the City of Phoenix is named as an additional insured for both products completed operations and premises operations.

C. NOTICE OF CANCELATION

For each insurance policy required by the insurance provisions of this Contract, the Contractor must provide to the City, within 2 business days of receipt, a notice if a policy is suspended, voided or cancelled for any reason. Such notice will be sent directly to the City of Phoenix Design and Construction Procurement, 200 W. Washington Street, 6th Floor, Phoenix, AZ 85003-1611 as listed on Page I.F.B.-1 of these specifications and will be sent by certified mail, return receipt requested.

D. ACCEPTABILITY OF INSURERS

Insurance is to be placed with insurers duly licensed or authorized to do business in the state of Arizona and with an "A.M. Best" rating of not less than B+ VI. The City in no way warrants that the above-required minimum insurer rating is sufficient to protect the Contractor from potential insurer insolvency.

E. VERIFICATION OF COVERAGE

Contractor must furnish the City with certificates of insurance (ACORD form or equivalent approved by the City) as required by this Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. *Any policy endorsements that restrict or limit coverage will be clearly noted on the certificate of insurance.*

All certificates and any required endorsements are to be received and approved by the City before work commences. Each insurance policy required by this Contract must be in effect at or prior to commencement of work under this Contract and remain in effect for the duration of the project. Failure to maintain the insurance policies as required by this Contract or to provide evidence of renewal is a material breach of contract.

All certificates required by this Contract must be sent directly to the City of Phoenix Design and Construction Procurement, 200 W. Washington Street, 6th Floor, Phoenix, AZ 85003-1611 as listed on Page I.F.B. - 1 of these specifications. The City project/contract number and project description must be

noted on the certificate of insurance. The City reserves the right to require complete, certified copies of all insurance policies required by this Contract at any time. DO NOT SEND CERTIFICATES OF INSURANCE TO THE CITY'S RISK MANAGEMENT DIVISION.

F. SUBCONTRACTORS

Contractors' certificate(s) must include all subcontractors as additional insureds under its policies or subcontractors must maintain separate insurance as determined by the Contractor, however, subcontractor's limits of liability must not be less than $1,000,000 per occurrence/$2,000,000 aggregate.

G. APPROVAL

Any modification or variation from the insurance requirements in this Contract must be made by the Law Department, whose decision is final. Such action will not require a formal Contract amendment, but may be made by administrative action.

H. OFF-DUTY POLICE OFFICER REQUIREMENTS

Off Duty Police Officer Requirements

It is required that the City provide off-duty police officers for construction projects as defined in the most recent edition of the City of Phoenix Traffic Barricade Manual. The Engineer must competitively procure Off Duty Police with vendors who are Authorized Traffic Coordinators with the City of Phoenix Police Department Off Duty Coordinator. The following requirements must be included in the procurement:

1. Hourly fees charged

2. Administrative fees (administrative fees to be charged as a part of the hourly rate, not billed separately)

   a. Pay applications requesting reimbursement for Off Duty Police hours worked will be accompanied with itemized documentation indicating officer name, date worked, hours worked, time of day worked and location.
   b. For audit purposes, contractor's files will contain documentation from the successful off duty vendor that the above items are accounted for in the vendor's price proposal.

3. Insurance Requirements:
   a. Commercial General Liability – Occurrence Form

   Policy must include bodily injury, property damage and broad form contractual liability coverage.

General Aggregate	$2,000,000
Products – Completed Operations Aggregate	$1,000,000
Personal and Advertising Injury	$1,000,000
Each Occurrence	$1,000,000

The policy must be endorsed to include the City of Phoenix as an additional insured with respect to liability arising out of the activities performed by, or on behalf of, the contract worker.

b. Non-owned Auto Liability $1,000,000

Coverage must be provided ***if*** a City of Phoenix Police vehicle is being used in the performance of the off-duty traffic control services.

The policy must be endorsed to include the City of Phoenix as an additional insured with respect to liability arising out of the use and operation of a City vehicle.

c. Worker's Compensation and Employers' Liability

Workers' Compensation	Statutory
Employers' Liability	
Each Accident	$100,000
Disease – Each Employee	$100,000
Disease – Policy Limit	$500,000

Policy must contain a waiver of subrogation against the City of Phoenix.

103.6.2 Indemnification of City Against Liability

Contractor agrees to indemnify, defend, save and hold harmless the City of Phoenix and its officers, agents and employees (and any jurisdiction or agency issuing permits for any work included in the project, and its officers, agents and employees), ("Indemnitee") from all claims, actions, liabilities, damages, losses or expenses, (including court costs, attorney's fees and costs of claim processing, investigation and litigation) ("Claims") caused or alleged to be caused, in whole or in part, by the wrongful, negligent or willful acts, or errors or omissions of Contractor or any of its owners, officers, directors, agents, employees, or subcontractors in connection with this Contract. This indemnity includes any Claim or amount arising out of or recovered under workers' compensation law or on account of the failure of Contractor to conform to any federal, state or local law, statute, ordinance, rule, regulation, or court decree. Contractor must indemnify Indemnitee from and against any and all Claims, except those arising solely from Indemnitee's own negligent or willful acts or omissions. Contractor is responsible for primary loss investigation, defense and judgment costs where this indemnification applies. In consideration of the City's award of this Contract, Contractor agrees to waive all rights of subrogation against Indemnitee for losses arising from or related to this Contract. The obligations of Contractor under this provision survive the termination or expiration of this Contract.

4. 104 SCOPE OF WORK, Add the following to Subsection 104.1.2 MAINTENANCE OF TRAFFIC:

ADA AND ANSI ACCESS OF PREMISES DURING CONSTRUCTION

Contractor will maintain existing ADA and ANSI accessibility requirements during construction activities in an occupied building or facility. ADA and ANSI accessibility requirements will include, but not be limited to, parking, building access, entrances, exits, restrooms, areas of refuge, and emergency exit paths of travel. Contractor will be responsible for the coordination of all work to minimize disruption to building occupants and facilities.

5. 104 SCOPE OF WORK, Add the following to Subsection 104.1.4 CLEANUP AND DUST CONTROL:

The Contractor will use a power pick-up broom as part of the dust control effort. No separate measurement or payment will be made for cleanup or dust control, or for providing a power pick-up broom on the job.

6. 105 CONTROL OF WORK, Add the following to Subsection 105.1, AUTHORITY OF THE ENGINEER:

A. CONTRACT ADMINISTRATION

The definition of "Engineer" will read as follows:

"Engineer": All references to "Engineer" in these contract bid documents, including the MAG Specifications, will mean City Engineer.

B. PRECONSTRUCTION CONFERENCE

After completion of the contract documents, to include bonds, insurance and signatures and prior to the commencement of any work on the project, the Street Transportation Department, DCM Division, (telephone 602-495-2050), will schedule a Pre-Construction Conference. This will be held at 1034 East Madison Street, Phoenix, Arizona.

Construction administration will be provided by City of Phoenix, Street Transportation Department, Design & Construction Management Division (DCM).

The purpose of this conference is to establish a working relationship between the Contractor, utility firms and various City agencies. The agenda will include critical elements of the work schedule, submittal schedule, cost breakdown of major lump sum items, payment application and processing, coordination with the involved utility firms, emergency telephone numbers for all representatives involved in the course of construction and establishment of the notice to proceed date. The Contractor will also provide copies of all purchase orders and/or contracts with SBE subcontractors and suppliers used to meet the subcontract goals programmed for this project.

Minimum attendance by the Contractor will be a responsible company/corporate official, who is authorized to execute and sign documents on behalf of the firm, the job superintendent and the Contractor's safety officer.

C. AUTHORIZATION OF THE ENGINEER

The City may, at its discretion and without cause, order the Contractor in writing to stop and suspend work. Immediately after receiving such notice, the Contractor will discontinue advancing the work specified under this Agreement.

Such suspension will not exceed one hundred and eighty (180) consecutive days during the duration of the project.

The Contractor may seek an adjustment of the contract price and time, if the cost or time to perform the work has been adversely impacted by any suspension or stoppage of work by the City.

7. 105 CONTROL OF WORK, Add the following to Subsection 105.2 PLANS AND SHOP DRAWINGS:

The Contractor will submit as many of the required shop drawings and product data submittals at the Pre-Construction meeting as practical and possible. All shop drawings and product data submittals will be submitted sufficiently in advance to allow adequate time for City review(s) and approval. The Contractor will submit early enough to allow enough time for reviews based on the assumption that a submittal may be marked “Revise and Resubmit” or “Rejected”, requiring the Contractor to modify the submittal and resubmit for additional review(s) until acceptance.

A separate transmittal will be used for each specific item type, class of material or equipment for which a submittal is required. Multiple items under one transmittal will only be allowed when the items taken together constitute a complete manufacturer's package, or are so functionally related that the entire package should be reviewed as a whole. The contractor will submit six (6) hard copies of each shop drawing for review. Email or FAX submittals will not be accepted.

The Contractor will allow up to four (4) weeks for City review for each submittal. Some submittals may be simple and straightforward and may not require the full four (4) weeks, but other more complex submittals may take the full four (4) weeks.

8. 105 CONTROL OF WORK, Add the following to Subsection 105.7 COOPERATION BETWEEN CONTRACTORS

If other Contractors are working in or near the area of this contract. The Contractor will conduct his work as specified in MAG Section 105.7.

9. 105 CONTROL OF WORK, Add the following to Subsection 105.8, CONSTRUCTION STAKES, LINES AND GRADES:

A. SURVEY

The City of Phoenix Street Transportation Department, Design & Construction Management Division (DCM) will set the construction stakes establishing lines, grades, and elevations to include necessary utilities and appurtenances and will be responsible for their conformance with plans and specifications. DCM will establish or designate a control line or benchmark of known location and elevation for use as a reference.

B. RECORD DRAWINGS

The Contractor will maintain a record set of plans at the job site. These will be kept legible and current and will show all changes or work added in a contrasting, reproducible color. Two weeks prior to issuance of substantial completion, the Contractor will submit, prior to final inspection, corrected landscape drawings showing the location of all utility services, controller, pipe, valves and wiring. The Engineer will be the sole judge as to the acceptability of the record plans and receipt of an acceptable set is a pre-requisite for final payment.

10. 105 CONTROL OF WORK, Add the following to Subsection 105.15 ACCEPTANCE, paragraph (B) Final Acceptance:

A. SUBSTANTIAL COMPLETION

The work may be judged substantially complete when all construction has been completed with the possible exception of final inspection punch list work. The purpose of granting or acknowledging substantial completion is to stop contract time. This is particularly important to the Contractor if contract time is exhausted or nearly so and/or punch list work is anticipated to extend beyond the allotted time. Granting of substantial completion will eliminate the possibility of incurring liquidated damages or additional liquidated damages beyond the substantial completion date, whichever case may apply.

In the event that the Engineer grants substantial completion, the Contractor will have thirty (30) days thereafter to complete punch list work, unless additional time is granted--in writing--by the Engineer. In no case will a Contractor be granted more than thirty (30) days to complete punch list work, unless

there are extenuating circumstances such as delay in shipment of a specialized piece of equipment, labor strike, or other circumstances beyond the Contractor's control which would necessitate a further time extension.

B. PENALTY FOR FAILURE TO COMPLETE PUNCH LIST WORK WITHIN SPECIFIED TIME

In the event the Contractor fails to complete the punch list work within thirty (30) days following the contract completion date, or in the case of specialized situations within the additional time allotted by the Engineer, the Contractor may be declared in default, and the Engineer may order the work completed by others.

In the event of default, as described herein, the Engineer will withhold from the Contractor's final payment, an amount equal to at least twice the estimated cost of the remaining work. In addition, the Engineer will withhold the retention deducted from contract progress payments until all punch list work has been satisfactorily completed, whereupon twice the amount of the actual cost of completing the work will be deducted from the Contractor's final payment and the remaining funds, if any, including the contract retention, will be released in accordance with the conditions set forth in contract retention.

C. CONTRACT RETENTION

This project will not be considered complete until all work has been completed, including punch list work. Under no circumstances will a Contractor receive any portion of the legally retained progress payments until the City has granted a final acceptance and/or acknowledged substantial completion. The following conditions will apply to each case:

1. Substantial Completion: The Engineer may reduce outstanding contract retention to not less than one (1) percent of the total contract amount, upon granting substantial completion, if the value of the punch list work is estimated to be less than one (1) percent of the total contract.

2. Project Acceptance: Project acceptance implies that all punch list work is done and the improvements have been accepted by the City. Under these conditions, the retention will be fully released to the Contractor subject only to the signing of the standard claims affidavit and hold harmless clause required for all contracts.

3. Final Release of Contract Retention and/or Release of More Than Ninety (90) Percent of the Contract Funds: Prior to final payment and release of monies retained and/or in the case of substantial completion where the Contractor has requested a reduction in contract retention, the Contractor will be required to sign a claims affidavit agreeing to hold the City harmless from any and all claims arising out of the contract.

11. 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Add the following to Subsection 107.1, LAWS TO BE OBSERVED, paragraph (C):

While every effort has been made to Blue Stake all known utilities, and to research and show on the plans, all existing underground utilities based on the best available information, it will be the Contractor's responsibility to locate and pothole all existing utilities sufficiently in advance of anticipated new underground construction to identify any potential conflicts and allow reasonable time for the Engineer to determine solutions. Any claims for additional compensation or work required due to the Contractor's non-compliance with this provision will not be considered for payment by the City.

12. 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Add the following new paragraphs to

Subsection 107.1, LAWS TO BE OBSERVED:

(G) FAIR TREATMENT OF WORKERS

The Contractor will keep fully informed of all Federal and State laws, County and City ordinances, regulations, codes and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any way affect the conduct of the work. He will at all times observe and comply with all such laws, ordinances, regulations, codes, orders and decrees; this includes, but is not limited to laws and regulations ensuring fair and equal treatment for all employees and against unfair employment practices, including OSHA and the Fair Labor Standards Act (FLSA). The Contractor will protect and indemnify the Contracting Agency and its representatives against any claim or liability arising from or based on the violation of such, whether by himself or his employees.

(H) DESERT TORTOISE MITIGATION

As stated in the Arizona Interagency Desert Tortoise Team (AIDTT) Management Plan (1996), if a desert tortoise is found in a project area, activities should be modified to avoid injuring or harming it. If activities cannot be modified, tortoises in harm's way should be moved in accordance with Arizona Game and Fish Department's "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects", revised October 23, 2007 (or the latest revision), included in these contract provisions. Taking, possession, or harassment of a desert tortoise is prohibited by State law, unless specifically authorized by Arizona Game and Fish Department.

(I) BURROWING OWLS MITIGATION – MIGRATORY BIRD TREATY ACT OF 1918

While no burrowing owls have been seen at the project site, small animal burrows likely used by rodents and cottontail rabbits are present. In the event that burrowing owls are found on the site, the project will comply with the Migratory Bird Treaty Act of 1918 and relocate the birds prior to grading. A contact for relocation of burrowing owls is Bob Fox or Greg Clark of Wild at Heart, 31840 North 45th Street, Cave Creek, AZ 85331, 480-595-5047.

13. 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Add the following to Subsection 107.2, PERMITS:

1. STORM WATER POLLUTION PREVENTION PLAN AND AZPDES PERMIT

Any project that disturbs 1 acre or more of the ground surface requires the Contractor to obtain an AZPDES permit and prepare a SWPPP. This project does require an AZPDES permit and SWPPP.

2. DUST PERMIT

Any project that disturbs more than 1/10 acre of soil requires an earthmoving permit from Maricopa County. Information and forms can be found at:

www.maricopa.gov/aq/divisions/permit_engineering/applications/Default.aspx

To facilitate and encourage strict compliance with the Maricopa County Air Pollution Control Regulations pertaining to fugitive dust control, the Contractor will submit the following documentation to the Engineer at the Pre-Construction meeting prior to conducting any earth moving or dust generating activities under the Contract.

a. Copy of a valid Maricopa County Earth Moving (Dust Control) Permit applicable to the work

or services under the Contract.

b. Copy of the Dust Control Plan applicable to the work or services under the Contract.

c. Documentation that all of the Contractor's on-site project managers have received the Comprehensive or Basic dust control training as required by Maricopa County Rule 310 based on project disturbed acres.

For construction sites where 5-acres or more are disturbed, the Contractor will designate and identify to the City an individual who has completed the dust control training as required for the site Dust Control Coordinator. The Dust Control Coordinator will be present on-site all times that earth moving or dust generating activities are occurring and until all ground surfaces at the site have been stabilized.

For construction sites less than 1-acre, the Contractor will designate an individual who has completed Basic Training to be on site at all times that earth moving or dust generating activities are occurring.

The Contractor will notify the Engineer within twenty-four (24) hours of any inspection, Notice of Violation, or other contact by the Maricopa County Air Quality Department with it or any of its subcontractors regarding the work or services under the Contract. A copy of any written communications, notices or citations issued to Contractor or any of its subcontractors regarding the work or services under the Contract will likewise be transmitted to the Engineer within twenty-four (24) hours.

The Contractor will prevent any dust nuisance due to construction operations in accordance with MAG Specifications, Section 104.1.3, Cleanup and Dust Control. The Contractor will use a power pick-up broom as part of the dust control effort. No separate measurement or payment will be made for cleanup or dust control, or for providing a power pick-up broom on the job.

The Contractor agrees to indemnify and reimburse the City for any fine, penalty, fee or monetary sanction imposed on the City by Maricopa County arising out of, or caused by the performance of work or services under the Contract. The Contractor will remit payment of the reimbursable sum to the City within thirty (30) days of being presented with a demand for payment from the City.

3. TEMPORARY RESTRICTION AND CLOSURE SYSTEM (TRACS) PERMIT

The Contractor will obtain a TRACS permit for any construction that restricts access (partial or complete closures) on Major/Collector public streets, or complete closures on Local streets, sidewalks, bike lanes and alleys. The Contractor will obtain this permit in accordance with the City of Phoenix Traffic Barricade Manual, latest edition. The Contractor will follow all requirements of the TRACS permit during construction. The Contractor will obtain this permit before the Notice to Proceed date. Any construction delays caused by non-compliance with the TRACS permit or the City of Phoenix Traffic Barricade Manual requirements will be the responsibility of the Contractor.

4. DEMINIMUS DISCHARGE PERMIT

As required, if the Contractor anticipates the discharge of any amount of water from the City water or wastewater system during construction, the Contractor will be responsible for obtaining a DeMinimus Permit from the Arizona Department of Environmental Quality (ADEQ) for any discharge that will reach "waters of the U.S.", either directly or indirectly, and complying with all requirements of that permit. This includes all compliance reporting required by the permit. No separate payment will be made for obtaining or complying with this permit.

5. U.S. ARMY CORPS OF ENGINEERS SECTION 404 PERMIT, BURROWING OWL & MIGRATORY BIRD FLYERS

This project is subject to a U.S. Army Corps of Engineers Section 404 Permit (or U.S. Army Corps of Engineers Nationwide Permit (NWP)). The Section 404 Nation Wide Permit 14, Linear Transportation Projects (or NWP 14) is included in these project specifications. The Contractor, Subcontractor(s) and all field personnel shall comply with all terms and conditions of the attached Section 404 Nationwide Permit 14, Linear Transportation Projects and Section 401 Water Quality Certification.

The attached Western burrowing owl flyer shall be posted by the contractor at the project site. If burrowing owls or potentially active burrows (natural or manmade holes 3 inches in diameter or greater) are observed during construction, work shall cease within 100 feet and the Street Transportation Department Environmental Quality Specialist (Ed Checkley, 602-534-3366 or Greta Halle, 602-534-6030) shall be notified immediately and allowed time to make appropriate arrangements.

The attached Migratory Bird Treaty Act flyer shall be posted by the contractor at the project site. There are trees and shrubs throughout the project area which could provide nesting habitat for migratory birds. Trees and shrubs shall be avoided to the maximum extent practicable. If trees or shrubs would be impacted between February 1 and August 31 of any calendar year, or if an active bird nest is present within 30 feet of the work area, work shall cease within 30 feet and the Street Transportation Department Environmental Quality Specialist (Ed Checkley, 602-534-3366 or Greta Halle, 602-534-6030) shall be notified immediately and allowed time to make appropriate arrangements.

6. OTHER PERMITS

The Contractor will be required to obtain additional permits from other agencies, such as the Arizona Department of Transportation (ADOT) Encroachment Permit before beginning work or restricting traffic in their right-of-way. An Easement Encroachment Permit & Indemnification Agreement from Arizona Public Service (APS) is also required before beginning work or restricting traffic in the APS 160' wide electric easement. The Contractor will be required to obtain these permits and the Contractor, Subcontractor(s) and all field personnel shall comply with all terms and conditions of the permit requirements.

14. 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Revise the title of Subsection 107.4 ARCHAEOLOGICAL REPORTS to 107.4 ARCHAEOLOGICAL MONITORING AND DISCOVERIES, and add the following:

No known archaeological sites are located within the project area. However, if any archaeological materials are encountered during ground-disturbing activities, the contractor shall cease all ground-disturbing activities within 10 meters of the discovery and the City of Phoenix Archaeology Office (602-495-0901) and Street Transportation Department Environmental Quality Specialist (Ed Checkley, 602-534-3366 or Greta Halle, 602-534-6030) shall be notified immediately and allowed time to properly assess the materials.

15. 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Modify Subsection 107.8, USE OF EXPLOSIVES as follows:

Replace the words "Uniform Fire Code" with "Phoenix Fire Code".

16. 107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Add the following to Subsection 107.11,

CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES:

A. UNDERGROUND FACILITIES

The Contractor will make whatever investigation it deems necessary to verify the location of underground utility facilities. If such facilities are not in the location shown in the drawings, then (regardless of whether this is discovered prior to or during construction) the contractor's remedies, if any, pursuant to Art. 6.3, Chapter 2, Title 40, A.R.S. (A.R.S. 40-360.21 through 40-360.32, "Underground Facilities"), will be the contractor's sole remedy for extra work, delays and disruption of the job, or any other claim based on the location of utility facilities. Locations of utility facilities shown on drawings furnished by the City are to be regarded as preliminary information only, subject to further investigation by the contractor. The City does not warrant the accuracy of these locations, and the contractor, by entering into this contract, expressly waives and disclaims any claim or action against the City under any theory for damages resulting from location of utility facilities.

The Contractor will be responsible for obtaining all Blue Stake utility location information, and for performing all requirements as prescribed in A.R.S. 40-360.21 through .29, for all underground facilities, including those that have been installed on the current project, until the project is accepted by the City.

At least two (2) working days prior to commencing any excavation, the Contractor will call the BLUE STAKE CENTER, between the hours of 7:00 a.m. and 4:30 p.m., Monday through Friday for information relative to the location of buried utilities. The number to be called is as follows:

Maricopa County (602) 263-1100

B. UTILITY-RELATED CONSTRUCTION DELAY DAMAGES CLAIM PROCEDURES

The following procedure is intended to provide a fair and impartial process for the settlement of construction delay claims associated with unknown or improperly located utility facilities.

The Contractor will immediately notify, in writing, the Project Engineer of any potential utility-related delay claim.

The Contractor will immediately notify the appropriate liaison of the affected utility verbally, followed by a written notification.

The Contractor will coordinate an investigation of the situation with the affected utility and the City's Utility Coordinator. After resolution, the Contractor will provide written notification of the settlement of the claim to all affected parties. If the affected utility makes a decision to handle negotiations for a claim, their personnel will be responsible for monitoring the project and all negotiations with the Contractor regarding the claim.

The Contractor will determine to document requirements of the affected utility for their acceptance of responsibility for the claims. The Contractor will provide four (4) copies of the required documentation to the utility involved and two (2) copies of this documentation to the Project Engineer. The Contractor will obtain written confirmation from the utility company involved of their documentation requirements.

17. 108 COMMENCEMENT, PROSECUTION AND PROGRESS Add the following to Subsection 108.2, SUBLETTING OF CONTRACT:

(F) PROMPT PAYMENT

1. Contractor Payment to Subcontractor or Supplier

Contractor will pay its subcontractors or suppliers within seven (7) calendar days of receipt of each progress payment from the City. The Contractor will pay for the amount of work performed or materials supplied by each subcontractor or supplier as accepted and approved by the City with each progress payment. In addition, any reduction of retention by the City to the Contractor will result in a corresponding reduction to subcontractors or suppliers who have performed satisfactory work. Contractor will pay subcontractors or suppliers the reduced retention within fourteen (14) days of the payment of the reduction of the retention to the Contractor. No Contract between Contractor and its subcontractors and suppliers may materially alter the rights of any subcontractor or supplier to receive prompt payment and retention reduction as provided herein. If the Contractor fails to make payments in accordance with these provisions, the City may take any one or more of the following actions and Contractor agrees that the City may take such actions: (1) to hold the Contractor in default under this agreement; (2) withhold future payments including retention until proper payment has been made to subcontractors or suppliers in accordance with these provisions; (3) reject all future bids from the Contractor for a period not to exceed one year from substantial completion date of this project; or (4) terminate agreement.

2. Alternative Dispute Resolution Between Contractor and Subcontractor or Supplier

If Contractor's payment to a subcontractor or supplier is in dispute, Contractor and subcontractor or supplier agree to submit the dispute to any one of the following dispute resolution processes within fourteen (14) calendar days from the date that any party involved gives written notice to the other party(ies): (1) binding arbitration; (2) a form of alternative dispute resolution (ADR) agreeable to all parties; or (3) a City of Phoenix facilitated mediation. When disputed claim is resolved through ADR or otherwise, the Contractor and subcontractor or supplier agree to implement the resolution within seven (7) calendar days from the resolution date.

3. Inspection and Audit

Contractor, its subcontractors and suppliers will comply with A.R.S. 35-214 and the City will have all rights and remedies to inspect and audit the records and files of Contractor, subcontractor or supplier, as afforded the State of Arizona in accordance with the provisions of A.R.S. Section 35-214.

4. Non-Waiver

Should the City fail or delay in exercising or enforcing any right, power, privilege, or remedy under this Section, such failure or delay will not be deemed a waiver, release, or modification of the requirements of this Section or of any of the terms or provisions thereof.

5. Inclusion of provisions in Subcontracts

Contractor will include these prompt payment provisions in every subcontract, including procurement of materials and leases of equipment for this Agreement.

6. No Third Party Benefits or Rights

Nothing contained in this Agreement is intended to benefit or confer any rights on any person or entity not a party to this Agreement, and no such person or entity, including but not limited to other Contractors, subcontractors or suppliers, may assert any claim, cause of action, or remedy against the City hereunder.

18. 108 COMMENCEMENT, PROSECUTION AND PROGRESS, Add the following to Subsection 108.4, CONTRACTOR'S CONSTRUCTION SCHEDULE:

No later than one (1) week after the Pre-Construction meeting (or one week after the Notice to Proceed date is firmly established), the Contractor will submit to the Engineer, two (2) copies of a detailed Critical Path Model (CPM) chart outlining the detailed progress of all major and critical elements of the project by weeks, from beginning of project to end. The chart will begin at the established Notice to Proceed date and progress on a calendar basis, week by week, to the end of the project.

The Contractor will submit updated CPM charts as required by the Engineer. This will typically be on a monthly basis. The required submittals of updated CPM charts may be less frequent than monthly, if approved by the Engineer.

Neither the City nor the Engineer will accept liability or responsibility for the reasonable or workable nature of the CPM schedules prepared and submitted by the Contractor—that responsibility will remain with the Contractor.

19. 108 COMMENCEMENT, PROSECUTION AND PROGRESS, Add the following to Subsection 108.5, LIMITATION OF OPERATIONS:

A. WORK HOURS

Regular working hours will be defined as one 8-1/2 hour shift per day, Monday through Friday, exclusive of City holidays.

Work in excess of regular working hours will be defined as overtime. For overtime which becomes necessary, the Contractor will make a written request to the Engineer at least eight (8) calendar days before the desired overtime. The request will include the duration, dates, times, reason for overtime, and a statement of the consequences if overtime is not approved.

The Contractor will not schedule any overtime work which requires inspection, survey, or material testing without written permission from the Engineer two (2) working days before the proposed overtime work. The Engineer reserves the right to deny the requested overtime. If an overtime request is denied, the Engineer may extend the contract time at no additional cost to the City, including extended overhead costs.

Unscheduled Overtime

Overtime that is not requested and approved in accordance with the above procedure will be defined as unscheduled overtime. All costs (including appropriate overhead) will be paid by the Contractor by deduction from the contract.

Emergency Overtime

An emergency is defined as work required for a situation that is not within the Contractor's control.

With the Engineer's approval, the Contractor will be permitted to work overtime without being responsible for paying the City's costs.

20. 108 COMMENCEMENT, PROSECUTION AND PROGRESS, Add the following to Subsection 108.10, FORFEITURE AND DEFAULT OF CONTRACT:

City's Right to Perform and Terminate for Cause

If the City provides the Contractor with a written order to provide adequate maintenance of traffic, adequate cleanup, adequate dust control or to correct deficiencies or damage resulting from abnormal weather conditions, and the Contractor fails to comply in a time frame specified, the City may have work accomplished by other sources at the Contractor's expense.

If Contractor persistently fails to (i) provide a sufficient number of skilled workers, (ii) supply the materials required by the Contract Documents, (iii) comply with applicable Legal Requirements, (iv) timely pay, without cause, Sub-consultants and/or Subcontractors, (v) prosecute the Contract Services with promptness and diligence to ensure that the Contract Services are completed by the Contract Time, as such times may be adjusted, or (vi) perform material obligations under the Contract Documents, then the City, in addition to any other rights and remedies provided in the Contract Documents or by law, will have the rights set forth below.
Upon the occurrence of an event set forth above, City may provide written notice to Contractor that it intends to terminate the Agreement unless the problem cited is cured, or commenced to be cured, within seven (7) days of Contractor's receipt of such notice.

If Contractor fails to cure, or reasonably commence to cure, such problem, then City may give a second written notice to Contractor of its intent to terminate within an additional seven (7) day period.

If Contractor, within such second seven (7) day period, fails to cure, or reasonably commence to cure, such problem, then the City may declare the Agreement terminated for default by providing written notice to Contractor of such declaration.

Upon declaring the Agreement terminated pursuant to the above, City may enter upon the premises and take possession, for the purpose of completing the Work, of all materials, equipment, scaffolds, tools, appliances and other items thereon, which have been purchased or provided for the performance of the Work, all of which Contractor hereby transfers, assigns and sets over to City for such purpose, and to employ any person or persons to complete the Work and provide all of the required labor, services, materials, equipment and other items.

In the event of such termination, Contractor will not be entitled to receive any further payments under the Contract Documents until the Work will be finally completed in accordance with the Contract Documents. At such time, the Contractor will only be entitled to be paid for Work performed and accepted by the City prior to its default.

If City's cost and expense of completing the Work exceeds the unpaid balance of the Contract Price, then Contractor will be obligated to pay the difference to City. Such costs and expense will include not only the cost of completing the Work, but also losses, damages, costs and expense, including attorneys' fees and expenses, incurred by the City in connection with the re-procurement and defense of claims arising from Contractor's default.

21. 108 COMMENCEMENT, PROSECUTION AND PROGRESS, Add the following to Subsection 108.11, TERMINATION OF CONTRACT:
TERMINATION FOR CONVENIENCE

The Owner for its own convenience has the right for any reason and at any time to terminate the contract and require the Contractor to cease work hereunder. Such termination will be effective at the time and in the manner specified in the notification to the Contractor of the termination. Such termination will be without prejudice to any claims which the Owner may have against the Contractor. In the event of a termination for

convenience, the Contractor will be paid only the direct value of its completed work and materials supplied as of the date of termination, and Contractor will not be entitled to anticipated profit or anticipated overhead or any other claimed damages from the Owner, Architect or the Engineer.

If the City is found to have improperly terminated the Agreement for cause or default, the termination will be converted to a termination for convenience in accordance with the provisions of this Agreement.

CANCELLATION OF CONTRACT FOR CONFLICT OF INTEREST
All parties hereto acknowledge that this agreement is subject to cancellation by the City of Phoenix pursuant to the provisions of Section 38-511, Arizona Revised Statutes.

22. 109 MEASUREMENTS AND PAYMENTS Add the following to Subsection 109.2, SCOPE OF PAYMENT:

A. PARTIAL PAYMENTS

The contracting agency will make a partial payment to the Contractor on the basis of an approved estimate prepared by the Engineer or the Contractor for work completed and accepted through the preceding month. The notice to proceed date, which is designated for the specific project involved, will be used as the closing date of each partial pay period. Payment will be made no later than fourteen (14) days after the work is certified and approved. City will review payment requests and make recommendation of approval or denial within seven (7) calendar days.

B. PAYMENT RETENTION

At the start of construction, ten percent of all pay requests will be retained by the City to guarantee complete performance of the contract. When the work is fifty percent complete, this amount may be reduced to five percent providing that construction progress and quality of work is acceptable to the City. Any funds which are withheld from the contractor will be paid no later than sixty days after completion of the contract and settlement of all claims.

In lieu of retention, the contractor may provide as a substitute, an assignment of time certificates of deposit (CDs) from a bank licensed by Arizona, securities guaranteed by the United States, securities of the United States, the State of Arizona, Arizona counties, Arizona municipalities, Arizona school districts, or shares of savings and loan institutions authorized to transact business in Arizona.

Securities deposited in lieu of retention must be deposited into a separate account with a bank having a branch located in the City of Phoenix and be assigned exclusively for the benefit of the City of Phoenix pursuant to the City's form of escrow agreement

CDs assigned to the City must be maintained in the form of time deposit receipt accounts. CDs will be assigned exclusively for the benefit of the City of Phoenix pursuant to the City's form of escrow agreement.

Escrow Agreement forms may be obtained from the Contract Specialist assigned to the project.

23. 109 MEASUREMENTS AND PAYMENTS, Add the following to Subsection 109.4.3, DUE TO EXTRA WORK:

ALLOWANCE FOR EXTRA WORK

Contract allowance items are provided for the purpose of encumbering funds to cover the costs of possible

change order work. The amount of the allowance item is determined by the Engineer and is not subject to individual bid pricing. All bidders will incorporate the amount pre-entered in the bid proposal and will reflect the same in the total amount bid for this project.

This allowance item provides an estimated funding to cover unforeseen changes that may be encountered and corresponding extra work needed to complete the contract per plan. Unforeseen extra work, if any, will be as approved by the Engineer; for example, extension of unit bid prices, negotiated price or time and material, in accordance with MAG Specification Section 109.4 and 109.5.

It will be understood that this allowance item is an estimate only and is based on change order history of similar projects. It will not be utilized without an approved contract change order. It is further understood that authorized extra work, if any, may be less than the allowance item.

24. 109 MEASUREMENTS AND PAYMENTS, Add the following to Subsection 109.4 COMPENSATION FOR ALTERATION OF WORK:

109.4.7CHANGE ORDERS

Owner reserves the right to decrease adjustments made in any change order if, upon audit of Contractor's records, the audit discloses contractor provided false or inaccurate cost and pricing data in negotiating the change order. In enforcing this provision, the parties will follow the procedure provided in the Federal Acquisition Regulation (FAR) clause 52.214-27, found in 48 CFR Part 52.

25. 109 MEASUREMENTS AND PAYMENTS, Delete Table 109-1 in Subsection 109.9, DOLLAR VALUE OF MAJOR ITEM, and substitute the following:

CONTRACT AMOUNT	MAJOR ITEM IS DEFINED AS ANY ITEM EQUAL TO OR GREATER THAN THE FOLLOWING
Up to $1 million	$15,000 or 3%, whichever is greater
$1 million to $3 million	3% of the original contract amount to a maximum of $75,000.00
$3 million to $5 million	2.5% of the original contract amount to a maximum of $90,000.00
Over $5 million	1.5% of the original contract amount to a maximum of $125,000.00

CONTINGENCY ITEMS

Contingency items which fall under the definition of a major item are subject to negotiation if decreased by more than twenty (20) percent.

Contingency items will not increase more than twenty (20) percent without being subject to renegotiation, regardless of the percentage of that item relative to the total contract amount.

26. 110 NOTIFICATION OF CHANGED CONDITIONS AND DISPUTE RESOLUTION Add the following to Subsection 110.1 GENERAL:

SOILS INFORMATION

The material boring logs shown on the plans or included in these specifications are included for the Contractor's convenience only. It is not intended to imply that the character of materials shown in the logs is representative throughout the project. The soil borings are indicative of the soil characteristics only at the location and to the depth of each of the borings.

Even if not specifically shown in the geotechnical information provided, the Contractor may encounter large cobbles, boulders, caliche, conglomerate, hard rock, perched groundwater, historic or prehistoric cultural resources, or other differing site conditions on this project. No additional compensation will be made for any differing site condition that may be encountered.

SPECIAL PROVISIONS

1. 205 ROADWAY EXCAVATION, Add the following to Section 205 ROADWAY EXCAVATION INCLUDING HAUL

Description

The work under this item consists of performing roadway excavation, including haul at the locations and in conformance with the details on the Project Plans, in accordance with these special provisions and as directed by the Engineer. Roadway Excavation will consist of excavating slopes in conformance with the lines and grades shown on the plans, including any hauling of excess excavated material.

205.7 MEASUREMENT:

Measurement for roadway excavation will be made by the cubic yard of the roadway areas excavated and graded at the locations and in conformance with the details on the Project Plans, in accordance with these special provisions and as directed by the Engineer.

205.8 PAYMENT

Payment will be made at the unit price quoted in the bid proposal for the bid item "ROADWAY EXCAVATION, INCLUDING HAUL". No separate payment will be made for Structure Excavation and Structure Backfill. The cost for Structure Excavation and Structure Backfill will be considered included in the structure being constructed.

2. 206 STRUCTURE EXCAVATION AND BACKFILL, Add the following to Section 206 STRUCTURE EXCAVATION AND BACKFILL:

Description

The work under this item consists of performing Structural Excavation and furnishing Structural Backfill at the locations and in conformance with the details on the Project Plans, in accordance with these special provisions and as directed by the Engineer. Structural Backfill will consist of furnishing, placing and compacting backfill around the structure to the level designated. All work under this Section will conform to SECTION 203 – EARTHWORK of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, plus all addenda, except as herein noted and on the Project Plans.

Construction Requirements

Section 203-5.03(B)(1) of the ADOT Standard Specifications is modified to add:

Structural Backfill may be comprised wholly or in part of salvaged Portland cement concrete material.

The source of all salvaged materials will be approved by the Engineer prior to use. Salvaged Portland cement concrete material will not contain hazardous waste materials. All metal reinforcement materials will be removed from salvaged concrete prior to its use for structure backfill.

Salvaged Portland cement concrete material to be used in structure backfill will be derived from crushing.

Structural Backfill containing any salvaged materials will conform to the gradation requirements specified for

structure backfill. If completely comprised of salvaged materials, the structural backfill requirements for pH, resistivity, and plasticity index will not apply. If soil and aggregate materials are blended with salvaged materials, the soil and aggregate portion will conform to the pH, resistivity, and plasticity index requirements specified for structure backfill.

If soil and aggregate materials are blended with salvaged materials, the Contractor will submit the relative percentages of salvaged materials and soil and aggregate materials to the Engineer for approval. The relative percentages will not be adjusted after approval except to maintain a consistent gradation. Any significant change in the proportions must be approved by the Engineer prior to use.

Section 203-5.03(B)(2) of the ADOT Standard Specifications is modified to add:

Salvaged materials will not be used as slurry unless approved by the Engineer.

Section 203-5.03(B)(4) of the ADOT Standard Specifications is modified to add:

Structural Backfill material consisting wholly or in part of salvaged Portland cement concrete material will be compacted to at least 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

Measurement and Payment

No direct method of measurement will be made for Structure Excavation or Structure Backfill. No payment will be made for Structure Excavation and Structure Backfill. The cost for Structure Excavation and Structure Backfill will be considered included in the structure being constructed.

3. 211 FILL CONSTRUCTION

Add the following to the first paragraph of Subsection 211.2 PLACING:

Rocks, broken concrete, or other solid material, which are larger than 3 inches in greatest dimension, shall not be placed within 12 inches of sidewalks, driveways, or other areas to be paved with this project.

4. 220 RIP RAP CONSTRUCTION

Add the following SECTION 220 RIP RAP:

220.1 DESCRIPTION:

Riprap construction shall consist of furnishing and placing stone, with or without grout, and underlain with filter material of granular filter blankets or erosion control geosynthetic fabric. The depth and type of riprap shall be as shown on the plans or in the special provisions.

220.2 MATERIALS

Riprap shall conform to the requirements of Section 703. Erosion control geosynthetic fabric shall conform to the requirements of Table 796-3 in Section 796.

220.7 MEASUREMENT:

The completed, in place riprap construction within the limits of the dimensions shown on the plans shall be measured. Measurement will be in square feet rounded to the square foot. No separate measurement will be made for erosion control geosynthetic fabric, bedding material, or grout.

220.8 PAYMENT:

Payment for riprap will be made for the accepted complete in-place riprap construction at the contract unit price. Riprap construction shall include excavation, ground surface preparation, erosion control geosynthetic fabric (if used for the project), bedding material, riprap stone, grout (if used for the project) and backfilling.

Payment will be made at the unit price quoted in the bid proposal for the bid item "ROCK RIPRAP", and shall be full compensation for furnishing all material, labor and equipment for riprap construction.

5. 221 ARCHITECTURAL GABIONS

Add the following new SECTION 221 ARCHITECTURAL GABIONS:

Comply with City of Phoenix Standard Specifications and Details for Public Works Construction in its entirety, including any City of Phoenix supplements.

221.1 DESCRIPTION:

The work under this item consists of furnishing all materials, equipment and labor necessary to construct architectural gabion basket planters, including furnishing and installing architectural gabion basket, anchorages, and river rock. The baskets shall be a non-galvanized 9 gauge welded wire baskets filled with river rock and shall be constructed at the location and as shown on the project plans, in accordance with these special provisions and as directed by the Engineer.

221.2 MATERIALS:

Materials shall conform to the requirements specified on the plans and these special provisions.

Prior to beginning any work on the fabrication of the architectural gabion basket planters, the contractor shall submit shop drawings for approval, showing complete details.

The Engineer shall be furnished complete, copies in triplicate of all mill reports on steel materials furnished.

All butt welds on exposed surfaces shall be ground flush with adjacent surfaces.

221.2.1 Rock for Baskets:

Rock for the welded wire mesh basket wall shall be a river run rock sound and durable, free from clay or shale seams, cracks or other structural defects. The Bulk Specific gravity (SSD) shall be determined in accordance with the requirements of AASHTO T 85 and shall be a minimum of 2.4. Rock used to fill the welded wire mesh baskets rock shall be well graded, rounded rocks varying from four inches minimum to eight inches maximum in size. Rock shall have the following gradation: D50 Shall be 6": DMax shall be 8": DMin shall be 4". Control for the gradation will be by visual inspection of the Engineer.

The source from which the rock will be obtained shall be selected well in advance of the time when it will be required in the work. Rock for welded wire mesh baskets shall be well graded, varying in size from four to eight inches. The acceptability of the rock will be determined by the Engineer with input provided by the City of Phoenix. If testing is required, suitable samples of rock shall be taken in the presence of the Engineer at least 25 days in advance of the time when its use is expected to begin. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.

221.2.2 Wire Fabric for Baskets:

The welded wire non-galvanized mesh basket used for the planter/wall shall be of a single unit construction. The bottom mat, sides, dividers, back face, front face, shall be connected and spiraled into rectangular baskets of the specified size. The non-galvanized welded wire mesh baskets shall be Hilfiker Artweld Gabion or approved equal. Contractor shall provide samples of welded wire mesh baskets to the Engineer at least 30 days in advance of the time when its use is expected to begin.

Mesh baskets shall be constructed of 3”x 3” opening 9 gauge welded wire fabric- NON-GALVANIZED and conform to the requirements of ASTM A185. Pre-formed stiffeners and spiral binders shall be constructed of 9 gauge non-galvanized wire and conform to the requirements of ASTM A82.

Wire fabric shall be of the diameter, spacing, pattern, and dimensions shown of the plans. The wire fabric shall be certified for a 50 year life cycle.

Certificates of Compliance conforming to the requirements of Subsection 106.2 shall be submitted to the Engineer.

221.2.3 Miscellaneous Fittings and Hardware for Baskets:

Miscellaneous fittings and hardware for the architectural gabion basket retaining wall shall be of the type and size provided by the manufacturer of the major item to which they apply and shall be in accordance with the requirements of ASTM A82.

Certificates of Compliance conforming to the requirements of Subsection 106.2 shall be submitted.

All ends of the baskets and the spiral ties shall be ground smooth with no protruding ends allowed on any part of the basket.

221.3 CONSTRUCTION REQUIREMENTS:

Areas on which welded wire baskets are to be constructed shall be excavated to a depth shown on the details and cleared of any debris that would result in the basket not being in direct contact with the sub-grade in reasonable conformance with the lines and grades shown in the project plans or established by the Engineer.

Architectural gabion basket planter shall be fabricated as one piece in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into a square unit of the specified size. Architectural gabion baskets shall be of single unit construction with the base ends and sides to be welded or physically connected into a single unit or one edge of these members connected to the end section of another unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the

mesh. The height, length, and width of architectural gabion baskets shall not vary more than 1 percent from the dimensions shown on the plans.

All perimeter edges of architectural gabion baskets shall be ground smooth or securely selvaged or bound so that the joints formed by tying the selvages have at least the same strength as the body of the mesh.

Architectural gabion baskets shall be placed to conform to the project plan details. Stone shall be placed in close contact in the unit so that maximum fill is obtained. The units may be filled by machine with sufficient handwork to accomplish requirements of this specification.

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

221.4 MEASUREMENT AND PAYMENT:

The architectural gabion baskets will be measured by the square yard. All of the required hardware and rock are all considered incidental to the architectural gabion basket constriction and will not be measured separately.

The accepted quantities of architectural gabion basket, measured as provided above, payment shall be at the unit price bid for bid item "ARCHITECTURAL GABIONS". The price paid shall include full compensation for furnishing all labor, materials tools and equipment and doing all work involved in constructing the architectural gabion planter and rock complete in place as shown on the plans and details.

6. Add the following new Section, 232 STORM WATER POLLUTION PREVENTION – BEST MANAGEMENT PRACTICES:

Description

Implementation of "Best Management Practices" (B.M.P.'s) to reduce stormwater pollution will be undertaken by the Contractor on a multi-tiered, most cost-effective approach. The Contractor will utilize the lowest-cost acceptable B.M.P. available to address each type of potential stormwater pollution situation encountered on the project. Should this prove ineffective in resolving the stormwater pollution problem, additional, higher-cost B.M.P.'s may need to be employed, upon approval by the City.

Construction Requirements

Typical multi-tiered B.M.P. approaches to construction operations may include:

A. ROADWAY SUBGRADE EXCAVATION:

1. Tier I - The excavated area will create, in effect, a temporary retention area. This may provide adequate control of storm runoff to prevent sediment from leaving the site. Pumping or other methods utilized to drain the excavation will employ filter fabric or other filtering method to remove sediment before leaving the site or entering the storm drain system.

2. Tier II - Catch basin inlet protection (utilizing filter fabric, gravel, etc.) may be necessary should Tier I controls prove inadequate. Care will be exercised to ensure that Tier II B.M.P.'s do not result in blockage of drainage and resultant flooding of adjacent properties.

B. OPEN PIPELINE TRENCHES:

1. Tier I - The open trench itself will act as a temporary retention area. The Contractor will provide a low-cost, readily-installed/removed temporary device on the open end of the pipe to prevent sediment-laden stormwater from entering the pipe. This may consist of a temporary "plug" incorporating filter fabric, a temporary weir, or other device capable of removing sediment before allowing stormwater to enter the pipe. Care must be taken to prevent damming of floodwaters in the excavation that could result in "floating" the pipe.

2. Tier II - If Tier I protection does not prove satisfactory, the Contractor may need to install straw bales, sandbag berms, or temporary diversion dikes around the perimeter of the open excavation to prevent sediment-laden stormwater from entering the open excavation. Due to installation/removal time, such devices need only be installed during periods of likely precipitation and runoff. Earthen dikes are the preferred alternate, due to ease of installation and removal. Care must be taken to assure that runoff is not blocked to the extent that flooding of adjacent properties will result.

C. BACKFILLED PIPELINE TRENCHES:

1. Tier I - As with roadway subgrade excavations, pipeline trenches which have been backfilled but not yet paved will be several inches lower than adjacent pavement areas, and will therefore act as temporary retention areas.

2. Tier II - If the "retention" provided by the backfilled area does not prevent sediment-laden runoff from leaving the excavated area, perimeter controls such as silt fence, straw bales, sandbag berms, or gravel filter berms may need to be installed around the downstream edge(s) of the backfilled area. As with open trenches, the selection of the appropriate measure, extent of its application, and time period during which it is needed will be dependent upon cost, site conditions, ease of installation/removal, and likelihood of precipitation/runoff. Again, care must be taken to ensure that diversion of stormwater onto adjacent properties does not result from these installations.

Another stormwater control method, which the Contractor may need to consider, is limiting the amount of area disrupted and therefore subject to sediment-laden stormwater runoff at any one time. Should such project phasing prove necessary due to the failure of other B.M.P.'s, the Contractor will revise his construction activities accordingly, at no additional cost to the City.

Standards for installation of the above B.M.P.'s are provided in the Flood Control District of Maricopa County's "Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control". Installation and operation of B.M.P.'s will be in accordance with that manual.

There will be no separate measurement or payment for preparing or developing Storm Water Pollution Prevention Plans, or for preparing NOI's or NOT's or obtaining an AZPDES Permit, all these costs being considered incidental to the cost of the project.

Use of individual BMP items will conform to the Contractor's approved Storm Water Pollution Prevention Plan (SWPPP).

Measurement and Payment

This project includes a pay item "ALLOWANCE FOR STORMWATER POLLUTION PREVENTION BEST MANAGEMENT PRACTICE (BMP'S)". The amount of this allowance is determined by the Engineer, and is not subject to individual bid pricing. All bidders will incorporate the amount pre-entered in the bid proposal and will reflect the same in the total amount bid for this project.

Payment for various types of necessary BMP's will be made from this allowance based on approved invoiced cost of the materials only, plus taxes, and a maximum 15 percent markup for overhead and profit. There will be no separate measurement or payment for the preparation or development of the Storm Water Pollution Prevention Plan; labor or equipment necessary to install, maintain or remove the BMP materials; moving existing BMP materials from one location to another on the same project; or constructing BMP swales or berms, all of these costs being considered incidental to the cost of the project.

7. 301 SUBGRADE PREPARATION: Add the following to Subsection 301.1, DESCRIPTION:

The work under Subgrade Preparation consists of all excavating and grading work necessary to bring the existing surface to the section specified on the plans prior to the covering of the prepared subgrade with pavement base materials. Structural backfill, specified on the plans, and occurring within the roadway prism, is not considered subgrade preparation and shall be incidental to the associated structure work.

8. 301 SUBGRADE PREPARATION, Delete Subsections 301.7, MEASUREMENT, and 301.8, PAYMENT, and substitute the following:

301.7 MEASUREMENT:

Measurement for subgrade preparation will be made by the square yard of the roadway areas excavated and graded and subsequently covered with pavement base materials. Payment for necessary grading for items outside of the lip of gutter will be included in the cost of those items.

301.8 PAYMENT

Payment will be made at the unit price quoted in the bid proposal for the bid item "SUBGRADE PREPARATION".

9. 308 ELECTRICAL GROUNDING OF METAL FABRICATIONS AND STRUCTURES

Add the following new Section, 308 ELECTRICAL GROUNDING OF METAL FABRICATIONS AND STRUCTURES:

308.1 GENERAL:

This Section includes the effective grounding of metal fabrications, fences, gabions and other structures within the Arizona Public Service (APS) easement and includes, but is not limited to, copper wire and cable, copper grounding rod, brass clamps, exothermic welding and necessary testing.

308.2 CONSTRUCTION REQUIREMENTS:

A separate, complete electrical grounding system, including copper wire and cable, copper grounding rod, brass clamps, exothermic welding and testing shall be provided for each physically separate and isolated metal fabrication and structure. Expansion joints provide physical separation and isolation. Copper jumpers across physical separations shall not be permitted as an alternative to providing a separate, complete

electrical grounding system for each separate metal fabrication and structure.

Adjacent gabion baskets shall be grounded by a continuous #4 AWG Copperweld wire clamped to each basket with 2 brass cable clamps and attached to a grounding rod with a brass cable clamp. The wire shall run through the middle of each basket and the wire and clamps shall not be visible when the basket is filled. The wire shall extend to the grounding rod a minimum of 6" below grade. The wire, clamp and grounding rod shall not be visible when installed.

Chain link fence shall be grounded by a separate, complete electrical grounding system at each corner post, end post and gate post. Gates shall have an 18" long, PVC (grey) insulated, #4 AWG, flexible power jumper cable with #4 AWG tinned copper strands connected to the gate and the support post with brass cable clamps. The galvanizing finish shall be removed at the clamp locations. The cable shall be installed in a sagging configuration. The cable and clamps shall be painted completely with a zinc rich grey paint.

308.2 MATERIALS AND METHODS:

Materials shall conform to the plans.

308.3 TESTING:

Testing shall conform to the plans.

308.4 PAYMENT:

Electrical grounding is incidental to the work being grounded and includes all labor, materials, welding and testing required for a complete electrical grounding system as specified on the plans. Payment will be made at the unit price bid for the applicable bid items. No separate measurement or payment will be made for electrical grounding. Based on results of the specified testing, any additional grounding rods, clamps, wire, welding, testing and labor necessary to meet the resistance limits specified on the plans shall be paid from bid item FURNISH AND INSTALL ADDITIONAL GROUNDING ROD, WIRE, CLAMP, WELDS AND TEST, CONTINGENT ITEM.

10. 310 PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE 310.1, Add the following to Subsection 310.1 DESCRIPTION:

Aggregate base course placed to lines and grades of the Asphalt Maintenance Road/Trail and shall comply with Section 1 Asphalt Maintenance Road/Trail detail shown on the Landscape Plans

310.2 PLACEMENT AND CONSTRUCTION:

The compacted lift thickness shall not exceed 4 inches, unless approved by the Engineer. Based on the type of material, type of equipment and compaction methods used, the Contractor may propose a greater lift thickness to the Engineer for approval. After distributing, the aggregate base course material shall first be uniformly watered and then graded to a uniform layer that will net, after compacting, the required thickness. The grading operation shall be continued to such extent as may be necessary to minimize segregation. The quantity of water applied shall be that amount which will assure proper compaction resulting in the density required by Section 310.3. After placement, the aggregate base course surface shall be true, even and uniform conforming to the grade and cross section specified. In no case shall the aggregate base course vary by more than ½ inch above or below required grade.

310.3 COMPACTION:

The contractor is responsible for providing appropriate equipment and techniques to achieve the compaction results required by this specification. The aggregate base course shall be compacted in lift thicknesses as allowed by Section 310.2

310.5 PAYMENT: Payment for aggregate base course will be made on the basis of the contract unit price per ton for "AGGREGATE BASE COURSE" provided in the proposal.

11. 321 PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT, Add the following to Subsection 321.1 DESCRIPTION:

PEMANEMT ASPHALT CONCRETE ROADWAY PAVEMENT

The permanent asphalt concrete roadway pavement section (Pavement Structural Section No.1) will consist of the following:

A base course of 4-inches compacted thickness of Type A-1 1/2 dense graded asphalt laid in one course on 100% compacted native subgrade.

The surface course will consist of 2-inches compacted thickness of Type D-1/2 dense graded asphalt concrete laid in one course.

Measurement and Payment

Payment will be made at the bid price per ton for "ASPHALT CONCRETE SURFACE COURSE TYPE D ½, 2" THICK and "ASPHALT CONCRETE BASE COURSE TYPE A 1½, 4" THICK, complete-in-place within the areas as specified above, and will include removal and disposal of existing materials and subgrade preparation. Aggregate base materials, where required, will be paid under that proposal item.

ASPHALT CONCRETE MAINTENANCE ROAD/TRAIL

The Asphalt Maintenance Road/Trail will consist of the following:

A base course of 4-inches compacted thickness aggregate base course on 100% compacted native subgrade.

The surface course will consist of 3-inches compacted thickness of Type D-1/2 dense graded asphalt concrete laid in one course.

Measurement and Payment

Payment will be made at the bid price per ton for "ASPHALT CONCRETE SURFACE COURSE TYPE D ½, 3" THICK, complete-in-place within the areas as specified above and as shown on the plans, and will include removal and disposal of existing materials and subgrade preparation. Aggregate base materials, where required, will be paid under that proposal item.

12. 336 PAVEMENT MATCHING AND SURFACING REPLACEMENT, Add the following to Section 336 PAVEMENT MATCHING AND SURFACING REPLACEMENT:

ASPHALT CONCRETE REPLACEMENT (DRIVEWAY AND PARKING LOT CONNECTIONS)

Construction Requirements

Asphalt concrete will be removed and replaced to match existing asphalt concrete frontage in back of new sidewalks and driveways, as detailed and noted on the plans and as directed by the Engineer. Existing asphalt concrete will be trimmed and removed in accordance with Section 336.2.2.

The (Pavement Structural Section at Driveway Connection): 4 inches Type C-3/4 (two lifts) C-3/4 on 100% compacted native subgrade.

Measurement and Payment

Payment will be made at the bid price per ton for "ASPHALT CONCRETE SURFACE COURSE C-3/4" FOR DRIVEWAY SIDEWALK AND PARKING LOT CONNECTIONS" complete-in-place within the areas as specified above, and will include removal and disposal of existing materials and subgrade preparation. Aggregate base materials, where required, will be paid under that proposal item.

13. 340 CONCRETE CURB, GUTTER, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE , Add the following to Subsection 340.2.1 Detectable Warnings; Subsection 340.3.1 Detectable Warnings; Subsection 340.5 MEASUREMENT; and Subsection 340.6 PAYMENT:

Add the following to MAG Subsection 340.2.1 Detectable Warnings:

Detectable warning material will meet the latest ADA requirements and be cast iron with natural finish. Approved detectable warning material manufacturers include:

a. Neenah Foundry
b. Deter Foundry
c. US Foundry

Add the following to MAG Subsection 340.3.1 Detectable Warnings:

Detectable warning plates will be installed per manufacturer's recommended specifications. The layout of plates will be determined by the Contractor, and if necessary, pre-cut as needed prior to beginning the installation process. Plates will not be cut to less than half their size. Plates will be cut as recommended by the manufacturer.

Add the following to Subsection 340. 5 MEASUREMENT and 340.6 PAYMENT:

Sidewalk Ramps, Measurement and Payment

Sidewalk ramps will be constructed in accordance with Phoenix Standard Details or special details called out on the plans.

Payment for sidewalk ramps will be made under the bid items for "SIDEWALK", "CURB AND GUTTER", and TRUNCATED DOMES FOR SIDEWALK RAMPS, and will include all costs for labor, materials, equipment, forming, placement and finishing for complete sidewalk ramp installation. The cost of any special curb at the back of sidewalk ramps will be measured by the square foot and paid for as "SIDEWALK".

Decorative pavement or paving stones as shown on the plans and used in sidewalk areas will be measured by the square foot installed, and paid for under the bid item for "DECORATIVE PAVEMENT FOR LANDSCAPING PER DETAIL", including all subgrade preparation, leveling sand, etc to provide a complete installation.

Concrete Driveway and Sidewalk Slab Connections, Measurement and Payment

This work will consist of constructing concrete driveway and sidewalk slab connections to match existing at locations shown on the plans or requested by the Engineer. The slab thickness will conform to the applicable driveway or sidewalk detail.

Measurement and payment for this work will be made per square foot complete and in place for the appropriate pay item "CONCRETE DRIVEWAY ENTRANCE" or "CONCRETE SIDEWALK".

Mountable Curb and Gutter, Measurement and Payment

Mountable curb and gutter will be constructed in accordance with MAG Detail 220-2, Type E, where shown on the plans.
Measurement will be made per linear foot complete in place, and payment will be made under the bid item for "COMBINED CONCRETE CURB AND GUTTER, STD. DETAIL 220, TYPE 'A', H=6".

14. 344 SALVAGED CONCRETE HEADER

Add the following new Section, 344 SALVAGED CONCRETE HEADER:

344.1 DESCRIPTION:

Contractor shall salvage existing unreinforced concrete curb that is to be removed as a part of this project, prepare and utilize the salvaged concrete curb to create a header curb along the new stabilized decomposed granite path as shown on the plans.

344.2 MATERIALS:

Setting bed shall conform to Section 776, Masonry Mortar, Type A.

344.3 PAYMENT:

Payment for salvaged concrete header shall be made at the unit price bid per linear foot for "SALVAGED CONCRETE HEADER" and shall be compensation in full for all labor, material, and equipment for the salvaged concrete header, complete, and in place, as shown on the plans and details including concrete remnant preparation, trenching, placing, backfill and setting bed.

15. 345 ADJUSTING FRAMES, COVERS, VALVE BOXES, AND WATER METER BOXES, Revise Subsection 345.1 DESCRIPTION, Subsection 345.5 MEASUREMENT, and Subsection 345.6 PAYMENT as follows:

Delete Subsection 345.1 DESCRIPTION in its entirety, and substitute the following:

Adjustment of manhole frames, covers, clean outs, valve boxes, survey monument boxes (and water meter boxes if located in the pavement) to finish grade will be done AFTER placement of the final surface course pavement.
Any missing manhole frames or covers and water valve or survey monument box hardware (such as lids, for example) will be reported in writing to the Engineer during the initial lowering process to allow arrangements to be made to obtain replacement hardware. Missing hardware that is properly reported to the Engineer will be supplied to the Contractor by the City of Phoenix or the appropriate private utility company.

Replacement of any missing hardware that was not reported to the Engineer initially as specified, that comes up missing later when these facilities are brought back up to finish grade, will be the full responsibility of the

Contractor, at no additional cost to the City.
In addition, all manhole frames and covers, water valve and survey monument boxes or other related hardware removed by the Contractor during the lowering process will be maintained in a secure area, and the Contractor will bear full responsibility for this hardware material. Any hardware lost by the Contractor will be replaced in-kind, at no additional cost to the City.

All areas of existing pavement removed for adjustments that will be subjected to traffic prior to placement of final concrete collar rings will be temporarily filled with hot-mix Type D-1/2 asphalt and roller-compacted flush with the adjacent pavement. There will be no separate measurement or payment for this temporary hot-mix asphalt or placement or subsequent removal, the cost being considered incidental to the cost of the adjustment.

After removal of asphalt pavement in the area of adjustment, and prior to placement of the final concrete collar ring around the frame or valve box (as shown on City of Phoenix Detail P-1391 and MAG Detail 422), the asphalt pavement in proximity of the adjustment will be rolled with a self propelled, steel wheel roller.

The concrete collar ring around the frame or valve box will be circular, and will be a minimum of eight (8) inches thick, placed flush with the adjacent new pavement surface. At a minimum, concrete will be MAG Class 'AA' on all paved streets. All concrete will be obtained from plants approved by the Engineer.

A single No. 4 rebar hoop will be placed in each adjustment collar. The hoop diameter will be such that its placement is centered between the edge of the manhole frame or valve box, and the outside edge of the concrete collar. The depth of the hoop will be such that it is centered in the thickness of the collar. Each concrete ring will be scored radially at quarter-circle points. Score lines will be 1/4-inch wide by 1/2-inch deep. The concrete collar surface will be rough broom-finished. All pavement removed for adjustments will be replaced with concrete.

Traffic will not be allowed on the collars until the concrete has reached a minimum compressive strength of 2500 psi on residential streets, and 3000 psi on collector and major streets. On major streets, the Contractor will use "high-early" cement in the concrete mix, approved by the Engineer, to minimize delay in re-opening the street to traffic.

Prior to commencing work on the adjustments, the Contractor will submit a written adjustment plan and schedule to the Engineer for approval.

Sewer manhole frames and covers will be matched, kept together, and replaced to their original locations. The Contractor will remove existing asphalt, chip seal, or other materials from all sewer manhole covers and water valve box lids to be adjusted on this project. The Contractor's method for removal will be approved by the Engineer prior to actual work. Cover cleaning will be completed prior to adjustment of frames. Also, all water valve risers will be thoroughly cleaned to fully expose the valve operating nut.

QUARTER SECTION MAPS FOR WATER AND SEWER LINES

The Contractor may obtain up to three sets of waterline and sewerline quarter section maps for the streets included in this project after the contract is awarded and issued. To order the maps, the Contractor will bring an official contract specification book and a list of desired quarter section maps to the Technical Support Services counter on the 8th Floor of City Hall, 200 W. Washington Street. Up to three sets of maps will be provided at no cost to the Contractor. If more than three sets are requested, the Contractor will purchase the additional sets.

WATER VALVE AS-BUILTS

Upon completion of water valve box adjustments, the Contractor will provide one complete accurate and clearly legible set of as-built waterline Quarter Section maps to the Engineer. The Contractor will mark and color code all water valves on the maps as follows:

Blue-All valves shown on the Q.S. map found and adjusted.

Yellow-All valves shown on the Q.S. map but not found in the field.

Red- Any valve not shown on the Q.S. maps but discovered and adjusted. (Draw valve symbol on map at appropriate location and provide offset and location dimensions for valves in this category.)

Delete Subsections 345.5 MEASUREMENT and 345.6 PAYMENT and substitute the following:

345.5 MEASUREMENT

Measurement for adjustments will be per each respective item.

345.6 PAYMENT

Payment for the appropriate item will be made at the unit price bid for 'ADJUST EXISTING MANHOLE FRAME AND COVER, STANDARD DETAIL 422'; 'ADJUST EXISTING TYPE 'A' WATER VALVE, STANDARD DETAIL P-1391 AND P-1391-1'; 'ADJUST EXISTING SEWER CLEAN-OUT FRAME & COVER, STANDARD DETAIL P-1270'; 'ADJUST SURVEY MONUMENT HANDHOLE FRAME AND COVER, STD DET P-1270; or ADJUST EXISTING WATER METER BOX & COVER. Payment will include all labor, materials, and equipment necessary to satisfactorily clean and make complete adjustments.

There will be no separate measurement or payment for adjusting NEW manhole frame & covers, valve boxes, sewer clean-out frame & covers or water meter boxes constructed with the project. Payment for adjusting these new facilities is considered included in the price bid for the appropriate new item.

16. Add the following new Section 346 ADJUSTING NON-CITY UTILITIES as follows:

346.1 DESCRIPTION

The utility companies may utilize the Contractor to adjust their frames, covers, and valve boxes for this project.

The Contractor will coordinate with the Engineer and the representatives of the various utilities regarding the adjustment and the inspection requirements of their facilities. The Contractor will be responsible for obtaining and adhering to the specifications and any other special requirements from the utility companies.

346.2 MEASUREMENT

Measurement of adjusted private utility features will be on a per each basis.

346.3 PAYMENT

Payment for this work will be made at the unit price bid per each item adjusted to grade, under the proposal item "ADJUSTING FRAMES, COVERS, VALVE BOXES ON EXISTING NON-CITY UTILITIES, CONTINGENT ITEM", “ADJUST TYPE A WATER VALVE BOX & COVER CONTINGENT ITEM” and will be compensation in full for complete and final adjustment, including any utility inspector costs associated with these adjustments, regardless of the type of manhole or valve. The individual utility companies have the right

to accept or reject the Contractor's bid price for their portion of adjustments. If the utility company rejects the Contractor's price, the utility company will adjust their own facilities and the item quantity will be adjusted accordingly.

17. 362 UNDERGROUND POWER INSTALLATION Add the following new Section 362 UNDERGROUND POWER INSTALLATION as follows:

362.1 TRENCHING FOR UNDERGROUND STREET LIGHT CIRCUITS

Materials and construction will be in accordance with the Arizona Public Service Company (APS) "Underground Distribution Construction Standards", MAG, City of Phoenix Standard Specifications and these Special Provisions. The work will consist of the following items:

1. Providing all trenching, bedding, backfilling and compacting for street light circuits.
2. Installing junction boxes and ground rods provided by Arizona Public Service Company (APS).
3. Furnishing and installing 2 1/2-inch conduit, sweeps and conduit caps, including the running of a mandrel through the system.
4. Installing APS furnished flat strap in all conduit runs.

The Contractor will be responsible for obtaining the APS Standards from the APS Standards Department (602-371-6383, Barbara McMinn). A copy of these standards is available for perusal at the City of Phoenix Street Transportation Department Utility Coordination Office.

All work will be subject to inspection by Arizona Public Service and City of Phoenix forces. The Contractor will call APS Contracts Section at 602-371-6512 at least five (5) working days prior to starting trench work to meet with the APS Inspector and review inspection requirements.

The APS Liaison Agent is Mr. Henry Miranda {602-371-6605 or 928-607-5429 (mobile)}.

Trenching will be completed prior to sidewalk construction and ahead of pole installation. The Contractor will backfill and compact the trench in accordance with Section 601. The trench will be per APS plans.

Measurement and Payment

Measurement will be per linear foot, and payment will be at the unit price bid per linear foot for "TRENCHING FOR STREET LIGHT CIRCUIT" and will be compensation, in full, for all labor, equipment and materials necessary for the satisfactory completion of trenching and bedding; furnishing and installing conduit and sweeps; installing APS-provided junction boxes and ground rods; installing APS-provided flat strap in all conduit runs; furnishing and installing related items; and backfilling and compacting in accordance with the Standard Specifications and these Special Provisions.

The Contractor will notify the APS inspector assigned to this project at least two weeks prior to needing the APS crew for wiring street light poles and pulling conductor wire and energizing the system. The Contractor will anticipate that APS crews will typically take approximately four hours for each complete street light installation.

18. Add the following new Section 363 STREET LIGHTING INSTALLATION as follows:

363 STREET LIGHTING INSTALLATION

Description

The Contractor will furnish and install all above-ground street light equipment (poles, luminaire arms, luminaires, photocells, etc.) in accordance with the plans.

The Contractor will submit shop drawings for review and approval by the Engineer and the appropriate Power Company on all street light equipment to be provided by the Contractor.

The Contractor will coordinate street light equipment installation efforts to avoid any damage to other elements of project construction, and will provide a complete, connected system installation ready for the Power Company to pull conductor wires and energize the street light system.

All work will be subject to inspection by the Power Company and City of Phoenix forces. The Contractor will call the Power Company at least five (5) working days prior to starting work to meet with the Power Company Inspector and review inspection requirements.

Measurement and Payment

Measurement will be per each complete street light installed, and payment will be at the unit price bid per each for "FURNISH AND INSTALL STREET LIGHT PER C.O.P. STREET LIGHTING PROCEDURES, STANDARDS AND SPECIFICATIONS MANUAL, LATEST EDITION (SINGLE ARM)" and will be compensation in full for all labor, equipment and materials necessary for the satisfactory installation of street light equipment, including furnishing and installing street light poles, luminaire arms, luminaires, photocells, and all other related equipment items in accordance with the plans, Standard Specifications and these Special Provisions.

19. 401 TRAFFIC CONTROL, Add the following to Subsection 401.4 TRAFFIC CONTROL MEASURES:

SEQUENCE OF CONSTRUCTION

The sequence of construction will conform to the requirements of the Special Traffic Regulations.

The project will follow a phasing plan approved by the Engineer. All lanes will be maintained on a paved surface at all times during construction. This may be accomplished by using existing, new, or temporary asphalt pavement. Trenches will be completely backfilled and either paved with temporary asphalt pavement, or covered with metal plating as necessary to comply with this requirement and the "Special Traffic Regulations".

Night work will not be allowed on this project.

The right to direct the sequence of construction is a function vested solely with the Engineer. Prior to commencement of the work, the Contractor will prepare and submit to the Engineer, a written phasing plan and work schedule for the project. This plan and work schedule will be submitted to the Engineer at the Preconstruction Conference for review.
When approved, the phasing plan and work schedule will not be changed without the written consent of the Engineer. Orderly procedure of all work to be performed under this contract will be the full responsibility of the Contractor. The work schedule will include the hours per day and the days per week that the Contractor plans to work on the project site.

20. 401 TRAFFIC CONTROL, add the following to Subsection 401.5 GENERAL TRAFFIC REGULATION:

TRAFFIC REGULATIONS

A. The following will be considered major streets:

Riverview Drive

B. All traffic and/or traffic control devices on this project will be provided, maintained and/or controlled as specified in the City of Phoenix Traffic Barricade Manual, 2007 edition and addendums thereof.

C. Permission to restrict City streets, sidewalks and alleys (street closure permits) will be requested as specified in Chapter 3 of the City of Phoenix Traffic Barricade Manual, 2007 edition and addendums thereof.

D. Unless otherwise provided for in the following "Special Traffic Regulations", all traffic on this project will be regulated as specified in Chapter 4 of the City of Phoenix Traffic Barricade Manual, 2007 edition and addendums thereof.

E. No deviation from the "Special Traffic Regulations" will be allowed or implemented unless submitted to the Engineer for review and approval at least 14 days prior to proposed work.

F. Only City of Phoenix certified contractors can set, move or remove temporary traffic control devices (signs, barricades, etc.). This annual certification can be scheduled by calling 602-262-6235.

G. Civil sanctions for temporary traffic control violations apply as follows:

Civil Sanction Per Day	Violation Description
$1,500	Creating an eminent risk of death or injury to the public within the public right-of-way
$1,000	Restricting the right-of-way without proper certification or a right-of-way temporary use permit
$1,000	Restricting traffic during peak traffic hours as described in the Traffic Barricade Manual without authorization
$1,000	Failing to correct or cure a violation, as listed in this table, within the time period stated on the warning notice
$1,000	Restricting traffic at signalized intersections without any work occurring
$500	Closing a sidewalk improperly or closing a sidewalk without proper certification or closing a sidewalk without a right-of-way temporary use permit
$500	Violating the restriction limits, times and locations, of the right-of-way temporary use permit
$500	Missing or improper use of advance warning signs
$500	Missing or improper use of barricades and channelizing devices

$250	Leaving advanced warning signs facing traffic after restriction has been removed – per one traffic direction
$250	Leaving traffic control devices in the right-of-way twenty-four hours after right-of-way temporary use permit expires, unless a request for a permit extension is received by the City prior to the expiration of such permit
$250	Use of "unacceptable" quality traffic control devices as described in the Traffic Barricade Manual
$250	Rendering a bus stop inaccessible without relocating it or making other accommodations

H. Parking Meter Fees: To take a parking meter out of service requires a $35 application fee and $10 per meter per day.

I. The City has the authority to remove and store temporary traffic control devices in emergency situations or as a last resort if the barricade owner will not pick them up. The City will assess removal and storage fees accordingly.

21. 401 TRAFFIC CONTROL, Add the following to Subsection 401.5 GENERAL TRAFFIC REGULATION:

SPECIAL TRAFFIC REGULATIONS

Local Access Requirements

The Contractor will maintain local access to all side streets, access roads driveways, alleys, and parking lots at all times and will notify residents 72 hours in advance of any restrictions which will affect their access. The Contractor will restore the access as soon as possible. If the primary access cannot be restored in a timely manner, the Contractor will provide an alternative which will be pre-determined with the residents prior to imposing any restrictions. Any local street restrictions imposed will be such that local area traffic circulation is maintained.

Business Access Requirements

Access will be maintained to adjacent businesses at all times during their hours of operation. Access may be maintained by such measures as constructing driveways in half sections, or by providing bridging over new concrete. Properties with multiple driveway access will not have more than one driveway access restricted at any given time. While the one driveway is restricted, access to the other adjacent driveways will be maintained and unrestricted. Each individual driveway access restriction will be no more than fourteen (14) calendar days. Any business restrictions will be coordinated with the affected business in writing at least fourteen (14) days prior to imposing restrictions.

City Park Access Requirements

The Contractor will maintain access to Rio Salado Park at 3180 S.24th Street during park hours. Any restrictions will be coordinated with the appropriate Parks District Supervisor at least fourteen (14) days in advance, and full access will be restored as soon as possible.

Recreational Trail Crossing

The Contractor will maintain the trail crossing at Riverview Drive safely open at all times, and will maintain all

special trail signs required.

Coordination With Other Agency Projects

The Contractor will coordinate and schedule work to minimize disruption or conflicts with other Agency or other ongoing projects in the area.

Any work that may affect this project will be coordinated with the appropriate Agency or Private Project contact at least fourteen (14) days in advance.

Sanitation Pick-up

The Contractor will provide sanitation pick-up for affected residents by relocating trash containers, or by providing alternative measures acceptable to the Public Works Department, Sanitation Division (602) 256-3310.

Special Events

If there are special events scheduled to take place during the construction of this project, the Contractor will coordinate these events with the construction schedule. No additional compensation for delays associated with special events will be considered.

Special Sign Requirements

The Contractor will provide, install and maintain advance notification; public informational; and directional access signs (for businesses, churches, hospitals, schools, parks,trails etc.) that may be required by the Engineer. These signs may include, but are not limited to portable changeable message signs, radar/speed sensing trailers and other applicable Intelligent Transportation System type devices. The cost will be included in the bid item for Traffic Control Devices.

Bus Stops

The Contractor will maintain all existing bus stop locations on this project in a safe manner, or provide alternate bus stop locations and related directional signage as required by the Engineer. Not fulfilling this requirement can lead to civil sanctions.

Flagging of Traffic

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

Traffic Control Plan

The Contractor will submit a traffic control plan for approval, showing placement of all traffic control devices, including all conflicting signs to be covered/removed or relocated, or other features that may conflict with the placement of temporary signage. This plan will be professionally drawn on a 24" x 36" reproducible medium, and will be submitted to the Engineer at the Pre-Construction meeting or before. The Contractor will allow the Engineer fourteen (14) calendar days for review and approval of an acceptable plan.

Temporary Traffic Control Zone and Safety

At the Pre-Construction conference, the Contractor will designate an employee, other than the Project Superintendent, who is knowledgeable in the principles and methods of proper traffic control and safety. This employee will be available on the project site during all periods of construction to coordinate and maintain safe, acceptable and effective temporary barricading whenever construction affects traffic. This person will be authorized to receive and fulfill instructions from the Engineer and will supervise and direct traffic control. Instructions and information given by the Engineer to this person will be considered as having been given to the Contractor.

Failure to maintain temporary traffic control devices in accordance with the City of Phoenix Traffic Barricade Manual, 2007 edition, the approved Traffic Control Plan, and directives by the Engineer will result in suspension of work and/or civil sanctions until deficiencies are corrected to the satisfaction of the Engineer.

Safety Fencing Requirement for Trenches and Excavations

The Contractor will provide safety construction fencing around all open trenches and excavations during all non-working hours.

The Contractor will provide for the safety and welfare of the general public by adequately fencing all excavations and trenches that are permitted by the Engineer to remain open when construction is not in progress.

Fencing will be securely anchored to approved steel posts located six (6) feet on centers, having a minimum height of six (6) feet, and will consist of wire mesh fabric of sufficient weight and rigidity to adequately span a maximum supporting post separation of six (6) feet.

The fencing, when installed about the periphery of excavations and trenches, will form an effective barrier against intrusion by the general public into areas of construction. Fencing will not create sight distance restrictions or visual obstructions. At all times when construction is not in progress, the Contractor will be responsible for maintaining the fencing in good repair, and upon notification by the Engineer, will take immediate action to rectify any deficiency. Prior to the start of any excavating or trenching required for the execution of the proposed work, the Contractor will submit to the Engineer for approval, detailed plans showing types of materials and methods of fabrication for the protective fencing.

There will be no separate measurement or payment for furnishing, installing, or maintaining protective fencing. The cost will be considered incidental to the cost of the pipe and/or structures.

TRAFFIC CONTROL

Payment for traffic control will be on a lump sum basis for Traffic Control Devices.

22. Add the following new Section 402 ADDITIONAL CONSTRUCTION REQUIREMENTS as follows:

402.1 FIELD DOCUMENTATION

The Contractor will document existing conditions within the project area prior to construction. Documentation will be video tape. The video tape will not be made from a moving vehicle. One copy of the video tape will be furnished to the City prior to the start of construction. The cost of the video taping will be considered incidental to the cost of the project. No separate measurement or payment will be made for this item.

402.2 CONTRACTOR COMMUNICATION INFORMATION

The Contractor will provide a pager and mobile phone to his on-site Project Superintendent to ensure that the Engineer can reach the Contractor's Superintendent. This pager and mobile phone must be accessible by local land-line telephone service. The Superintendent's pager and mobile phone will remain in service for the duration of the project, and these phone numbers will be included on the Contractor's list of emergency phone numbers submitted at the pre-construction conference.

402.3 TRENCH PLATING

In paved areas where vehicles will be driving over trench plating, the plates will be set to match flush with existing pavement on all sides. Setting plates on top of the pavement surface and installing temporary asphalt ramps around them will not be allowed.

402.4 TRENCHING IN RIGHT OF WAY

The Contractor will not be allowed to stockpile trench material or store any equipment other than the mainline track hoe within the right-of-way. The Contractor will secure temporary 6' chain link fence around the track hoe during non-working hours.

402.5 MAXIMUM OPEN TRENCH

No more than 330 linear feet of open trench will be allowed. Trenches across driveways will be plated to maintain access. The cost of these plates will be considered incidental to the project.

402.7 POWER BROOM

The Contractor may be instructed by the Engineer to provide additional pavement cleaning (in parking lots, or other locations) above and beyond the normal expected cleanup and dust control required by MAG Section 104.1.3. If requested by the Engineer, the Contractor will clean the requested areas with a power pick-up broom.

Use of the power pick-up broom in the special requested areas only will be measured and paid for on an hourly basis under the bid item, 'POWER BROOM'. The number of hours listed in the bid proposal is only an estimate. Actual hours requested for this project may vary.

402.9 PUBLIC INFORMATION SERVICES

The City of Phoenix will provide a public information specialist for the community relations program on this project.

The Contractor will cooperate with the City's public information specialist firm in the preparation of newsletters, advanced notification for service disruptions, answering questions from the public, etc. He will also provide schedule update information to the specialist.
The Contractor will provide representatives as needed for all meetings with the public throughout the contract period.

The City will pay public information service costs associated with approved contract time extensions; however, if the Engineer determines that delays were caused by the Contractor, the additional costs for public information services will be deducted from the Contractor's final pay request.

402.10 SPECIAL CONSTRUCTION REQUIREMENTS THROUGH ADOT OUTFALL CHANNEL

General

The Contractor will be responsible for ensuring that all onsite and offsite activities, equipment, and facilities conform to the requirements of applicable 404 NWP 14 Permit. The construction of the box culvert, retaining walls, channel lining and channel bottom protection, headwalls, inlet and outlet structures, new pipe lines, relocated pipe lines, removal and planting of trees, and placement of hydroseed will be accomplished in accordance with the applicable 404 Permit.

Stockpiling of materials, including asphalt pavement, concrete or excavated material in the ADOT Outfall Channel is not permitted.

Construction Limits

All work in the canal must remain within the "Limits of Canal Reconstruction" defined on the plans and disturbance in the canal shall be minimized to the extent practicable. No additional activities within or outside the illustrated work area are assumed in this response or should be implied as authorized.

All temporarily disturbed areas within the "Limits of Canal Reconstruction" shall be returned to preconstruction conditions. Disturbance in the canal must be minimized as much as possible at all times.
Stockpiling material (e.g., accumulated sediment, trees, branches, concrete, etc.) and equipment or vehicle maintenance in the canal is not allowed. Such materials will be hauled off immediately.

The Contractor will provide and install temporary orange plastic fencing along the limits of canal reconstruction. The fencing will define the work zone and the allowable reconstruction disturbance limit.

Measurement and Payment

No separate measurement or payment will be made for these special construction requirements in the ADOT Outfall Channel. The cost of these items will be considered incidental to the cost of the project.

402.11 POLLUTION AWARENESS MARKERS

Pollution Awareness Markers (PAM's) will be installed by the Contractor for all new catch basins and for each existing catch basin within the project limits that does not have a PAM. The PAM's will be supplied to the Contractor by the City. PAM's will be installed at the location identified by the Engineer. For existing catch basins, flat PAM's will be supplied, and the contractor will clean the surface with a wire brush, apply appropriate adhesive to the back of the marker, and apply the marker to the clean surface. For new catch basins, PAM's with feet will be supplied, and the Contractor will install them as the catch basin is cast.

23. <u>430 LANDSCAPING AND PLANTING</u>

Add the following paragraph to <u>Subsection 430.1 DESCRIPTION:</u>
Contractor is encouraged to avoid disturbing the existing landscape area in the TCE on the Intrepid Coatings property which is north of Riverview Drive and west of the ADOT channel. Contractor is encouraged to photo document the TCE prior to beginning construction. Existing shrubs damaged or destroyed during construction shall be replaced in kind with a 5 gallon shrub of the same genus & species. Any decomposed granite removed or damaged during construction shall be replaced in kind with the same size and color of rock mulch.

Add the following to <u>Subsection 430.2 GENERAL:</u>

All planting areas shall be left free of construction debris including but not limited to concrete, grout, re-bar, wood, nails, debris and/or toxic material and graded to a level to permit landscape and irrigation construction. Trenches, foundation backfill or other filled excavations shall be compacted prior to the site being turned over to the Landscape Contractor. Compaction of fill areas for planting shall be at 85% maximum. No soil preparation or planting shall begin before the site has been cleared and cleaned of debris. The Engineer shall approve the condition of all planting areas prior to commencement of soil preparation for planting. Commencement of work indicates acceptance of job site conditions by the Contractor.

The Contractor shall maintain stakes set by others until all parties concerned mutually agree upon their removal.

As directed by the Engineer, treat all non-paved areas with a chemical contact herbicide, such as Round Up or approved equal, to kill existing weeds. Clear, grub and remove the weeds after weed kill has been established, to the satisfaction of the Engineer.

Finished grades for landscape areas shall be a smooth, uniform surface, free of abrupt grade changes or depressions. Finished soil grades adjacent to paving, curbs or headers shall be as shown in the drawings and may be adjusted by the Engineer for surface materials.

Provide proper surface drainage within all planted areas. Any grading conditions found in the plans or specifications, in obstructions on the site, or in prior work done by another party that the Contractor feels precludes establishing proper drainage, shall be brought to the attention of the Engineer in writing for resolution.

During the installation of landscape plantings, keep pavements clean and work areas in a neat and orderly condition on a daily basis. Remove all debris, trash and excess materials generated by the landscape installation. Sweep, scrub or hose affected areas as directed by the Engineer to maintain a clean and neat work area.

Landscape Contractor shall call for “blue stake” as required. Exercise extreme caution in all planting operations, as there are underground electric and telephone cables, sewer lines and water lines throughout the entire area. Contractor shall study and be familiar with the location of these obstructions and underground utilities. Place plantings where shown on the plans. If there are obstructions or underground utilities, relocate plants clear of any interference at the direction of the City inspector. Landscape Contractor shall repair all damages caused by him to obstructions and underground utilities at no expense to Owner.

The Contractor shall layout all plant material using stakes or flags to indicate the location of all plant materials. Spacing of shrub and groundcover material shall be as specified in schedule on plans. Location and spacing of trees shall be determined by the plan scale and located as accurately as the scale permits. Preliminary adjustments to conform to actual site conditions shall be accomplished at this time and the approval of the Engineer on the stakeout of all plant material.

Contractor shall not begin planting operations until landscape grading and irrigation system has been installed and is fully operable.

Add the following paragraphs to <u>Subsection 430.2.1 Source Quality Control:</u>

The Contractor shall ship materials with Certificates of Inspection required by governing authorities. Certification shall indicate suppliers name, address, telephone number, date of purchase, name, model number and technical description of item purchased, and quantity of each item purchased.

Send the availability letter to the Engineer within 30 days of Notice to Proceed. The definition of Non-availability is the contractor contacting a minimum of five (5) different sources.

Add the following paragraphs to Subsection 430.3 PLANT ESTABLISHMENT GUARENTEE AND MAINTENANCE:

Contractor Supervisor shall be responsible for the training and supervision of the maintenance personnel's performance of their duties during the maintenance period.

All materials as noted (but not limited to this list) shall conform to the bid specifications:

Pre-emergent
Fertilizer
Plant material
Decomposed granite
Compost

Tree and Shrub Care: Maintain trees and shrubs in a healthy, growing condition by performing necessary operations, including the following:

Pruning: Prune and shape only as necessary to maintain the usual form of the plant, to stimulate growth, to maintain growth within space limitations, and to maintain a natural appearance. Do not shear plant material. Any plant material improperly maintained, as determined by the Engineer, the Contractor shall remove and replace at no additional cost to the Owner.

Staking: Stakes are to be inspected weekly and adjusted or removed as necessary.

Weed Control: In groundcover area, keep areas between plants free of weeds. Use recommended, legally approved, herbicides whenever possible. Avoid frequent soil cultivation.

Granite Areas: Inspect landscape granite weekly. Remove man-made debris, weeds, and grass controlled with chemicals. Any erosion that has occurred in any granite areas the Contractor shall be remedy, repair and replace granite at the contractor's expense.

Weed Control: Keep all landscape areas free of broadleaf or grassy weeds, with pre-emergent and/or selective contact herbicides. Cultivating or hoeing weeds is not an allowed practice. The Contractor shall eradicate all noxious weeds or the Owner may not accept the project. An Arizona pesticide licensed contractor shall perform all chemical control.

Contractor shall replace plants within seven days of notification from the Engineer. Remove and replace dead, damaged or vandalized plants within seven days of notification. Install replacement plants of the same kind and size as originally specified and as described in the contract documents.

The Contractor shall maintain the irrigation system as specified in Section 440 and make any necessary repairs regardless of cause to assure a complete and operational system as originally designed and constructed. Repairs shall be made within 24 hours of detection.

The Contractor shall notify the Engineer 48 hours prior to the application of any chemical treatments. Chemical mixing and the use of application equipment shall be done by qualified personnel in the presence of the Engineer. All chemical control shall be performed by an Arizona pesticide licensed contractor. The Engineer shall approve the personal, materials and methods of application of chemicals prior to beginning the operation.

Delete the first, second, third, fourth paragraphs of Subsection 430.5 DELIVERY, STORAGE, AND HANDLING in their entirety and replace with the following:

All packaged materials that will be utilized during the planting operation shall be delivered in containers showing weight, analysis and name of manufacturer. Contractor shall protect materials from deterioration

during delivery and while stored on site. Submit certification of contents, quantity and source of all plants and planting materials to the Engineer for approval.

Upon delivery to the site, all nursery stock shall be planted as soon as possible, if planting is delayed more than 6 hours after delivery, protect the plants from the sun, wind and mechanical damage. Keep roots and root balls moist and water as often as necessary to maintain good health and vigor. Remove and replace all damaged and unhealthy plants as directed by the Engineer. Do not bend or bind any plants in such a manner as to damage bark, break branches or destroy their natural shape. Provide adequate protection for root systems. Do not handle container plants by their foliage, branches or trunks. Stock which is not satisfactory in the opinion of the Engineer shall be immediately replaced with acceptable stock at contractor's expense.

Add the following to the fifth paragraph of Subsection 430.5 DELIVERY, STORAGE, AND HANDLING:

Any plants found to be unsuitable in growth habit or condition, or plants which are not true to the specification, shall be removed immediately from the site and replaced with acceptable plants.

Delete Subsection 430.10.1 Deciduous and Evergreen Planting in its entirety and replace with:

Planting pit width only for trees and shrubs shall be excavated to a volume two and a half (2 ½) times the size of the root ball of the plant to be planted. Contractor shall stockpile native soil excavated. Use the native soil for backfilling planting soil. Contractor shall scarify the walls of the planting pit to the satisfaction of the Engineer.

Prior to planting perform a percolation test on all plant pits to determine that adequate drainage exists. Fill the pits half-full with water. Allow the pits 24 hours to drain. If any pit has not substantially drained, install a rock caisson. Each caisson shall have a four-foot deep (4') by 8-inch (8") diameter hole filled with 1-1/2-inch diameter crushed stone filled to the bottom of the pit. Increase the depth of the caissons if encountering ground water, caliche, or impervious rock.

Provide proper surface drainage within all planted areas. Any grading conditions found in the plans or specifications, in obstructions on the site, or in prior work done by another party that the Contractor feels precludes establishing proper drainage, shall be brought to the attention of the Engineer in writing for resolution.

Planting pits shall be backfilled with equal parts in thirds of native soil, humus, and sand and be watered settled to a grade sufficient, that in the setting of the plant, the finish grade level after settlement will be the same as that at which the plants were grown (see details in landscape plans).

Container Removal: Remove container by turning plant upside down, supporting root ball with hand and tapping container gently to dislodge plant. Support root ball with both hands until planted in pit. Do not injure root ball, or hold plant by the stem.

Box Removal: Remove bottom of plant boxes before planting. Remove sides of box without damage to root ball after positioning plant.

Set container and boxed stock on undisturbed native soil, plumb, and hold rigidly in center of pit or trench with top of ball at elevation as shown on planting details. When set, place additional soil backfill and fertilizer tablets around base and sides of ball, and work each layer to settle planting soil backfill to eliminate voids and air pockets. Working in six inch (6") lifts of planting backfill mix water settle the area every twelve (12") of depth applied around plant thoroughly before placing next two lifts, repeat process until completed.

After removal of plants from containers or box sides, superficially cut edge-roots with a sharp knife on sides and tease out feeder roots to assure positive contact and embedment into planting soil.

After watering, any settlement within basins shall be refilled to required grade with native soil.

Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by the City Inspector, do not cut tree leaders, and remove only injured or dead branches.

Remove from site any excessively pruned or malformed stock resulting from improper pruning and replace at no additional cost to the Owner.

Stake trees as identified on the plans.

Remove any rock or other underground obstructions, if possible, to the depth necessary to permit proper planting, according to plans and specifications. When encountering underground construction, obstructions, or rock in the excavation of planting areas, the Contractor may select other locations of the planting only upon approval of the Engineer. Prior to any work, the Contractor must be knowledgeable of the locations of all existing underground installations, and their protection is his responsibility. At the expense of the Contractor, correct all damage to the satisfaction of the Engineer. Coordinate all work with other trades so conflicts will not exist or delay the work in any way. Coordinate grades with earthwork and with placement of irrigation systems fixtures.

All trees specified for staking shall be staked in line with prevailing winds. Stakes shall be 2-inch round knot-free pine, length as required and installed as follows: Stakes shall be placed immediately adjacent to, but in no case through, the root ball, and penetrate at least 6 inches into undisturbed soil, be aligned vertically, be pointed at one end, and be aligned so as not to interfere with the existing branch structure of the tree, extending 5 to 6 feet above grade.

Staple vinyl for fastening trees to stakes to the wood stakes, or otherwise attached to prevent removal of the vinyl. Provide not less than two (2) stakes spaced equally around trees (see tree staking details). After the Engineer has reviewed tree staking, remove all growth stakes, labels, and ties from trunks of trees and shrubs and be properly disposed of.

Delete Subsection 430.13 DECOMPOSED GRANITE AND RIVER RUN AREAS in its entirety and replace with the following:

Decomposed granite shall be native, local, desert from a single source, free from coating, clay, caliche or organic matter. Contractor shall provide City Inspector with a minimum five (5) gallon sample of each material for approval before installation.

Contractor must examine the subgrade, verify the elevations, and observe the conditions under which the work is to be performed. The existing grade shall be fine graded and raked free of organic matter and other debris one inch diameter and larger and then compacted.

Unless otherwise specified in the drawings, granite finish grade shall be one inch (1") below top of curb or adjacent sidewalk surfaces.

Do not utilize black polyethylene film.

430.13.1 Installation

Any existing weeds or Bermuda grass growing in designated landscape areas shall be treated with a post-emergent spray, such as "Round-up", or an approved equal. Any existing or new trees or vegetation shall be protected from the spray drift. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated from all areas of the landscape and where designated by the Engineer. The contractor shall remove all non-planted vegetation from all areas designated to receive decomposed

granite (by chemical or mechanical means) and maintain the designated areas “vegetation-free” for a minimum period of 40 working days prior to placement of the decomposed granite, or as specified by the Engineer. Prior to placement of the decomposed granite, designated areas to receive decomposed granite shall be completely free of all grass, weeds, or other miscellaneous vegetation growth. All dead grass and weeds shall be removed and properly disposed of. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated where designated by the Engineer from landscape or decomposed granite areas.

All weed control products and herbicides shall be approved for use by the Engineer prior to any applications. Contractor shall submit copies of all manufacture specifications and application rates to the Engineer for review and approval prior to application. Herbicides and weed control shall only be performed by a licensed applicator; contractor shall supply information on applicator to the Engineer for approval.

The sub-grade, prior to granite placement, shall be compacted to between 85 to 90-percent of the maximum proctor density, as determined in accordance with the requirements of Arizona Test Methods 230 or 235, depending on the test method used to determine the compaction density (Sand Cone or Nuclear Method). Compaction testing and associated report shall be provided to the Engineer and sealed by a registered and licensed geotechnical engineer with all cost for testing and report of results to be provided by the Contractor at no cost to the Engineer.

Contractor shall apply three (3) applications of pre-emergent. One application of pre-emergent herbicide as per manufacturer’s directions prior to installing granite and one application after granite has been installed, compacted and raked level and one application 30 Days prior to the end of the maintenance period. The pre-emergent herbicide shall be applied in the manner recommended by the manufacturer to prevent germination of noxious weeds, and shall be equivalent to Gallery, or an approved equal, and shall be applied at a rate of one pound per acre. Pre-emergent herbicide shall be applied to the designated granite areas, prior to the final water settling operation. The Engineer is to be notified prior to all pre-emergent applications. Water to activate the pre-emergent herbicide shall be applied to the areas of the herbicide application as recommended by the manufacturer’s label. The amount of water specified by the manufacturer may be adjusted due to rainfall, if approved by the Engineer.

After the first application of pre-emergent the granite shall be installed and shall be rolled or raked to remove any irregularities, tire marks etc. Installation shall provide a two-inch depth of decomposed granite after compacting. During the final spreading and final grading operations, all surfaces within the decomposed granite areas shall be passed over by the spreading and grading equipment a minimum of 2-times. Equipment operations for spreading, grading, raking, chemical application, water settling, and any other operations shall be done in a manner that uniformly maximizes the vehicle(s) wheel compaction over the surface area. All vehicles used for spreading, grading and raking the decomposed granite shall have one set of wheels with floatation tires having a minimum width of 18-inches to allow equal compaction of the granite mulch. The use or application of granite by any method (conveyor belt etc.) shall not relive the contractor of providing granite compaction to a level approved by the Engineer. Methods of compacting such as rolling, water settling, etc., shall be approved by the Engineer.

After placing, spreading, compacting, and grading the decomposed granite the contractor shall water settle the total thickness of the decomposed granite to remove the fine material from the surface. The water settling operation, noted above, shall be completed by applying water at minimum depth of one-half inch over the decomposed granite areas placed or as approved by the Engineer. This water settling technique can be used to water in the second application of pre-emergent in compliance with pre-emergent Manufacturer recommendations and as approved by the Engineer.

430.13.2 Decomposed Granite to Match Existing Size & Color:

Contractor shall supply and place decomposed granite in areas designated on the plans to match existing granite size and color. Contractor shall provide samples of each type of decomposed granite to the City of Phoenix to verify that the proposed granite matches the existing in size and color. Decomposed granite samples shall be placed in mock up sample areas at the sizes locations indicated in the Landscape Notes on the project Landscape Plans. Engineer must approve all new granite samples prior to placement.

430.13.3 Stabilized Decomposed Granite Size & Color per Plans:

The Contractor shall supply and place 1/4" Minus Granite in 1" lifts and compact areas with vibrating plate compactor in colors as designated on the plans. Size gradation requirements for the 1/4" minus decomposed granite is as follows:

1/4 Inch Minus

Sieve Size Sieve	Percent Passing
1/4 Inch	100
No. 40	5-25

Contractor shall provide samples to the City of Phoenix for all granite as specified above for approval by the City prior to placement.

Delete Subsection 430.15 MEASUREMENT AND PAYMENT in its entirety and replace with:

Measurement and Payment for Plants is the price bid per each complete in place plant as shown on the project plans, details, and specifications. Payment shall be full compensation for all labor, material, equipment, and incidental and appurtenant work. Any costs incurred to repair, replace or re-install existing plants on private or parks department property shall be considered incidental to the cost of the project.

Measurement and Payment for Decomposed Granite for General Landscape, Per Plans and Specifications will be at the contract unit price bid per Cubic Yard for the inert materials as shown on the project plans, details, and specifications and shall include all costs, materials, equipment, labor, and operations necessary for the installation and associated weed control and pre-emergent applications.

Measurement and Payment for the Decomposed Granite, Stabilized for the Multi-Purpose Trail, 1/4" Minus 3" Thick (Apache Brown) will be at the contract unit price bid per Square Foot for the inert materials as shown on the project plans, details, and special provisions and shall include all costs, materials, equipment, labor, and operations necessary for the installation and associated weed control and pre-emergent applications. Any costs incurred to repair, replace or re-install existing decomposed granite on private or parks department shall be considered incidental to the cost of the project.

Measurement and Payment for the Rock Riprap (4"-8") will be at the contract unit price bid per Square Foot for the inert materials as shown on the project plans, details, and special provisions and shall include all costs, materials, equipment, labor, and operations necessary for the installation and associated weed control, pre-emergent applications, and filter fabric installation.

Measurement and payment for Plant Establishment Guarantee and Maintenance shall be on a monthly basis for acceptable landscape maintenance under the bid item "PLANT ESTABLISHMENT GUARANTEE AND MAINTENANCE" (including water and power if required). No payment shall be made for unacceptable maintenance. When acceptable corrections have been made for the monthly inspection, the monthly payment will be released. Upon final acceptance, the final monthly payment will be made.

Prior to final acceptance of the landscaping, the Contractor will provide the Engineer with all water and electrical account numbers and billing information. Final acceptance will not be granted until this information is given to the Engineer and accounts are turned over to the city.

24. 432 NATIVE HYDROSEEDING

Add the following new Section, 432 NATIVE HYDROSEEDING:

Comply with City of Phoenix Standard Specifications and Details for Public Works Construction in its entirety, including City of Phoenix Supplements.

432.1 GENERAL

432.1.1 References

The publications listed below form a part of this specification to the extent referenced. The text references only the basic publications designation.

A. ASTM INTERNATIONAL (ASTM),

1.ASTM D 4972-01 (2007) Standard Test Method for pH of Soils

2.ASTM D 5268-07 Standard Specification for Topsoil Used for Landscaping Purposes

B. U.S. DEPARTMENT OF AGRICULTURE (USDA)

Agricultural Marketing Service (AMS) Federal Seed Act (1988 Revised 1998)

C. THE UNITED STATES PHARMECOPEIA (USP)

Swell Volume USP29NF24 Psillium (plantago) powder swell volume test

432.1.2 Submittals

The Contractor shall submit 6 copies of the following to the Engineer for review.

Equipment and Materials Lists;

Submit complete list of major items of landscape equipment and materials at the preconstruction conference. Submit all items at one time. A partial list is not acceptable. Submittals shall include the Manufacturer's Specifications, weights, space requirements, physical dimensions, rating of equipment and supplemental information requested by the Engineer. Submit performance curves for pumps and fans. Where a manufacture cut sheet describes additional items, highlight the required submittal item or delete all additional items. Clearly note equipment and materials that deviate from those shown or specified in size, weight, required clearances, and location of access. Indicate and provide modifications to the Work as shown or specified in the submittals as a part of the Work.

Surface Erosion Control Material;

Contractor shall get advance approval from the Engineer for temporary erosion control and shall have it in place at the start of this contract. Contractor will analyze existing drainage structures and drainage ways, and make renovations as needed as a part of this scope of work to control and minimize erosion to this project's seeding and landscape. The cost for this work shall be incidental to the required Storm Water Pollution Prevention Plan provisions of this contract.

Chemical Treatment Material;

Submit Manufacturer's literature including physical characteristics and application instructions for equipment and chemical treatment material.

Delivery Schedule;

Submit a delivery schedule within 45 calendar days of the Notice of Proceed.

Seed Reserve List;

Submit a complete reserve list of all the seeds needed for this project. The list shall include the confirmed seed source for the seed varieties, assuring the availability of each species and quantity specified on the plans and this specification. The list shall include the species name, common name, percent of pure live seed (PLS), minimum percent of germination, and maximum percentage of weed seed content. The Contractor shall confirm the source for the seed as evidenced by an invoice or contract with the confirmed source and the approximate delivery date of the seed to the jobsite.

Seed Establishment Period;

Submit a seed establishment period at the preconstruction conference. When there is more than one seed establishment period, describe the boundaries of the seeded area covered for each period.

Maintenance Record;

Submit a written record of the maintenance work performed each week including areas reseeded, erosion control, mowing, fertilization calendar, erosion repair, irrigation system repair, replacements, and diagnosis of any unhealthy materials and the prescribed treatment.

Application of Pesticide;

Submit a Pesticide Treatment Plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included. Treatment for disease or pest shall be in accordance with all Federal, State and City of Phoenix rules and regulations. As feasible, Contractor should seek cultural and biological control solutions, which do not depend on chemical applications for the eradication of insects, mites, snails, nematodes, and small animals (squirrels and gophers). Utilize trapping unless a licensed pest control advisor prescribes in writing another method. The Engineer shall approve method prior to initiation of any pesticide treatment or pesticide program.

Delivered Topsoil;

The Contractor shall test samples taken from several locations at the source and the certified results submitted to the Engineer prior to the delivery of tested topsoil to the site. All top soil shall comply with “Arizona Residential Soil Cleanup levels and standards.

Soil Amendments;

Submit a 10-pound sample to the City for approval. Submit a chemical analysis for bulk deliveries.

Mulch;

Submit a 10-pound sample to the City for approval

Equipment Calibration;

Certification of calibration tests conducted on the equipment used in the seeding operation.

Soil Test;

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Correctly identify each report and describe the test methods used and compliance with recognized test standards.

Certificates;

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

A. Seed - Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

B. Topsoil - Particle size, pH, organic matter content, textural class, soluble salts and chemical and mechanical analyses.

C. pH Adjuster - Calcium carbonate equivalent and sieve analysis.

D. Fertilizer - The chemical analysis and composition by percent
E. Organic Material - Composition and source.

F. Soil Conditioner - Composition and source.

G. Mulch - Composition and source.
H. Non-Asphaltic Adhesive - Composition.

I. Pesticide - EPA registration number and registered uses.

432.1.3 Source Inspection

The source of delivered topsoil shall be subject to inspection by the Engineer.

432.1.4 Delivery, Inspection, Storage, and Handling

432.1.4.1.2 Soil Amendments

Deliver soil amendments to the site in the original, unopened containers bearing the manufacturer's chemical analysis. Soil amendments furnished in bulk is acceptable in lieu of containers. Provide a chemical analysis for bulk deliveries. All soil amendments shall comply with all Federal, State and Local regulations.

432.1.4.1.3 Pesticides

All pesticide applications shall comply with all Federal, State and Local regulations and AZPDES Requirements specified as a part of these specifications. Deliver pesticide material to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Store, protect and secure all pesticides according to all Federal, State and Local regulations.

432.1.4.2 Inspection

Upon arrival at the job site, inspect seed for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Inspect other materials for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Remove unacceptable materials from the job site.

432.1.4.3 Storage

Store all materials in designated areas. Store the seed, lime, and fertilizer in a cool dry location away from contaminants. Store and protect chemical treatment material according to all Federal, State and Local regulations and manufacturer's instructions, but not with seeding operation materials.

432.1.4.4 Handling

Except for bulk deliveries, do not drop or dump materials from vehicles.

432.1.4.5 Time Limitation

Hydro seeding time limitation for holding seed in the slurry is a maximum of one (1) hour.

432.2 PRODUCTS

432.2.1 Seed

432.2.1.1 Seed Classification

Provide State-approved seed of the latest season's crop in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

432.2.1.2 Permanent Seed Species and Mixtures

Proportion permanent seed species and mixtures weight as follows:

SEED AREAS

LOWER SONORAN MESQUITE

Botanical Name	Common Name	Rate/Acre
Acacia constricta	Whitethorn acacia	1.5
Atriplex canescens	Four-wing saltbush	1.0
Atriplex lentiformis	Quailbush	0.25
Bouteloua curtipendula	Side-oat grama	2.0
Cercidium floridum	Blue palo verde	2.0
Celtis pallida	Desert hackberry	1.0
Larrea tridentata	Creosote bush	4.0
Lycium exsertum	Desert thorn	0.5
Olneya tesota	Ironwood	3.0
Phacelia crenulata	Wild heliotrope	1.0
Ziziphus obtusifolia	Lotebush	1.0

Weed Seed: Weed seed shall not exceed one percent (1%) by weight of the total mixture.

432.2.1.3 Quality

Weed seed shall be a maximum 0.50 percent by weight of the total mixture.

432.2.1.4 Seed Mixing

The mixing of seed shall be done on-site at the agreed upon location/staging area and only after inspections and approval of individually delivered species accompanied with required paperwork have been received and approved by the Engineer. The Engineer will inspect and approve all seed mixing prior to any applications.

432.2.1.5 Substitutions

The Contractor shall request in writing and receive approval from the Engineer before making any substitutions.

432.2.2 Topsoil

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with Section 201 Clearing and Grubbing. When additional topsoil is required beyond the available topsoil from the stripping operation, then amend as recommended by the soil test for the seed specified the delivered topsoil. Topsoil shall be free from slag, cinders, stones, sticks, roots, trash, or lumps of soil or other material over a minimum 1-1/2-inch diameter. Topsoil shall be free from viable plants and plant parts. The Contractor shall furnish a source for topsoil, if not designated, in accordance with the requirements herein and the requirements of "Arizona Residential Soil Cleanup" levels and standards. Topsoil from sources furnished by the Contractor shall conform to the following requirements:

Prior to hauling any topsoil to the project site, the Contractor shall furnish a written soil analysis, prepared by a laboratory approved by the Engineer, for each source of topsoil proposed for use. The soil analysis shall indicate the pH, soluble salts, percent calcium carbonate, exchangeable sodium in percent and parts per million, plasticity index and size gradation. Test a minimum of three samples per each 10,000 cubic yards, with at least three samples per source. Perform all tests in accordance with the following requirements and test procedures listed in the Table A.

Table A

Characteristics	Test Method	Requirement Average of 6 Samples
pH	ARIZONA 237	6.0 - 8.3
Soluble Salts: (PPM)	ARIZONA 237	2000 Maximum
Calcium Carbonate	ARIZONA 732	8% Maximum
Exchangeable Sodium:	ARIZONA 729	5% Maximum
Exchangeable Sodium: (PPMP)	ARIZONA 729	300 Maximum
PI	AASHTO T 90	5 - 20
Gradation:	ARIZONA 201	% Passing
2 inch		100
1/2 inch		85 - 100
No. 40		35 - 100

At the Contractor's option, the Engineer will test these topsoil samples. The Contractor shall bear the expense of any topsoil testing from proposed sources. Topsoil shall be fertile, friable soil obtained from well-drained arable land, which has or is producing healthy crops, grasses or other vegetation. It shall be free draining, non-toxic and capable of sustaining healthy plant growth. Topsoil shall be reasonably free of subsoil, refuse,

roots, heavy clay, clods, noxious weed seeds, phytotoxic-materials, coarse sand, large rocks, sticks, brush, litter and other deleterious substances.

For acceptance purposes, a lot is approximately 20,000 cubic yards of topsoil material delivered from a given source to the project site. For each lot of topsoil, take six representative samples at random locations designated by the Engineer. Sample the Topsoil after final placement. Test each source of topsoil separately. The Engineer will sample each lot for pH, soluble salts, calcium carbonate, exchangeable sodium in percentage and parts per million, PI, and gradation in accordance with the test procedures listed in the Table A. The average test result obtained for each characteristic from each lot shall meet the following requirements:

a. The Engineer shall reject a lot if it fails to meet all the average test results, from the specifications listed above. In lieu of removal and replacement, the Contractor may propose to the Engineer for consideration a method of treatment of the in-place material to obtain specification compliance. The Contractor shall treat the topsoil at no additional cost to the City, and then the Engineer will resample and test the lot for specification compliance.

b. If the pH of the topsoil for a lot exceeds 8.3, then remove and replace or treat the topsoil as provided for in the preceding paragraph. Any treatment for pH shall be sufficient to obtain an average pH between 6.0 and 8.0, inclusive. The treatment for pH shall follow the recommendations of a recognized soil analyst and shall be subject to the approval of the Engineer. Any treatment for pH shall be at no additional cost to the City. Additional acceptance testing after treatment for pH will not be required.

432.2.3 Soil Amendments

Soil amendments shall consist of pH adjuster, fertilizer, organic material, and soil conditioners meeting the following requirements. The City does not allow Vermiculite. All soil amendment applications shall comply with all Federal, State and Local regulations and AZPDES, and these specifications. Apply amendments per the directions and application rates specified in the soil testing report, completed by the City of Phoenix, and in compliance with all applicable Federal, State and Local regulations. Prepare soil using a mixture of 70% excavated site soil and 30% soil conditioner and amendments. Remove Clods or stones exceeding 2" in diameter and foreign matter deemed objectionable by the Engineer. All excess soil excavated from the plant pits that has clods or stones 2" and larger shall be disposed of on the project site as directed by the Engineer. Mix amendments with the soil conditioner after delivery to the project site and under the supervision of the Engineer. The City will not allow pre-mixing prior to delivery to the project. The City will not make additional payment for this work considering it part of the planting operation.

432.2.3.1 pH Adjuster

The pH adjuster shall be agricultural grade soil sulfur. These materials shall be 99% pure, granular or pelletized and flowable. Use the pH adjuster to create a favorable soil pH for the plant materials specified and in compliance with applicable Federal, State and Local regulations.

432.2.3.2 Fertilizer

It shall be as recommended by the soil test completed by the City of Phoenix.

432.2.3.3 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test completed by the City of Phoenix.

432.2.3.4 Organic Material

Organic material shall consist of either decomposed wood derivatives or recycled compost. The products shall conform to the following minimum requirements: Cellulose fiber mulch shall consist of at least 70% specifically

prepared virgin cellulose fiber, thermo-mechanically processed for specific use as hydro-mulch. It shall contain no growth inhibiting factors and shall have the following properties:

Virgin Wood Cellulose Fiber - 70% (minimum)
Recycled Cellulose Fiber 30% (maximum)
Ash Content 0.8% - 0.3% (maximum)
pH 4.5-1.0
Water Holding Capacity 10:1 (Ratio of Water : fiber) 2.3.4.1

432.2.3.4.1 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted or stabilized with nitrogen.

432.2.3.4.2 Recycled Compost

Compost shall be a well-decomposed, stable, weed free organic matter source. Use compost from food; agricultural or industrial residuals; bio-solids (treated sewage sludge); yard trimmings or source-separated or mixed solid waste. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent by weight of man-made foreign matter. Clear the compost of plastic materials larger than 2 inches in length.

432.2.3.5 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements of the soil test completed by the City of Phoenix.

432.2.3.5.1 Sand

Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Balance greensand with the inclusion of trace minerals and nutrients.

432.2.3.5.2 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

432.2.4 Mulch

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region.

432.2.4.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment. All straw shall be second cut bales and shall be Arizona grown, harvested and packaged. Contractor shall submit to the Engineer name of supplier for approval. All straw shall comply with all applicable Federal, State and Local regulations.

432.2.4.2 Wood Cellulose Fiber Mulch

Wood cellulose fiber mulch shall not contain any growth or germination-inhibiting factors and dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

432.2.4.3 Paper Fiber

Paper fiber mulch shall be recycled shredded newsprint for mulching seed.

432.2.5 Non-Asphaltic Adhesive

The tackfier shall be a naturally occurring organic compound and be non-toxic. It shall be a product typically used for binding soil and mulch in erosion control and seeding operations. It shall consist of mucilage by dry weight as active ingredients obtained from Indian Wheat (psyllium) Plantago spp. The tackfier label shall include swell volume, which is the indicator for mucilage content.

Swell volume shall be tested by an independent laboratory using the USP Swell Volume method. Use a swell volume of 30 milliliters per gram as the standard swell volume. Adjust tackifier rates for variations in swell volume. Tested material with lesser swell volume will have tackifier rates increased by the same percentage of decrease in swell volume from the standard. Tested materials with greater swell volume can have rates decreased by the same percentages of increase in swell volume from the standard. Do not cut the tackifier with starch or any other compound that would appreciably alter the swell volume of the plantago mucilage.

432.2.6 Water

Furnish all water for seeding according to City of Phoenix regulations for construction water. Contractor shall supply all labor and equipment required to load, transport and unload water for seeding operations.

432.2.7 Pesticide

Pesticide shall be insecticide, herbicide, fungicide, nematocide, rodenticide or miticide. For the purpose of this specification, a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved. Applications of all pesticides shall comply with Sections all applicable Federal, State and Local regulations.

432.2.8 Surface Erosion Control Material

Surface erosion control material shall conform to the following:

432.2.8.1 Surface Erosion Control Blanket

Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted Kraft paper cord netting.

432.2.8.2 Surface Erosion Control Fabric

Fabric shall be of knit construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

432.2.8.3 Surface Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

432.2.8.4 Surface Erosion Control Chemicals

Chemicals shall be high-polymer synthetic resin or cold-water emulsion of selected petroleum resins. All applications shall comply with all applicable Federal, State and Local regulations.

432.2.8.5 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

432.2.9 Equipment

Equipment of major items of landscape equipment and materials, shall include but not limited to: backhoes, tractors, dumpsters, trenchers, bobcats, pickups, augers, etc. the list that shall be provided by the contractor to the Engineer shall include all the equipment that will be required to complete the work specified. Contractor shall submit the equipment list including the name/type of equipment and the Manufacturer's Specifications, weights, space requirements, physical dimensions, rating of equipment and supplemental information requested by the Engineer.

432.3 EXECUTIONS

432.3.1 Installing Seed Time and Conditions

432.3.1.1 Seeding Time

Install the seed from October to February for spring establishment; from March to September for summer establishment; and from August to November for fall establishment.

432.3.1.2 Seeding Conditions

Perform seeding operations only during periods when beneficial results can be obtained. When excessive moisture or other unsatisfactory conditions prevail the work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, submit proposed alternate times for approval.

432.3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, conduct calibration tests on the equipment scheduled for use. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. Provide the Engineer the calibration test results within one (1) week of testing.

432.3.1.4 Soil Test

Test delivered topsoil, existing soil in smooth graded areas and stockpiled topsoil in accordance with ASTM D 5268 and ASTM D 4972 for determining the particle size, pH, organic matter content, textural class, chemical analysis, soluble salts analysis, and mechanical analysis. Sample collection on site shall be random over the entire site. Sample collection for stockpiled topsoil shall be at different levels in the stockpile. The soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test shall determine the quantities and type of soil amendments required to meet local growing conditions for the seed species specified.

432.3.2 Site Preparation

432.3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and complete the placing of topsoil, smooth grading, and compaction requirements in accordance with Section 02300 EARTHWORK, prior to the commencement of the seeding operation.

432.3.2.2 Application of Soil Amendments

432.3.2.2.1 Applying pH Adjuster

Apply the pH adjuster as recommended by the soil test.

432.3.2.2.2 Applying Fertilizer

Apply the fertilizer as recommended by the soil test.

432.3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test.

432.3.2.2.4 Applying Super Absorbent Polymers

Spread polymers uniformly over the soil as recommended by the manufacturer and thoroughly incorporate by tillage into the soil to a maximum 6-inch depth.

432.3.2.3 Tillage

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

432.3.2.4 Prepared Surface

432.3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. Blend new surfaces to existing surface areas. Complete the prepared surface with a light raking to remove debris.

432.3.2.4.2 Lawn Area Debris

Remove debris and stones over a minimum 5/8-inch in any dimension from the surface. The smooth grade surfaces designated to receive turf to conform to grading specifications of 1/20 ft.

432.3.2.4.3 Field Area Debris

The nature of this project in the Salt River bed will result in working in a cobble rocky surface plane. Leave all surfaces designated on the plans to receive seeding in a natural appearing roughened condition without

tracks, windrows, or ruts. Stones naturally occurring shall remain where not obtrusive or an impediment to the restoration projects programmed features. Remove other unnatural materials over 3 inches from the surface and legally dispose of offsite.

432.3.2.4.4 Protection

Protect areas with the prepared surface from compaction or damage by vehicular or pedestrian traffic and surface erosion.

432.3.3 Installation

Prior to installing seed, rework any previously prepared surface compacted or damaged to meet the requirements of paragraph 432.3.2, SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

432.3.3.1 Installing Seed

Seeding method shall be Hydroseeding. Seeding procedure shall ensure even coverage. The Contractor shall not use, because of the difficulty in achieving even coverage, gravity fed applicators that drop seed directly from a hopper onto the prepared soil, unless otherwise approved. Mix absorbent polymer powder with the dry seed at the rate recommended by the manufacturer.

432.3.3.2 Hydroseeding

Add water to the seed and fertilizer and thoroughly mixed to meet the rates specified. The time for holding the seed in the slurry shall be a maximum one hour. Add wood cellulose fiber mulch and tackifier at the rates recommended within these specifications with the seed, fertilizer, and water and thoroughly mix to produce homogeneous slurry. Uniformly apply the slurry under pressure over the entire area. The Contractor shall not roll the hydroseeded area.

432.3.3.2.1 Cobble Areas

For areas of predominant cobble, (rock) seed shall be hydroseeded with an even application of aqueous slurry of decomposed wood derivatives or recycled compost and other amendments as recommended by the soil test. Apply decomposed wood or compost at 4 tons per acre. This application method applies only to the high cobble areas of the terrace and the associated slopes from the overbank to the terrace area. This method of application shall allow the aqueous slurry to create the seedbed under, around and in between the cobble areas and not be conducive for the mulch and seed mix to adhere to the surface of the cobble areas. Consult with the Engineer in reference to the cobble areas.

432.3.3.2.2 Field Soil Areas

For areas of predominant soil fines (sand, silt, clay) seed shall be hydroseeded using cellulose fiber mulch at 200 pounds per acre for slopes up to 3:1, and at 600 pounds per acre for slopes exceeding 3:1. This application method applies only to the field soil areas confined to the overbank area. This standard method of application shall allow the hydroseed mix to create the seedbed on the prepared surface. Consult with the Engineer in reference to the field soil areas.

432.3.3.3 Mulching

432.3.3.3.1 Straw Mulch

Spread straw mulch uniformly at the rate of two (2) tons per acre. Spread mulch by hand, blower-type mulch spreader, or other approved method. Start mulching on the windward side of relatively flat areas or on the

upper part of steep slopes and continue uniformly until the area is covered. Do not allow the mulch to bunch or clump. Do not completely exclude sunlight from penetrating to the ground surface. Mulch all areas installed with seed on the same day as the seeding. Mulch shall be anchored immediately following spreading. All straw mulch shall be Arizona grown, harvested and packaged for use per Article MULCH of this Specification.

432.3.3.3.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment. Affix where practicable all areas of straw mulch by crimping with a mechanical anchor. Crimp the straw mulch to an average depth in the soil of 2 inches. Tack the straw immediately following the crimping operation using a non-asphaltic tackifier.

432.3.3.3.3 Non-Asphaltic Adhesive Tackifier

Apply plantago tackifier at 150 pounds per acre (USP method swell volume of 30 ml per gm) for slopes less than 3:1 and at 200 pounds per acre for slopes exceeding 3:1 in aqueous slurry combined with cellulose fiber mulch.

432.3.3.3.4 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Apply wood cellulose fiber, paper fiber, or recycled paper as part of the hydroseeding operation. Mix and apply the mulch in accordance with the manufacturer's recommendations. Apply Cellulose fiber mulch meeting the requirements herein in aqueous slurry with non-asphaltic tackifier at 500 pounds per acre for slopes less than 3:1 and at 750 pounds per acre for slopes greater than 3:1.

432.3.3.3.5 Mulching Areas Designated for Seed

Areas of predominant cobble (rock) shall require no additional mulch beyond that used for the hydroseeding process described above. The Contractor shall mulch with straw and affix as specified herein the areas of predominantly soil (sand, silt, clay). Straw shall be affixed by mechanical anchor and applying an even slurry over the straw of cellulose fiber mulch and non-asphaltic tackifier.

432.3.3.4 Watering Seed

Contractor shall be required to develop a temporary irrigation system, to apply irrigation to all seeded areas for establishment and acceptance by Engineer. Submit method to Engineer for approval prior to installing temporary seeding irrigation system. The Contractor shall start watering immediately after completing the seeding of an area.

Apply water to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 6-inch depth. The Contractor shall prevent run-off and ponding. Contractor shall not allow watering trucks drive over seeded areas, unless otherwise directed. Prevent the watering of other adjacent areas or plant material.

432.3.4 Surface Erosion Control

432.3.4.1 Surface Erosion Control Material

Where indicated or as directed, install surface erosion control material in accordance with manufacturer's instructions. Accomplish placement of the material without damage to installed material or without deviation from finished grade.

432.3.5 Quality Check

For materials provided in bags, retain the empty bags for recording the amount used. For materials provided in bulk, retain the weight certificates as a record of the amount used. Compare the amount of material used with the total area covered to determine the rate of application used. Adjust differences between the quantity applied and the quantity specified as directed.

432.3.6 Application of Pesticide

When application of a pesticide becomes necessary to remove a pest or disease, submit and coordinate a pesticide treatment plan with the Engineer and the installation pest-management program. All applications conform to all the Federal, State and City regulations.

432.3.6.1 Technical Representative

The certified installation pest-management coordinator shall be the technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.

432.3.6.2 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations and all applications conforming to all the Federal, State and City regulations. Use clothing and personal protective equipment as specified on the pesticide label. The recommendation is to use of a closed system as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Prevent overflow during the filling operation. Prior to each day of use, inspect the equipment used for applying pesticide for leaks, clogging, wear, or damage. Perform any required repairs immediately. Submit a pesticide treatment plan.

432.3.7 Restoration and Clean Up

432.3.7.1 Restoration

Restore to original condition damage to existing turf areas, pavements, and facilities occurring from the seeding operation at Contractor's expense.

432.3.7.2 Clean Up

Remove excess and waste material from the seeded areas and legally dispose of offsite. Clean adjacent paved areas.

432.3.8 Protection of Installed Areas

Immediately upon completion of the seeding operation in an area, the protect area against traffic or other use by erecting barricades and providing signage as required, or as directed.

432.3.9 Seed Establishment Period

432.3.9.1 Commencement Seeding

The seed establishment period to obtain a healthy stand of plants shall begin on the first day of seeding work under this contract and shall continue through the remaining life of the contract and end 12 months after the last day of the seeding operation required by this contract. The Contractor shall furnish a written calendar to the Engineer showing the time required for the seed establishment. When there is more than one (1) seed establishment period, describe the boundaries of the seeded area covered for each period. The seed

establishment period shall be coordinated with the tree & shrubs establishment period. Modify the seed establishment period for inclement weather, shut down periods, or for separate completion dates of areas.

432.3.9.3 Satisfactory Stand of Plants

Evaluation of plants for species and health is when the plants are a minimum 1-inch high.

432.3.9.3.1 Seeded Area

A satisfactory stand of seeded plant areas shall be composed of a minimum of three perennial plants per square yard and bare areas shall not exceed 12% of the total seed area.

432.3.9.4 Maintenance During Establishment Period

Maintenance of the seeded areas shall include removing competitive weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

432.3.9.4.1 Post-Fertilization

Apply the fertilizer as recommended by the soil test. Apply all fertilizer in accordance with all the Federal, State and City regulations.

432.3.9.4.2 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph 432.3.6 APPLICATION OF PESTICIDE.

432.3.9.4.3 Repair or Reinstall

Repair, reseed or reinstall unsatisfactory stands of turf grass, native seeded plants and unequal distribution of mulch; and repair eroded areas in accordance with paragraph 432.3.2, SITE PREPARATION.

432.3.9.4.4 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

432.4 BASIS OF PAYMENT

Measurement and Payment for the Native Hydroseeding shall be at the unit price for bid item "HYDROSEED, NATIVE MIX" at the contract unit price bid per Square Foot for all materials, labor equipment, and permits, for a complete and established seeded area. No measurement or direct payment will be made for revising the seeding plan, mix, soil preparation, bank stabilization, amendments, mulch, seed or other documentation required to perform the work, the cost being considered as included in the price of this contract item.

25. Add the following new Section 434 ADDITIONAL LANDSCAPING REQUIREMENTS as follows:

434.1 PLANT SWALES AND TREE STAKING

Prior to preparing plant swales and staking trees, the Contractor will have a representative sample of tree and shrub swales, and tree staking inspected and approved by the Engineer and Landscape Architect for conformance with project plans and specifications.

The Contractor will correct any swales or staking that do not conform to the approved representative samples.

There will be no separate measurement or payment for swales or staking. The cost will be considered incidental to the cost of the plant materials.

434.2 TRIMMING NEWLY PLANTED TREES

The Contractor will trim all newly planted trees as necessary prior to staking so that low branches are removed where standard trees are required. Trees will be trimmed so that the tree is balanced and a central leader is maintained. When necessary, excess branching will be thinned so that a strong branching structure will develop. The Contractor will trim with a hand-held pruner. Trimming will be done to the satisfaction of the Engineer and the Landscape Architect.

There will be no separate measurement or payment for trimming new trees. The cost of the work will be considered incidental to the cost of furnishing and/or installing new trees.

434.5 PROVIDE PROTECTION FOR EXISTING TREES

The Contractor will be responsible for protecting existing trees to remain in place as tagged in the field and/or as noted on the plans. The Contractor will provide fencing around all trees and plants which are to remain in place that could be damaged by construction activity or equipment. A minimum area will be established around each plant based on its trunk caliper size. The minimum area will be one (1) foot of radius for each inch of caliper. For example, if a tree has a 6" caliper, there will be a minimum 6' radius area around the tree that will be considered a protected zone, and a fence will be placed at that location. The fencing will provide protection to the trunks and limbs from damage that could be caused by construction activity or equipment.

Any trimming that is necessary to prevent construction damage to existing trees will be pre-approved by the Landscape Architect. If the roots of existing trees could be affected in any way by construction they will be hand excavated and trimmed as described in the Special Provision, "PRUNING ROOTS OF EXISTING TREES". Root pruning will also be pre-approved by the Landscape Architect.

The Contractor will be responsible for all costs associated with protection of existing trees in place. If any damage occurs to trees or other plants to remain that, in the opinion of the Engineer and Landscape Architect, destroys, aesthetically disfigures, or threatens the plant's future survival, the Contractor will be responsible for replacing the tree in kind. Replacement trees will be the same size as the damaged tree. Prior to selection of any replacement tree, the Contractor will obtain approval of the size, type and purchase source from the Engineer and Landscape Architect.

There will be no separate measurement or payment for providing protection for existing trees and plants in place. The cost will be considered incidental to the cost of the project.

26. 440 LANDSCAPE IRRIGATION SYSTEM INSTALLATION

Add the following paragraphs to Subsection 440.1 GENERAL:
All irrigation materials to be utilized on the project shall compatible with a potable water use system. The plans indicate a detailed layout of irrigation lines, laterals, sprinklers, and emitter locations; however, some of the piping may be shown diagrammatically outside of the planting areas for graphic clarity. The contractor shall follow the intent of the plan layout and shall review and obtain written approval from the Owner's Authorized Representative for any requested changes.

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

Work for this project includes protecting and working around all existing irrigation equipment and lines within the limit of work, the installation of new irrigation equipment and lines, connecting the new irrigation equipment and lines to the existing irrigation system and ensuring that the existing irrigation system is operable during construction.

Contractor shall make repairs using like equipment and materials. All repairs shall be made within 48 hours of initial disturbance.

Contractor is encouraged to avoid disturbing the existing landscape area in the TCE on the Intrepid Coatings property which is north of Riverview Drive and west of the ADOT channel. The contractor is to maintain the operational integrity of any private property or Phoenix Parks Department existing irrigation system during construction. Repair, within 24 hours, any part of the existing irrigation system required to deliver water to existing plants not disturbed by construction.

Add the following submittal items to Subsection 440.4.1 Shop drawings and product Information:

Drip Irrigation Emitters
PVC Nipples
Valve I.D. Tags
Unions

Add the following paragraphs to Subsection 440.4.2 Record Drawings:

The Contractor shall maintain project record (as-built) drawings during the irrigation system construction as described below:

Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project Record Documents. Keep documents current on a daily basis. Contractor shall provide Record Drawings which shall clearly show all differences between the Contract work as drawn and as installed for all work, as well as work added to the Contract which is not shown on the Contract drawings. These shall be kept legible and current and shall be available for inspection at all times by City of Phoenix. The record drawings shall show all changes in the Contract work, or work added, on these Record Drawings in a contrasting color, including work changed by Addendum or Bulletin.

Current up-to-date Record Drawings are a prerequisite for scheduled payments. Do not permanently cover work until recording Record Drawing information. Record pipe and wiring network alterations. Record installed work that is different from shown on the construction drawings. Record accurate reference dimensions, measured from at least two permanent reference points, of each irrigation system valve-assembly, each controller, each sleeve end, each wire splice location, each stub-out for future pipe or wiring connections, and all other irrigation components enclosed within a valve box.

Label each sheet "Record Drawing". Completion of the Record Drawings will be a prerequisite for the Final Review.

If quantities are furnished either in specifications or on drawings, quantities are furnished for information only. It is Contractor's responsibility to determine actual quantities of material, equipment, and supplies required by the project and to complete independent estimate of quantities and wastage.

Record Drawings shall contain the names, addresses, and phone number of the Subcontractors and shall be signed by the Contractor.

The Engineer shall review the Record Drawings and shall be the sole judge of the acceptability of these drawings.

Add the following paragraphs to Subsection 440.4.4 Operation and Maintenance Manuals:

Operating instructions shall include complete operating sequence, control diagrams, description of method of operating machinery, machine serial numbers, factory order numbers, parts lists, instruction books, supplier's phone numbers and addresses and individual equipment guarantee. Parts lists shall be complete in every respect, showing all parts and part numbers for ready reference.

Assemble Maintenance Manual and Operating Instructions in hard back 3-ring loose-leaf binders. Suitably label and index all material contained therein for ready reference.

Delete the Extra Stock to be furnished in Subsection 440.4.5 Equipment to be Furnished in its entirety and replace with the following

5 of each size remote control valve installed
10 of each emitter type and volume installed
Two keys (5' handle) for each type of gate and ball valve installed
Two quick coupler keys with ¾" mht swivels

Delete item "d" from Subsection 440.6.2 Trench Excavation in its entirety and replace with the following:

d. Plastic Lines under Pavement – 36 inches cover

Add the following paragraphs to Subsection 440.6.2 Trench Excavation:

Pipe trenches shall be straight but if obstructions necessitate a change of direction, the limits of curvature for PVC pipe shall be followed in strict accordance with pipe manufacturer recommendations.

Trenches may be curved to change direction or avoid obstructions within the limits of the curvature for PVC pipe. Minimum radii of curvature are 25 feet for 2-inch diameter pipe, 100 feet for 3- and 4-inch diameter pipe, and 150 feet for 6-inch pipe. All curvature results from the bending of the pipe lengths. No deflection will be allowed at a pipe joint.

Add the following paragraphs to Subsection 440.6.3 Sleeving:

Extend sleeve ends twelve inches beyond edge of hardscape, or sidewalks. Cap sleeve ends and mark with stakes. Provide rope or wire through sleeve and secure to stake at surface grade at each end for future sleeve location. Sleeve ends shall be covered with duct tape prior to backfill.

Asphalt cut and patch operations necessary for sleeve installation shall be considered incidental to the sleeve installation. All asphalt cutting shall be done with proper equipment to allow straight and true cuts through the entire depth of the asphalt being removed. Compact trench backfill to 95% with a minimum of a 6" ABC base and 6" asphalt top patch cover. Contractor shall replace any patch work if the patch compacts more than ½" or if any of the patches becomes dislodged within one year. All asphalt shall comply with MAG section 336.

Add the following paragraphs to Subsection 440.6.4 Piping:

Fittings for use with mainline pipe under 2 ½" and smaller shall be schedule 80, pipe 3" and larger shall be ductile iron.

When PVC to metal pipe connections are required, these connections shall be accomplished first. A plastic adapter with external pipe thread should be used, screwing it into the metal internal pipe threads. Use teflon tape, or equal, on all plastic to metal threaded joints. The joint shall be hand-tightened. Utilize a light wrench, as necessary, to prevent leaks.

Piping or conduit of different trades crossing each other shall be separated by a minimum of 6 inches in the vertical direction.

Install thrust blocks for fittings on pipe greater than or equal to 3-inch diameter or any diameter rubber gasketed pipe. Use 3,000 PSI concrete, 2 mil plastic, and No. 4 Rebar. Use cast-in-place concrete bearing against undisturbed soil. Size, orientation and placement shall be as shown on the installation details. Wrap fitting with plastic to protect bolts, joint, and fitting from concrete. Install rebar as shown on the installation details.

Use a joint restraint harness on pipe greater than or equal to 3-inch diameter or any diameter rubber gasketed pipe wherever joints are not positively restrained by flanged fittings, threaded fittings, and/or thrust blocks. Use a joint restraint harness with transition fittings between metal and PVC pipe, where weak trench banks or vertical directional changes do not allow the use of thrust blocks, or where extra support is required to retain a fitting or joint. Use bolts, nuts, retaining clamps, all-thread, or other joint restraint harness materials which are zinc plated or galvanized.

Use restrained casing spacers for gasketed pipe routed through sleeving. Provide Ford Uni-Flange Restrained Casings Spacers or approved equal. Restrainer body and runner supports must be constructed of high strength ductile iron meeting ASTM A536 and grade 65-42-12. Connecting rods must meet ASTM A242, ANSI/AWWAC111/A21.11. Runners must be constructed of ultra-high molecular weight polymer. Install harness in the manner recommended by the manufacturer and in accordance with accepted industry practices. Install self-restraining casing spacers at all gasketed pipe bell joints and every 10-feet along the gasketed mainline pipe installed through sleeving. Provide correct number and type of restraints per manufacturer's requirements.

Provide Flush End Caps at the end of lateral drip lines as locations as shown on the plans or directed by the Engineer. Construct Flush End Caps as per the plan details. There is no measurement for Flush End Caps and are incidental to the other irrigation items.

Add the following paragraphs to <u>Subsection 440.6.5 Wiring:</u>

There is no measurement for the installation of new control wiring from new valves back to the existing controller, this shall be incidental to the cost of the new electric control valve.

Wire connections to remote control electric valves and splices in the field, if approved by Engineer, shall be made in the following manner, using Pen-Tite wire connectors and sealant:

(1) Strip ends of wires and push wires through the holes of the base socket.

(2) Twist wires together and mechanically bond together using crimp sleeve and crimp pliers.

(3) Pull wire connection back into base socket as far as possible.

(4) Apply sealant to outside of scaling plug, then fill cavity of sealing plug completely with sealant.

(5) Push sealing plug into base socket, using slight twisting motion, until it bottoms.

(6) Push wires unseating sealing plug. This assures cement completely sealing around wire insulation and waterproofing the connection.

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

Add the following paragraphs to <u>Subsection 440.6.6 Valves, Valve Boxes, and Special Equipment:</u>

Install all remote control valves, pressure regulators, wye strainers, emitter flush plugs, and quick coupling valves in suitable plastic valve access box of proper size as required for easy access to the installed components. All valve boxes supplied shall be Carson irrigation boxes as shown on plans or approved equal. Economy boxes are not an acceptable alternative. Install all valve boxes with a six-inch minimum ¾ -inch diameter crushed aggregate sump. Line the sump with geotextile fabric.

All valve boxes are to be colored tan when placed in granite or green when placed in turf.

Install valves in planting areas and according to the construction details. Only one valve per box will be allowed. Align valve boxes at right angles to adjacent hardscape whenever possible. Where several valve boxes are located in the same area, arrange them in a uniform and orderly fashion. Valve boxes shall be installed with an 8-inch deep layer of ¾-inch crushed gravel at the base of the box.

When grouped together, allow a minimum of 12 inches between valves. The valves shall be installed in valve boxes that will have enough room on all sides of the valves to allow repair personnel to completely re-construct the valves without removing the valve box.

Automatic remote control valves be electric solenoid operated of the types and sizes as indicated on the plans. They shall be compatible with the system operating pressure and design. The solenoid shall be for 24 volt, 60 cycle operation with running current of 2 watts. For all remote control valves the valve body and bonnet shall be constructed of glass-filled nylon. All remote control valves shall be equipped with stainless steel self-cleaning screen for dirty water applications, and with female pipe thread connections.

The solenoid plunger shall be spring loaded so the valve may be operated when installed in any position and shall be constructed of stainless steel. The diaphragm shall be of durable nylon reinforced neoprene. Valve bonnet shall be equipped with an internally operated manual bleed mechanism for manual operation of the valve at any time. Valve bonnet shall be secured to the valve body by corrosion resistant stainless steel bolts.

Locate all quick coupling valves within 12 to 18 inches of walks, curbs, header boards, or paved areas where applicable. Locate quick coupler valves inside shrub and ground cover areas whenever possible. Quick coupling valves shall be installed such that valve top will be 3 inches below the lid of the valve box.

Add the following paragraphs to <u>Subsection 440.6.9 Pipe Bedding, Backfill, and Compaction:</u>

Bedding sand shall be required under asphalt and concrete pavements such as roadways and parking surfaces.

Trench backfill, sufficient to anchor the pipes, may be deposited before pipeline pressure testing, except that joints shall remain exposed until satisfactory completion of testing.

Under no circumstances shall vehicle wheels be used for compacting soil.

If settlement occurs and subsequent adjustments in pipe, valves, irrigation heads, turf or other plantings, or other construction are necessary, the contractor shall make all required adjustments without cost to the Owner.

Add the following paragraphs to <u>Subsection 440.7 FLUSHING AND TESTING:</u>

Provide all necessary pumps, bypass piping, storage tanks, meters, supply piping, and fittings in order to perform testing properly. The Contractor shall backfill the trench to prevent movement of the pipe under pressure. Expose couplings and fitting. Purge air from pipeline before test. Maintain constant pressure to the subject mainline pipe. No allowable pressure loss will be allowed.

Replace any defective pipe, fitting, joint, valve, or appurtenance. Repeat the test until the subject mainline pipe meets the above maximum allowable volume loss during the test period.

Perform an operational test of the irrigation system in the presence of the Engineer. Contact the Engineer three working days prior to testing.

Operation of all valves, flow sensors, gate and ball valves, drip systems, ET devices and remote monitoring equipment (computer central or internet) shall be demonstrated prior to project acceptance and start of maintenance

Add the following paragraphs to Subsection 440.8 PRELIMINARY, SUBSTANTIAL, AND FINAL WALK-THROUGH INSPECTIONS:

Upon Substantial Completion of the Project, Contractor shall submit the redlined record drawings to the Engineer for preliminary review. Contractor shall make all corrections required and resubmit a new copy for review and approval. Upon acceptance of the redlined record drawings and prior to final payment the contractor shall submit to Engineer the corrected and final version of the record drawing red-lines.

Upon Substantial Completion, submit one copy of the Maintenance Manual and Operating Instructions to the Engineer for review.

Guarantees and Warranties: Submit all required guarantees and warranties to the Engineer. Provide all written guarantees, warranties or certificates required. Guarantees and warranties shall be a part of maintenance manual.

Adjustments may include, at no additional cost to the City of Phoenix, additional emitters, tubing, nozzles, and flush end caps as required.

Irrigation System Maintenance: Maintain irrigation system for a duration of 12 months in conjunction with the Plant Establishment Guarantee and Maintenance. Make periodic examinations and adjustments to irrigation system components in order to achieve the most desirable application of water.

The Contractor shall replace any pavement damage resulting from the installation of the irrigation system and repair damage to grading, soil preparation, seeding, sodding, or planting at no additional cost to the City of Phoenix. Make repairs within 48 hours following notification by the Engineer. The Engineer has the right to make emergency corrections and back-charge to the contract for costs when determined necessary by the Engineer.

Clean Up: Remove machinery, tools, excess materials, and rubbish upon completion of work.

Maintain a clean and orderly jobsite on a daily and ongoing basis. Trash, discarded material and other debris shall not be allowed to blow around on the project. Discard all materials off site at an approved sanitary landfill.

Delete Subsection 440.19 MEASUREMENT AND PAYMENTS in its entirety and replace with the following:

A Lump Sum payment for the irrigation system will be made per the bid item "LANDSCAPE IRRIGATION SYSTEM" and shall be full compensation for the complete installation of the irrigation system identified on the plans and details. Work shall include all costs, materials, equipment, labor, and operations necessary to ensure the irrigation system is operating properly. Any costs incurred to repair, replace or re-install existing irrigation shall be considered incidental to the cost of the project.

27. 505 CONCRETE STRUCTURES, Add the following to Section 505 CONCRETE STRUCTURES:

Add the following Subsection 505 REINFORCED CONCRETE BOX CULVERT:

505.01.1 Description

The work under this item consists of furnishing all labor and materials for constructing 2-Barrel Reinforced Concrete Box Culvert at the locations and in conformance with the details on the Plans, all referenced ADOT standard drawings, these special provisions and as directed by the Engineer. All work under this subsection shall conform to SECTION 601 – CONCRETE STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

The City will not consider alternatives to the concrete box culvert shown in the project plans.

505.01.2 Materials

All exposed concrete to be used for Cast-in-Place Reinforced Concrete Box Culvert, excluding the barrels of the box culvert shall be integrally colored per Section 505.17

505.01.3 Certification

The Contractor shall be responsible for reviewing all available geotechnical investigation reports. The available geotechnical investigation reports are included in these documents.

505.01.4 Method of Measurement

2-Barrel Reinforced Concrete Box Culvert will be measured by the linear foot of box culvert constructed. Measurement shall be along the center line axis of the box culvert.

505.01.5 Payment

Payment for 2-Barrel Reinforced Concrete Box Culvert will be made at the unit price for the bid item "2-BARREL REINFORCED CONCRETE BOX CULVERT PER SPECIAL DETAIL" complete in place, including the box culvert top, floor walls, and including all necessary concrete channel lining removal, excavation, structure backfill, compaction, concrete, reinforcement, wall drainage system, geocomposite membrane, integral color, form liners and rustication as described herein and on the Plans.

28. Add the following to Section 505 CONCRETE STRUCTURES:

CONCRETE HEADWALL

Add the following new Subsection 505.11 Concrete Headwall:

505.11.1 Description

The work under this item consists of furnishing all labor and materials for constructing Concrete Headwalls attached to the top of the 2-Barrel Reinforced Concrete Box Culvert at the locations indicated and in conformance with the details on the Project Plans, all referenced ADOT standard drawings, these special provisions and as directed by the Engineer. All work under this section will conform to SECTION 914 – WALLS AND MISCELLANEOUS STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

The City will not consider alternatives to the concrete retaining walls shown in the project plans.

505.11.2 Materials

All concrete to be used for Concrete Headwalls shall be integrally colored per Section 505.17

505.11.3 Method of Measurement

Concrete Headwall will be measured by the linear foot of wall constructed. Measurement shall be along the front face of the wall. Counterforts are considered incidental to the work and not included as part of the length of the headwall.

505.11.4 Payment

Payment for Concrete Headwall on top of the double barrel box culvert will be made at the unit price for the bid item "CONCRETE WALL PER DETAIL ON PLANS" complete in place, including concrete, reinforcement, wall drainage system, geocomposite membrane, integral color, painting, form liners and rustication as described herein and on the Project Plans. All structural excavation, backfill, and compaction shall be included in the bid item.

29. Add the following to Section 505 CONCRETE STRUCTURES:

CONCRETE RETAINING WALL

Add the following new Subsection 505.12 Concrete Retaining wall:

505.12.1 Description

The work under this item consists of furnishing all labor and materials for constructing Concrete Retaining Walls at the locations and in conformance with the details on the Project Plans, all referenced ADOT standard drawings, these special provisions and as directed by the Engineer. All work under this section will conform to SECTION 914 – WALLS AND MISCELLANEOUS STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

The City will not consider alternatives to the concrete retaining walls shown in the project plans.

505.12.2 Certification

The Contractor will be responsible for reviewing all available geotechnical investigation reports. The geotechnical investigation reports are available at the City of Phoenix, 1034 East Madison, Phoenix, Arizona 85034.

505.12.3 Measurement

Concrete Retaining Wall will be measured by the square foot of wall constructed. Measurement will be along the front face of the wall from the top of footing to the top of wall.

505.12.4 Payment

The accepted quantities for Concrete Retaining Wall, measured as provided above, will be paid for at the contract unit price for the bid item "CONCRETE RETAINING WALL, PER PLANS", complete in place, including all necessary structural excavation, structure backfill, compaction of fill material, concrete, reinforcement, wall drainage system, geocomposite membrane, integral color and rustication as described herein and on the Project Plans.

30. Add the following Subsection 505.13 REINFORCED CONCRETE PARAPET WALL:
505.13.1 Description

The work under this item consists of furnishing all labor and materials for constructing Reinforced Concrete Parapet Walls at the locations and in conformance with the details on the Plans, all referenced ADOT standard drawings, these special provisions and as directed by the Engineer. All work under this subsection shall conform to SECTION 914 – WALLS AND MISCELLANEOUS STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

The City will not consider alternatives to the reinforced concrete parapet walls shown in the project plans.

505.13.2 Materials

All concrete to be used for Cast-in-Place Reinforced Concrete Parapet Walls, excluding footings, shall be integrally colored per Section 505.17

505.13.3 Certification

The Contractor shall be responsible for reviewing all available geotechnical investigation reports. The available geotechnical investigation reports are included in these documents.

505.13.4 Method of Measurement

Reinforced Concrete Parapet Wall will be measured by the cubic yard of concrete wall constructed including the bottom of footing to the top of wall.

505.13.5 Payment

Payment for Reinforced Concrete Parapet Wall will be made at the unit price for the bid item "REINFORCED CONCRETE PARAPET WALL, PER DETAIL ON PLANS" complete in place, including the footing, and all necessary concrete, reinforcement, excavation, structure backfill, compaction, wall drainage system, geocomposite membrane, integral color, stain, form liners and rustication as described herein and on the Plans.

31. Add the following Subsection 505.15 INLET STRUCTURE AND OUTLET STRUCTURE:

505.15.1 Description

The work under this item consists of furnishing all labor and materials for constructing Concrete Inlet and Outlet Structures in the ADOT drainage channel adjacent to the double barrel culvert at the locations shown and in conformance with the details on the Plans, all referenced ADOT standard drawings, these special provisions and as directed by the Engineer. All work under this subsection shall conform to SECTION 601 – CONCRETE STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

505.15.2 Payment

Payment for the Concrete Inlet Structure and the Concrete Outlet Structure will be made for at the unit price for each of the respective bid items, "INLET STRUCTURE PER SPECIAL DEATAIL" and "OUTLET STRUCTURE PER SPECIAL DETAIL", complete in place, including removal of concrete channel lining, structural excavation, over excavation, structural backfill, over excavation backfill, concrete, reinforcement, wall drainage system, geocomposite membrane, integral color, form liners and rustication as described herein and on the Plans.

32. Add the following Subsection 505.16 FORM LINERS:

505.16.1 Description

The work consists of furnishing all labor, materials, equipment and incidentals to construct architectural rustication enhancements for the concrete retaining walls, headwalls and parapet barrier walls on the Riverview Drive Box Culvert at the ADOT drainage channel, including the fabrication and installation of wall graphics in accordance with the details shown on the plans and the requirements of these special provisions. All painting shall be per MAG Section 530.

505.16.2 General

505.16.2.1 References

The publications listed below form a part of this specification to the extent referenced. The text references only the basic publications designation.

A. American Concrete Institute (ACI): ACI 117 - Tolerances for Concrete Construction and Materials.

B. ASTM International (ASTM):

   a. ASTM D 256

   b. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

   c. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.

   d. ASTM D 648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

   e. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.

   f. ASTM D 785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.

   g. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

   h. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

   i. ASTM D 1525 - Standard Test Method for Vicat Softening Temperature of Plastics.

   j. ASTM D 2240 - Standard Test Method for Rubber Property Durometer Hardness, Shore A; A Scale Test.

505.16.2.2 Submittals

Submit 6 copies of the following to the Engineer.

A. Product Data: Manufacturer's data sheets on each product to be used, including:

   a. Printed product data and installation guidelines for form liner system.

   b. Manufacturer's installation instructions, showing required preparation and installation procedures.

   c. Storage and handling requirements and recommendations.

d. Installation methods.

e. Cleaning and maintenance instructions.

B. Shop Drawings: Submit formwork panel elevations, detailing the location of architectural concrete work, including but not limited to the following:

a. Form tie locations, end locations and other special conditions, panel sizes, joint locations, joint widths, reveal and false-joint locations and dimensions, elevations, sections and details of assembly components, and attachment details; indicate locations, configurations, typical details, connections, expansion joints, large scale plans.

b. Show sequence of installation.

c. Show location of members, other items of work and related work of other Sections to be coordinated with work of this section.

d. Submit detail drawings depicting proper installation and flashing techniques. Coordinate locations with those found on the Contract Drawings.

A. Sample Panel: Within 30 days of receiving contract, the contractor is required to submit a 24" x 24" sample of form liner panels and a 5' long sample of rubber reveal strip.

B. Quality Assurance Submittals: Copies of test reports by independent laboratories verifying the performance of the system shall be submitted to the Architect upon request.

C. Verification Samples: For each finish product specified, two samples, size 24 inches (610 mm) by 24 inches (610 mm), representing actual products, styles, colors, patterns, and textures.

a. Form liner samples of each type of form liner specified.

b. Bond breaker sample on brick chip representing bond breaker specified.

c. Form release sample representing form release specified.

D. Warranty: Copy of manufacturer's standard warranty.

505.16.2.3 Quality Assurance

A. Single Source Requirements: Primary and secondary components required for installation of form liner systems shall be components of system recommended by single source.

B. Manufacturer Qualifications: Minimum 5 years' experience manufacturing similar products.

C. Installer Qualifications:

a. Experienced and competent in architectural concrete installation.

b. Submit a list of a minimum of four (4) projects satisfactorily completed which involved the erection of cast in place concrete walls with architectural texturing to achieve a high quality textured finish in a vertical format. This list shall include the dates of the project work, type of equipment used, description of the project and the work that was performed, of which the supplier and the contractor were personally responsible for, the name and phone number of a contact person representing the agency, company or owner for which the work was completed. Engineer shall contact reference list supplied by contractor to verify previous jobs were satisfactorily completed.

c. The crews that will be managing the placement, supervising, and placing the cast in place architecturally enhanced surface must have the experience, and capability to perform the work. Contractor shall submit a list of the key personnel that will manage the architectural relief and individuals for wall construction, who will supervise and perform the actual production and implementation of all the architectural concrete work. The information on these individuals shall include the following: a listing of the four (4) jobs that each individual was in a similar managing and supervisory role, and a listing of other jobs where the individual had related experience.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

E. The mock-up shall demonstrate the full range of specified design options and workmanship to be expected in completed work.

a. Locate mock-up on site in location as directed by Engineer. Construct, clean patch and finish the mock-up using the same procedures, materials and tools as planned for the final construction.

b. Obtain Engineer's acceptance of mock-up before start of work.

c. Do not proceed with remaining work until workmanship, colors, styles, patterns, and textures are approved by Engineer.

d. Incorporate edge, reveal, and detail as per drawings.

e. Modify mock-up as required to produce acceptable work.

f. Maintain mock-up for comparison with finished work.

g. Remove mock-up at the completion of the work.

F. Conduct a pre-installation meeting to verify all products, application procedures, site conditions and warranty terms.

505.16.2.4 Delivery, Storage & Handling

Materials shall be delivered to the location in unopened factory containers. Upon arrival, materials shall be inspected for damage and manufacturer informed of any discrepancies. Deficient materials shall not be used.

Materials shall be stored in a protected location and safeguarded from damage.

Store form liners covered and elevated off the exposed ground. Prolonged high or low temperatures will cause a permanent distortion and deterioration of physical properties.

Protect liquid materials from freezing temperatures and temperatures in excess of 90 degrees F (32 degrees C). Store covered, out of direct sunlight.

505.16.3 Products

The form liners used to produce the architectural rustication enhancements and other special wall finishes shall be fabricated of elastomeric rubber, fiberglass, ABS or other pre-approved materials. The creation of the form liners form shall comply with one of the following materials or a pre-approved alternative. Form liners listed by manufacture in the plans are shown to establish a level of quality and texture. Contractor may submit alternate manufacture of same textures and quality for review and approval.

505.16.3.1 Manufacturers

Manufactures of form liners are as follows; this list is not an all-inclusive list and is provided for contractor reference only as potential sources for form liners, all form liners shall meet the requirements specified herein:

Scott System, Inc.
10777 E. 45th Avenue
Denver, CO 80239
303-373-2500

Symons by Dayton Superior
2400 Arthur Avenue
Elk Grove Village, IL 60007
800-800-7615

Greenstreak
3400 Tree Court Industrial Blvd.
St. Louis, MO 63122
800-325-9504

Fiztgerald Form Liners
1500 E. Chestnut Avenue
Santa Ana, CA 92701
800-547-7760

Creative Form Liners, Inc.
3411 Windom Road
Brentwood, Maryland 20722
301-864-3676

505.16.3.2 Form liners

All materials used in the creation of the form liners shall be free from defects affecting the accuracy of shape, strength, rigidity, water tightness, and smoothness of the surface.

A. Extended-Use Elastomeric Form liner:
   a. Style: 'Western Range Grass' Pattern 20003B manufactured by Fitzgerald Form liners.
   b. Description: 100 percent pure urethane, mold bonded to 0.75 inch (19 mm) ACX plywood, up to 100 concrete pours. Cut form liner are necessary to fit specified location on the plans.

   c. Compliance:
      Shore A Hardness ASTM D 2240: 60-70.
      Cast Density: PCF 62-67.
      Tear Strength, ASTM D 624: PLI 140-160.
      Tensile Strength, ASTM D 638 (ASTM D 412): 1300-1600 psi.
      Ultimate Elongation, ASTM D 638 (ASTM D 412): 280-330 percent.
      Hardware: T-nuts are available if needed for attaching form liners to steel forms.
      Manufacturing Tolerances.
      Mold Bonded to 0.75 inch (19 mm) Plywood: 0.125 inches (3.2 mm), length and width).
      Unbonded: shrinkage rate of +/- 1 inch (25 mm), length and width.

B. Vac-U-Form Single-Use and Multi-Use Vacuum-Formed Plastic Form liners:
   a. Style: 'Weathered Plank' Pattern 16925 manufactured by Fitzgerland Form liners.
   b. Description: Multi-use, ABS; 6-8 re-use.
   c. Panel Size: 4 feet x 10 feet (1219 mm x 3048 mm) panels.

d. Compliance:
IZOD Impact, ASTM D 256: 2.0.
Tensile Strength, ASTM D 6383: 3,700 psi.
Heat Deflection, ASTM D 695: 188.
Vicat Softening, ASTM D 1525: 212.

C. Rubber Reveal Strips:
a. Description: Re-Usable Flexible Urethane Rubber
b. Size: 10' long strips to match the cross-section specified on the plans.
c. Compliance:
Shore A Hardness ASTM D 2240: 55-60.
Tensile Strength, ASTM D 6383: 1,485 psi.
Tear Strength, ASTM D 624: PLI 169.
Elongation: 500%

505.16.4 Execution

505.16.4.1 Installation

Install in accordance with manufacturer's written instructions as applicable to each type of substrate required. Install in accordance with specified pattern and mortar.

The contractor shall schedule his construction activities to accommodate the necessary time required to create and gain approval by the Engineer of the required final material(s) and the production and the associated time to create and fabricate the required form liners and deliver them to the project site.

The responsibility for the adequacy of the formwork and any falsework or shoring required for support of the formwork remains with the contractor. All form release agents, adhesives, sealants, fasteners, back up boards, pour rates, and allowable form pressures and other materials used in conjunction with the form liners shall be in accordance with the recommendations of the form liner manufacturer. In areas where form liners require seaming to accommodate the textures, seam shall be placed per manufacturer instructions. Joints shall be sealed to prevent loss of water from wet concrete based on the manufacturer's recommendations. Layout of form ties shall be designed to eliminate location of ties outside of rustication strip areas. Contractor shall not seam or cut through any pattern face unless approved by the Engineer.

Form liners used in the production of the graphic panels shall be removed in accordance with the recommendations of the form liner manufacturer. The contractor shall take precautions to insure that the wall panel surface is not damaged during formwork and form liner removal. The contractor shall notify the Engineer of any defects in the concrete surfaces, and shall patch any defects in a manner approved by the Engineer.

Patch work shall consist of repairing all textures in concrete, making all edges of images visually crisp, and filling any voids or pock marks in the surface of the concrete to the satisfaction of the Engineer. All methods and materials used for patch work shall be reviewed and approved by the Engineer prior to being used on any wall. The acceptable concrete surface should have a pleasing appearance with minimal color and texture variations and minimal surface defects when viewed at a distance of five (5) feet.

505.16.4.2 Cleaning and Protection

Cleaning: As recommended by manufacturer.

The Engineer shall inspect all form liners prior to use and reused.

Form liners may be reused in accordance with the manufacturer's recommendations and approval from Engineer. Damaged form liners shall not be used. Handling, storage, cleaning and repair of the form liners shall be in accordance with the manufacturer's recommendations.

505.16.5 Payment

Form liners, samples and mock ups shall be incidental to the structure utilizing the form liners. No separate payment for these items will be made.

33. Add the following Subsection 505.17 CAST-IN-PLACE INTEGRALLY COLORED CONCRETE:

505.17.1 Description

The work under this item consists of furnishing all labor and materials for constructing cast-in-place Integrally Colored concrete structures at the locations shown and in conformance with the Details on the Plans.

505.17.1.1 References

American Concrete Institute (ACI):
ACI 301 "Specification for Structural Concrete for Buildings."
ACI 302 IR "Recommended Practice for Concrete Floor and Slab Construction."
ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete."
ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete."
ACI 305R "Recommended Practice for Hot Weather Concreting."
ACI 306R "Recommended Practice for Cold Weather Concreting."

American Society for Testing and Materials (ASTM):

ASTM C309 "Liquid Membrane-Forming Compounds for Curing Concrete."
ASTM C494 "Standard Specification for Chemical Admixtures for Concrete."
ASTM C979 "Standard Specification for Pigments for Integrally Colored Concrete."

American Association of State Highway and Transportation Officials (AASHTO):

AASHTO M194 "Chemical Admixtures."

505.17.1.2 Submittals

Product Data: Submit manufacturer's complete technical data sheets for the following:
Colored admixture.
Curing compound.

Design Mixes: For each type of integrally colored concrete.

505.17.1.3Quality Assurance

Manufacturer Qualifications: Manufacturer shall have 10-years of experience in the production of specified products.

Comply with the requirements of ACI 301.

Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

505.17.1.4 Delivery, Storage and Handling

Colored Admixture: Comply with manufacturer's instructions. Deliver color additives to job site or batch plant in original, unopened packaging. Store in dry conditions.

505.17.1.5 Project Conditions

Integrally Colored Concrete Environmental Requirements:

A. Schedule placement to minimize exposure to wind and hot sun before curing materials are applied.

B. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours.

C. Protect fresh concrete from moisture and freezing.

D. Comply with professional practices described in ACI 305R and ACI 306R.

E. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer’s written recommendations.

505.17.2 Products

505.17.2.1 Manufacturers

Integrally colored concrete shall be as indicated on the Plans.“

505.17.2.3 Materials

Colored Admixture for Integrally Colored Concrete:

A. Color-conditioning admixture shall be available in both normal-set and retard-set forms and be interchangeable without color variance.

B. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are limeproof and ultra-violet resistant.

C. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494 and ASSHTO M194.

D. Curing and sealing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.

505.17.2.4 Curing

Apply curing and sealing compound for integrally colored concrete according to manufacturer's instructions using manufacturer’s recommended application techniques.

Apply curing and sealing compound at consistent time for each pour to maintain close color consistency.

Curing compound shall be same color as the colored concrete and supplied by same manufacturer of the colored admixture.

Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 Plastic Shrinkage Cracking published by the National Ready Mixed Concrete Association.

Do not cover concrete with plastic sheeting.

34. Add the following to MAG Subsection 505.18 PAYMENT:

CATCH BASINS

Storm drain catch basins will be paid for at the unit price bid for each type of catch basin, as represented by the respective bid item, regardless of dimensional or other differences occurring within a particular type. The unit price to be paid under these items will be compensation in full for furnishing and placing catch basin structures as shown on the plans and as specified, including, when applicable, all removal and replacement of existing curb, gutter and sidewalk, concrete, reinforcing steel, forming, vibrating, finishing, curing, access opening frame and cover, embedded angles, grating, anchor bolts, structural excavation, backfill, compaction, pavement replacement and any necessary modifications of catch basin structures during construction. Where shown on the plans, the Contractor will install 3-inch diameter standard strength iron pipe through the catch basin. This pipe will project a minimum of 6-inches past the outside wall.

35. 515 STEEL STRUCTURES, Add the following to Section 515 STEEL STRUCTURES:
DECORATIVE STEEL FENCE

Description

The work under this item consists of furnishing all labor and materials for constructing Decorative Steel Fence at the locations and in conformance with the details on the Project Plans, these special provisions and as directed by the Engineer. All work under this section will conform to SECTION 604 – STEEL STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

Materials

Materials will conform to the requirements specified on the plans and these special provisions.

Structural Steel will conform to ASTM A36.

Tubular Steel will conform to ASTM A500, Grade B.

The Contractor will furnish complete copies, in triplicate, of all mill reports on steel materials furnished.
Welding will be performed in accordance with the requirements of the current edition of the American Welding Society, Structural Welding Code, D1.1. All butt welds on exposed surfaces will be ground flush with adjacent surfaces.

Construction Requirements

The use of expansion anchors and/or epoxy anchors will not be permitted.

Certificates of Compliance will be submitted to the Engineer in accordance with the requirements of Subsection 106.05 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition.

Horizontal members and railing will be carefully erected, true to line and grade. Posts will be vertical and parallel, with the deviation from the vertical for the full height of the panel not exceeding 1/8 inch.

Railing panels will be straight and true to dimensions.

For rails on curves, either horizontal or vertical, the rail will conform closely to the curvature of the structure.

Decorative Steel Fence color will be semi-gloss black. The color will be approved by the Engineer prior to painting. All portions of the rails, connections and perforated metal will be painted. Paint for items to be embedded in concrete will extend a minimum of 2 inches below the finished concrete surface.

After erecting the handrail, any damage or abrasion to painted surfaces or exposed steel will be repaired in accordance with SECTION 610 - PAINTING of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition.

All perforated metal will be clear of rough surfaces and burrs. All surfaces will be cleaned and painted in conformance with SECTION 610 - PAINTING of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans. Rough surfaces will be ground smooth and repainted prior to acceptance.

Shop Drawings

Prior to beginning any work on the fabrication of the Decorative Steel Fence, the Contractor will submit shop drawings showing complete details in accordance with Subsection 105.03 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition. Shop drawings will show complete fabrication and erection details including fully detailed dimensions and sizes of component parts of the structure and details of miscellaneous parts.

Measurement

Decorative Steel Fence will be measured by the linear foot, according to fence height, from end post to end post for each location specified on the Project Plans.

Payment

The accepted quantities of Decorative Steel Fence, measured as provided above, will be paid for at the contract unit price under the bid items, “DECORATIVE STEEL FENCE, HEIGHT = 3’-2” and “DECORATIVE STEEL FENCE, HEIGHT = 6’-0””, and will be full compensation for the Decorative Steel Fences complete and in place, including all labor, materials, shop drawings, welding, galvanizing, painting, expansion joints, and connections.

36. 520 STEEL AND ALUMINUM HANDRAILS, Add the following to Section 520 STEEL AND ALUMINUM HANDRAILS:

STEEL RAIL FOR RETAINING WALL AND WING WALLS

Description

The work under this item consists of furnishing and installing Steel Rail including railing, posts, fittings and anchorages. The rail will be installed at the locations and in conformance with the details on the Project Plans, these special provisions and as directed by the Engineer. All work under this section will conform to SECTION 604 – STEEL STRUCTURES of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

Materials

Railing and posts will be tubular steel meeting the requirements of ASTM A500, Grade B.

The Contractor will furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

Welding will be performed in accordance with the requirements of the current edition of the American Welding Society, Structural Welding Code, D1.1. All butt welds on exposed surfaces will be ground flush with adjacent surfaces.

Construction Requirements

The use of expansion anchors and/or epoxy anchors will not be permitted.

Certificates of Compliance will be submitted to the Engineer in accordance with the requirements of Subsection 106.05 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition.

The railing will be carefully erected, true to line and grade. Posts will be vertical and parallel with the deviation from the vertical for the full height of the panel not exceeding 1/8 inch.
Railing panels will be straight and true to dimensions.

All portions of the handrails and the connections will be painted. Painting for items to be embedded in concrete will extend a minimum of 2 inches below the finished concrete surface.

Painting will be performed in accordance with Section 610 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition.

After erecting the handrail, any damage or abrasion to painted surfaces or exposed steel will be repaired in accordance with Section 610 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition.

Shop Drawings

Prior to beginning any work on the fabrication of the Steel Rail, the Contractor will submit shop drawings showing complete details in accordance with Subsection 105.03 of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition. Shop drawings will show complete fabrication and erection details including fully detailed dimensions and sizes of component parts of the structure and details of miscellaneous parts.

Measurement

Steel Rail will be measured by the linear foot from end post to end post for each location specified on the Project Plans.

Payment

The accepted quantities of Steel Rail, measured as provided above, will be paid for at the contract unit price for the bid item "HANDRAIL, PHOENIX SUPP. DETAIL P-1173 (MOD)", complete in place, including all labor, materials, welding, painting, galvanizing, expansion joints, and connections.

37. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following to Subsection 601.2.6 Grading and Stockpiling after the first paragraph:

During excavation, material suitable for backfilling will be piled in an orderly manner, a sufficient distance back from the edges of trenches, to avoid overloading and to prevent slides or cave-ins. Material unsuitable for backfilling, or excess material, will be hauled from the job site and disposed of by the Contractor.

38. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following to Subsection 601.2.7

Shoring and Sheeting:

The Contractor will do such trench bracing, sheathing or shoring necessary to perform and protect the excavation as required for safety and conformance to governing laws. The bracing, sheathing or shoring will not be removed in one operation, but will be done in successive stages as determined by the Engineer to prevent overloading of the pipe during backfilling operations. The cost of the bracing, sheathing or shoring and the removal of same will be included in the unit price for the pipe.

39. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following to Subsection 601.2.8 Open Trench:

Except where otherwise noted in the special provisions, or approved in writing by the Engineer, the maximum length of open trench, where the construction is in any stage of completion (excavation, pipe laying or backfilling), will not exceed 1,320 feet in the aggregate at any one location.
Any excavated area will be considered open trench until all ABC for pavement replacement has been placed and compacted. With the approval of the Engineer, pipe laying may be carried on at more than one separate location, the restrictions on open trench applying to each location. Trenches across streets will be completely backfilled as soon as possible after pipe laying.

Substantial steel plates with adequate trench bracing will be used to bridge across trenches at street crossings where trench backfill and temporary patches have not been completed during regular work hours. Safe and convenient passage for pedestrians will be provided. The Engineer may designate a passage to be provided at any point he deems necessary.

40. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following new Subsection 601.2.9 Pavement and Concrete Cutting and Removal:

601.2.9 Pavement and Concrete Cutting and Removal: Where trenches lie within the Portland cement concrete section of streets, alleys, driveways or sidewalks, etc., such concrete will be sawcut to neat, vertical, true lines in such a manner that the adjoining surface will not be damaged. The minimum depth of cut will be 1 ½ inches or ¼ of the thickness, whichever is greater.

Asphalt pavement will be clean-cut with approved equipment and by approved methods in accordance with the requirements of Section 336.

No ripping or rooting will be permitted outside limits of cuts. Surfacing materials removed will be hauled from the job site immediately, and will not be permitted in the backfill.

41. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following to Subsection 601.4.3 Bedding for Storm Sewers Maintained by the City of Phoenix:

All Controlled Low Strength Material (CLSM) will be provided by a commercial-source. No on-site mixing or addition of cement to aggregate base course slurry in transit mixers will be allowed.

42. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following to Subsection 601.4.4 Backfill:
BACKFILL TYPE REQUIREMENTS FOR PIPE TRENCHES

Type "B" backfill, as shown on City of Phoenix Detail P1200, will be used for all mainline pipe installations across major, collector, or other signalized intersections. At a minimum, the extent of the Type "B" backfill will

be from curb-return-to-curb-return through the intersection, unless noted otherwise on the plans or in the special provisions. Type "B" backfill will also be used for all lateral pipe connections in ALL streets. Type "A-Modified" backfill (suitable native material as specified in City of Phoenix Supplement to MAG Specification Section 601.3.2, except that no piece larger than 3 inches will be allowed), as shown on City of Phoenix Detail P1200, may be used at all other locations, from the top of bedding to the specified pavement subgrade level, unless noted otherwise on the plans or in the special provisions. There is no separate measurement or payment for pipe backfill. The cost is considered included in the bid price for furnishing and installing the pipe. The pavement replacement section will be as specified on the plans or in the special provisions, and will be paid for by the square yard or by the ton, whichever is indicated in the special provisions and on the bid proposal.

43. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following new Subsection 601.4.5 Cutting Newly Placed Pavement for Pipe Installation:

601.4.5 Cutting Newly Placed Pavement for Pipe Installation: In the event temporary or base course pavement must be cut in order to install pipe, the cost of sawcutting, removing and replacing the asphalt will be considered incidental to the cost of the pipe.

44. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following new Subsection 601.6 PROTECTION OF EXISTING UTILITIES:

601.6.1 Utilities: Unless otherwise shown on the plans or stated in the specifications, all utilities, underground or overhead, will be maintained in continuous service throughout the entire contract period. The Contractor will be responsible and liable for any damages to or interruption of service caused by the construction.

If the Contractor desires to simplify his operation by temporarily or permanently relocating or shutting down any utility or appurtenance, he will make the necessary arrangements and agreements with the owner and will be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. All property will be reconstructed in its original or new location as soon as possible and to a condition at least as good as its previous condition. This cycle of relocation or shutdown and reconstruction will be subject to inspection and approval by both the Engineer and the owner of the utility.

The Contractor will be entirely responsible for safeguarding and maintaining all conflicting utilities that are shown on the plans (Sections 107 and 105 apply). This includes overhead wires and cables and their supporting poles whether they are inside or outside of the open trench. If, in the course of work, a conflicting utility line that was not shown on the plans is discovered, the Contracting Agency will either negotiate with the owner for relocation, relocate the utility, change the alignment and grade of the trench or as a last resort, declare the conflict as “extra work” to be accomplished by the Contractor in accordance with Section 104.

601.6.2 Irrigation Ditches, Pipes and Structures: The Contractor will contact the owners of all irrigation facilities, and make arrangements for necessary construction clearances and/or dry-up periods.

All irrigation ditches, dikes, headgates, pipe, valves, checks, etc., damaged or removed by the Contractor, will be restored to their original condition or better, by the Contractor at no additional cost to the Contracting Agency.

601.6.3 Building, Foundations and Structures: Where trenches are located adjacent to building, foundations and structures, the Contractor will take all necessary precaution against damage to them. The Contractor will be liable for any damage caused by the construction.

Except where authorized in the special provisions or in writing by the Engineer, water settling of backfill material in trenches adjacent to structures will not be permitted.

There will be no separate measurement or payment for this work. The Contractor will include all associated costs in the unit bid price for the pipe installation.

601.6.4 Permanent Pipe Support Options and Encasements: Where 18-inch or larger mainline pipes (or other pipes as directed by the Engineer) cross under existing sanitary sewerlines (vitrified clay pipe 12-inches or smaller), the Contractor will permanently support the sanitary sewerline per MAG Detail 403-1, 403-2 or 403-3. If the ductile iron pipe replacement option is used (403-3), and the required crossing length is more than one joint of pipe, concrete pipe supports as detailed in MAG Details 403-1 or 403-2 will be used in addition to the ductile iron pipe. For a single joint of standard 20-foot-long ductile iron pipe replacement, the maximum trench width allowed at the point of the sewer line crossing will be 9-feet, unless otherwise directed by the Engineer. Mechanical or restrained joints will be required on all multiple-joint ductile iron pipe crossings.

Where waterlines, reclaimed waterlines or sanitary sewer lines (new or existing) cross over or under each other, pipeline encasements will be provided as necessary in accordance with MAG Detail 404.

When the ductile iron pipe replacement option is used for the sewer lines, the new pipe will be properly blocked at each end with one or more bricks resting on undisturbed or 95% compacted soil haunches outside the trench walls to prevent differential settlement.

The interior of all ductile iron pipe used for sewer lines will be coated per the specification, "LINING FOR DUCTILE IRON PIPE USED FOR SEWER LINES" in these Special Provisions.

Upon completion of a sanitary sewer line support or encasement, including backfilling and compacting, but prior to permanent pavement replacement, the Contractor will request, through the Engineer, a televising of the line by the City Water Services Department to ensure proper line and grade of the sanitary sewer pipe. If the pipe is out of alignment, it will be the Contractor's responsibility to remedy the situation at no cost to the City.

If the sanitary sewer line is less than 8-inches in diameter, the Contractor will provide the necessary equipment and televise the line to determine proper pipe alignment. The Engineer will be present during the televising, and a video tape of the televising will be made for the City Water Services Department for confirmation that the pipe is properly aligned. The cost of televising the line and preparing the video tape will be included in the bid price paid for the pipe support or encasement.

Permanent pipe supports will be paid for at the unit price bid for each unit installed regardless of type. Encasements will be paid for at the unit price bid per linear foot installed regardless of type. The unit price bid for either item of work will be compensation in full for providing complete and satisfactory permanent pipe supports or encasements, including ductile iron pipe and fittings, concrete, reinforcing steel, forming, vibrating, any required earthwork, televising and videotaping, and any other incidental items necessary.

601.6.5 Electronic, Telephonic, Telegraphic, Electrical, Oil and Gas Lines: During trenching operations, underground facilities such as electronic, telephonic, telegraphic, electrical, oil and gas lines will be supported and protected by the Contractor. Support for plastic pipes will be continuous along the bottom of the pipe. Support for metal pipe and electrical conduit may be continuous or nylon webbing may be used for suspension at no greater than ten-foot intervals.
The Contractor will avoid damaging any pipes, conduits or duct bank facilities during excavation, foundation and bedding placement, and trench backfilling and compaction.

601.6.6 Measurement and Payment:

There will be no measurement or payment for this work. The Contractor will include all associated costs in the

unit bid price for the pipe installation.

45. 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION, Add the following new Subsection 601.7 CONTRACTOR CERTIFICATION OF INSTALLATION PROCEDURES:

601.7 CONTRACTOR CERTIFICATION OF INSTALLATION PROCEDURES

When requested in the Special Provisions or by the Engineer prior to installation, the Contractor will furnish to the Contracting Agency an affidavit (certification) from the pipe manufacturer (or his designee) stating that the Contractor is familiar with the manufacturer's suggested installation methods and procedures and the installation complies with those procedures and is consistent with MAG requirements.

Also, when required in the Special Provisions or requested by the Engineer, the pipe manufacturer or his designee will review the Contractor's methods and procedures for pipe installation in the field. The Contractor will make any adjustments in the installation as recommended by the manufacturer or his representative. If necessary, the Contractor may be required to reinstall or provide corrections to pipe installed prior to the field review at no cost to the Agency. Once the manufacturer or his representative has reviewed the Contractor's installation methods and the Contractor has adjusted his installation methods as recommended by the same, the manufacturer or his representative will furnish to the Contracting Agency an affidavit (certification) that the Contractor's installation methods and procedures, at the time of the review, complied with the manufacturer's installation practices. The affidavit must provide the name of the manufacturer's representative witnessing the pipe installation.

46. 610 WATERLINE CONSTRUCTION, Add the following to Subsection 610.4 CONSTRUCTION METHODS: WATER MAIN REALIGNMENT (CONTINGENT ITEM)

In the event of unavoidable conflict between proposed construction and an existing water main, the Contractor will vertically and/or horizontally realign the water main in accordance with COP Detail P1370 and Section 610. No concrete thrust blocks will be allowed. All pipe will be ductile iron with restrained joints.

The water main realignment will include, but not be limited to, excavation, backfill, compaction, pipe, fittings, offsets, couplings, sleeves, joint restraint and hardware. The realigned water main will be visually inspected for leaks under line pressure prior to backfilling.

The Contractor will arrange with the Engineer to have the line shut down in order to perform the work. At no cost to the Contractor, the City Water Services Department will provide necessary valve cut-ins, take the line out of service and flush the relocated line prior to placing it back in service.

Materials for water main realignment will be ductile iron in accordance with COP Supplement to MAG Subsection 750.2 DUCTILE IRON WATER PIPE.

Measurement and Payment

Measurement will be made per each realignment constructed for the various water main sizes encountered. Payment for realignment of water mains will be made at the unit price bid per each under proposal items "WATERLINE REALIGNMENT, 6" AND 8", CONTINGENT ITEM"; and "WATERLINE REALIGNMENT, 10" AND 12", CONTINGENT ITEM".

47. 610 WATER LINE CONSTRUCTION, Add the following new Subsections 610.9.1 Fire Hydrant Relocation; 610.9.2 New Fire Hydrant Installation; and 610.9.3 Fire Hydrant: Remove, Salvage and Deliver to City of Phoenix:

610.9.1 Fire Hydrant Relocation:

Fire hydrant relocations will be paid for at the unit price bid per each under the bid item, “RELOCATE FIRE HYDRANT”. The unit price bid will be full compensation for removing and reinstalling the fire hydrants at the new locations shown on the plans and in accordance with new construction standards. All pipes, valves and fittings necessary to accomplish the relocation are to be included in the unit price. Prior to removing the fire hydrant from service and prior to reactivating the fire hydrant, the Contractor will notify the Engineer. The Contractor will minimize the time the fire hydrant is out of service but in no event will the out-of-service time exceed 24 hours. If in the opinion of the Engineer, the fire hydrant should be replaced, Water Distribution Division will provide a replacement fire hydrant at no cost to the Contractor. It will be the Contractor's responsibility to pick up the replacement hydrant and to either return the old hydrants to the Water Distribution Division Yard, or dispose of them, whichever is directed by the Engineer. In order to obtain new fire hydrant replacements, the Contractor must first obtain a written order (Field Directive) from the Engineer. Then, at no additional cost to the City, the Contractor will pick up the specified number of units at the Water Distribution Warehouse located at 2500 S. 22nd Avenue.

610.9.2 New Fire Hydrant Installation:

New fire hydrant installations will be paid for at the unit price bid per each under the bid item, “FIRE HYDRANT FURNISHED BY THE CITY OF PHOENIX, INSTALL”. The unit price bid will be full compensation for installing the new fire hydrants at the locations shown on the plans and in accordance with construction standards. All pipes and valves necessary to accomplish the installation will be measured and paid for separately under their respective bid line items. All fittings necessary to accomplish the installation of the new fire hydrant will be paid for separately under the bid item, “ALLOWANCE FOR EXCESS DUCTILE IRON FITTINGS, FURNISH AND INSTALL”. Payment for these fittings will be made from this allowance based on approved invoiced cost of the materials only, plus bonds, insurance and taxes, and a maximum 15 percent markup for overhead and profit.

Prior to removing any existing fire hydrant from service and prior to activating the new fire hydrant, the Contractor will notify the Engineer. Water Distribution Division will provide new fire hydrants at no cost to the Contractor. It will be the Contractor's responsibility to pick up the new hydrants and to either return old hydrants to the Water Distribution Division Yard, or dispose of them, whichever is directed by the Engineer. In order to obtain new fire hydrant, the Contractor must first obtain a written order (Field Directive) from the Engineer. Then, at no additional cost to the City, the Contractor will pick up the specified number of units at the Water Distribution Warehouse located at 2500 S. 22nd Avenue.

610.9.3Fire Hydrant - Remove, Salvage and Deliver to City of Phoenix:

All existing fire hydrants to be abandoned will be removed. The void created will be backfilled with ABC and compacted. The surface will be replaced to match the existing surrounding surface—asphalt, concrete, gravel, etc.

Fire hydrants served from a water main staying in service will require either a tapping sleeve and valve “cut-out” or tee “cut-out” and a new piece of pipe “cut-in” in accordance with City of Phoenix Standard Detail P1344.

Fire hydrants served from a water main <u>not</u> staying in service will require the fire hydrant water main lateral to be cut and plugged near the fire hydrant in accordance with City of Phoenix Standard Detail P1343.

It will be the Contractor’s responsibility to either return the old fire hydrants to Water Distribution Division Yard, or dispose of them, whichever is directed by the Engineer.

Measurement and payment for this work will be under the bid item "FIRE HYDRANT: SALVAGE AND DELIVER TO THE CITY OF PHOENIX", and will include, but not limited to all labor, materials and equipment necessary to remove the fire hydrant, backfill, compact and return or dispose of the fire hydrant. Pavement or concrete replacement, if any, will be paid for under separate respective bid items. Waterline cut-outs (P1344) and cut and plugs (P1343) will be paid under separate bid items for that work. Fire hydrant valve box and cover removal will be paid under separate bid item for that work.

48. 610 WATER LINE CONSTRUCTION, Add the following to Subsection 610.10 CONNECTION TO EXISTING MAINS:

WATER MAIN SHUTDOWN

For shutdowns that are necessary to accomplish the work, the Contractor will make written request to Water Distribution at least three (3) calendar weeks before the shutdown. Requests will specify location, size of line, duration, date, and time for each shutdown. Within one (1) week, Water Distribution will schedule shutdown and give written notification to the Contractor. Any schedule revisions requested by the Contractor must be in writing. Water Distribution's revised schedule will be available within one (1) week. The City does not guarantee a totally dry line. The Contractor will be prepared to de-water as necessary to accomplish the work.

The Contractor will be responsible for maintaining accessibility to the valve operating nuts for all valves within the project boundaries. Failure to maintain accessibility to valves will be cause for canceling shutdown, and the Contractor will be required to request a revised schedule.

The Water Services Department is indemnified for any and all resultant costs incurred by the Contractor such as, but not limited to traffic control, delays, loss of incentives, standby and penalties if the Contractor did not properly request a shutdown; failure to maintain accessibility to valves; or if the Contractor's scheduled work did not progress to the anticipated shutdown schedule.

49. 610 WATER LINE CONSTRUCTION, Add the following to Subsection 610.11(D) METER SERVICE CONNECTIONS:

HORIZONTAL BORING FOR METER SERVICE CONNECTIONS

For meter service pipes 1-inch or larger in diameter, the maximum bore hole size permissible will be twice the internal diameter of the service line being installed. For meter service pipes smaller than 1-inch in diameter, the maximum borehole size will be two (2) inches in diameter.

50. 610 WATER LINE CONSTRUCTION, Add the following to Subsection 610.19 MEASUREMENT AND PAYMENT:

(H) Ductile Iron Fittings: Any additional waterline fittings that become necessary during construction, beyond what is shown on the plans for water main construction; and any fittings needed for new fire hydrant installations, will be paid for separately under the bid item, "ALLOWANCE FOR EXCESS DUCTILE IRON FITTINGS, FURNISH AND INSTALL". Payment for these fittings will be made from this allowance based on approved invoiced cost of the materials only, plus bonds, insurance and taxes, and a maximum 15 percent markup for overhead and profit. All other waterline fittings as shown on the plans will be considered incidental to the cost of the water pipe.

51. 618 STORM SEWER CONSTRUCTION WITH PRE-CAST CONCRETE PIPE, HIGH DENSITY POLYETHYLENE PIPE, OR STEEL REINFORCED POLYETHYLENE PIPE:

Revise all references to the term, “storm sewer” to read, “storm drain.”

52. 618 STORM SEWER CONSTRUCTION WITH PRE-CAST CONCRETE PIPE, HIGH DENSITY POLYETHYLENE PIPE, OR STEEL REINFORCED POLYETHYLENE PIPE, Add the following to Subsection 618.7 PAYMENT:

(F) Pipe Plugs: Pipe plugs, per MAG Detail 427, will be paid for at the unit price bid for each plug, and price will be compensation in full for providing complete, satisfactory pipe plugs including brick or block work, concrete, grout or mortar, vitrified clay or plastic plugs, band seal couplings, any required earthwork, end-of-pipe marker, or any other incidental items necessary.

(G) Concrete Pipe Collars: Pipe Collars for pipes 24” and Larger, per COP STD Detail P-1505, will be paid for at the unit price bid for each collar, and price will be compensation in full for providing complete, satisfactory pipe collors including brick or block work, concrete, grout or mortar, vitrified clay or plastic plugs, band reinforcing, any required earthwork, or any other incidental items necessary.

53. 620 STORM SEWER CONSTRUCTION WITH CAST-IN-PLACE CONCRETE PIPE:

Revise all references to the term “storm sewer” to read “storm drain.”

54. 625 MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS, Add the following to Subsection 625.2 MATERIALS:

Per City of Phoenix Water Services Department, "MAG Standard Detail 425: 24” Aluminum Manhole Frame and Cover” is not approved and will not be used in the City of Phoenix.

55. 625 MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS, Add the following to Subsection 625.3.1 MANHOLES:

If steps are inadvertently installed, they will be removed and the holes will be filled with epoxy or Class "B" concrete.

56. 625 MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS, Add the following to Subsection 625.3.1, MANHOLES:

SANITARY SEWER MANHOLE ADJUSTMENTS

On all existing sewer manholes adjusted to new finish grade, the entire new portion of the adjusted manhole will be seal coated in accordance with COP Supplement to MAG Specification Sections 626 and 627.

57. 625 STORM SEWER MANHOLE PER DETAIL AND SPECIAL DETAIL CONSTRUCTION AND DROP SEWER CONNECTIONS, Delete the first paragraph in Subsection 625.5 PAYMENT and replace with the following:

Manholes will be paid for at the unit price bid for each type, as represented by the respective bid item, “STORM SEWER MAHOLE PER DETAIL ‘A’ ”, “STORM SEWER MANHOLE PER SPECIAL DETAIL ‘B’ ”, regardless of dimensional or other differences occurring within a particular type. The unit price to be paid under these items will be compensation in full for furnishing and placing manhole structures as shown on the plans and as specified, including circular reinforced concrete protection slab, reinforcing steel, steel manhole frame, steel manhole grates, frame adjustment to grade, structural excavation, forming, vibrating, finishing,

curing, sprayed polyurethane foam application, slurry backfill, backfill, compaction, any pavement adjustments, equipment, tools, labor and incidentals necessary to complete the work.

58. 631 WATER TAPS AND METER SERVICE CONNECTIONS, Add the following Subsection 631.3 Excavation and Backfill:

Bedding and backfill will be full depth ABC for water services installed under pavement using open trench method. The cost of the ABC material, labor and compaction will be included in the cost of the water service work.

59. 631 WATER TAPS AND METER SERVICE CONNECTIONS, Add the following new Subsection 631.9 REPLACEMENT, EXTENSION AND RELOCATION OF EXISTING WATER SERVICES AND METERS as follows:

631.9 REPLACEMENT, EXTENSION AND RELOCATION OF EXISTING WATER SERVICES AND METERS

Extension or Replacement of Existing Water Service Lines

The Contractor will replace or/and extend existing water service lines at the stations listed in these specifications or on the plans in accordance with Detail P-1342. The Engineer will determine when the existing lines are unsatisfactory and must be replaced. Generally, existing copper in good condition with sufficient cover will be extended. Water service lines other than copper will be replaced.

The water service will include, but is not limited to, locating the present tap, trenching, bedding, backfilling, disconnecting the existing service pipe from the corporation stop, furnishing and installing new service pipe, new appurtenant fittings, new curb stop and new meter coupling, and re-connection to the meter. The existing tapping saddle and corporation stop will remain, but the Contractor will not use any other salvaged service connection components. If the saddle is a single strap, the saddle will be replaced with a double strap saddle. In the event there is no tapping saddle, the Contractor will install one. The cost of the saddle and reinstallation of the corporation stop will be considered incidental to the water service replacement.

Inserts or adapters required to connect to the corporation stop are available at the Water Services Department yard at no cost to the Contractor. The Contractor must obtain a written order (AVO) from the Engineer before picking up said items.

Bedding and backfill will be full depth aggregate base course. Payment for furnishing and compacting the aggregate base course will be included in the bid item for replacing or extending existing water services.

The Contractor will schedule his work so that no open trenches are left overnight.

Materials for water service connections will conform to MAG Section 754 and City of Phoenix Supplement 610.4.4 and 610.4.5. Joints in the copper tubing will be made by the use of approved fittings, properly soldered or by means of approved compression fittings such as flared joints or pack joints.

Water Meter Relocation

Water meter relocation consists of disconnecting the meter, moving the meter, meter box and cover from the existing location to the new location and reconnecting in accordance with Details P-1342 and P-1363. The meter box and cover will be set to match the grade at the new location.

Any water meter boxes and/or covers damaged by the Contractor during course of construction will be replaced in kind at the Contractor's expense.

It is anticipated that some water meter boxes and/or covers may require replacement due to prior damages not due to the fault of the Contractor. The Water Services Department will furnish replacement water meter boxes and covers at no cost; however, the Contractor must first obtain a written order (Field Directive) from the Engineer. Then, at no additional cost to the City, the Contractor will pick up the specified number of units from the Water Distribution Warehouse located at 2500 S. 22nd Avenue.

Water meter boxes and covers will be Type 1, 2 or 3 in accordance with MAG Details 310, 311, 312, and 320 and P-1315.

All materials and fittings will conform to the requirements of Section 610 and 754. No salvaged service connection components will be used.

Measurement and Payment

Measurement for extending and/or replacing water services will be made to the nearest linear foot from the point of connection to the existing line or corporation stop, whichever is applicable, to the curb stop.

Payment for extending and/or replacing water services will be made at the unit price bid per linear foot under the proposal items "3/4-INCH AND 1-INCH WATER SERVICE REPLACEMENT PER SPECIAL PROVISIONS"; and "1 1/2" AND 2" WATER SERVICE REPLACEMENT PER SPECIAL PROVISIONS".

Measurement for water meter relocation will be made per each water meter regardless of size up to and including 2-inch. Payment for water meter relocation will be made at the unit price bid per each under the proposal item "RELOCATE WATER METER" which will include all sizes encountered on the project up to and including 2-inch.

60. 631 WATER TAPS AND METER SERVICE CONNECTIONS, Add the following new Subsection 631.11 WATER MAIN SHUTDOWN FEES as follows:

631.11 WATER MAIN SHUTDOWN FEES
All water main shutdown fees for installation of new water services, extension or replacement of existing water service lines, and relocation of existing water meter boxes will be waived. When it becomes necessary to shut down existing water mains and services to install water service extensions or replacements, no main will be left out of service for more than one (1) hour, and no individual service will be disrupted for more than five (5) continuous hours. Main valves will be operated by representatives of the City's Water Services Department. Shutdowns will not begin before 8:00 a.m. and will not extend past 4:00 p.m. It will be the Contractor's responsibility to notify all customers in advance that the water service will be turned off. The customers will be notified in writing at least 24-hours in advance and also verbally the day of the shutdown. Initial notification will include the reason for the shutdown, the date, the time and duration the water service will be shut off. A copy of the notification will be given to the Engineer.

61. 727 STEEL REINFORCEMENT, Add the following to Section 727 STEEL REINFORCEMENT:

Description

The work under this item consists of fabrication, furnishing and placing steel reinforcement of the quality, grade, type, size and quantity designated, in conformance with the details on the Project Plans, and in accordance with these special provisions and as directed by the Engineer. All work under this Section will

conform to SECTION 605 – STEEL REINFORCEMENT of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

Construction Requirements

Section 605-3 of the ADOT Standard Specifications of modified to add:

605-3.05 Shop Drawings:

The Contractor will submit shop drawings and lists showing the bending of reinforcement bars, splice locations and details and complete manufacturer's information on proprietary splices to the Engineer for review and approval prior to proceeding with the work. Approval of the submittal will not relieve the Contractor of responsibility for the correctness of the shop drawings and lists.

62. 727 STEEL REINFORCEMENT Add the following to Section 727 STEEL REINFORCEMENT

EARLY STEEL PROCUREMENT

Description

The work under this item consists of early procurement of steel reinforcement. All materials furnished under this section will conform to SECTION 605 – STEEL REINFORCEMENT and SECTION 1003- REINFORCING STEEL of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans. This specification does not include placement of the steel.

Bonding and Title

All storage facilities for the rebar will be bonded and insured to cover the replacement cost of the rebar. All storage facilities will be located within the State of Arizona. The City will retain title to the rebar.

Quantity

Rebar must meet the standard for all applications for which it is intended to be used. Quantities have been calculated by the Contractor and no additional payment by the City will be made for additional rebar. Rebar delivered to the site must be in new condition. Any defects from storage will be remedied by the Contractor at no cost to the City.

Materials

The Contractor will furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

Storage of Rebar

It is advisable to allocate steel rebar storage a separate area characterized by minimum pedestrian traffic. The rebar stacks should be stored above ground and separated by wooden separators.

If the rebar stacks are to be stored in the open air for more than 2 - 3 weeks, it is recommended to cover them with canvas or dark polyethylene sheets to protect against sunlight, and weather exposure.

The steel rebar will be stored separately and clearly marked or tagged with "Property of the City of Phoenix" or other such nomenclature as to identify the owner of the steel.

The steel rebar will be open for inspection by City inspectors with 24-hour notice at any time.

Measurement and Payment

Payment for the steel rebar will be made by the pound under bid item M5055000. This includes the storage of the rebar, and the delivery to the site when needed for construction. Payment will be made after the City receives title to the steel rebar.

Payment for the rebar material does not release the Contractor of any responsibility for meeting all testing requirements at the time of installation. Any rebar that does not conform to SECTION 605 – STEEL REINFORCEMENT of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, at the time of installation will be replaced at the Contractor's expense.

63. 727 STEEL REINFORCEMENT, Add the following to Section 727 STEEL REINFORCEMENT:

Description

The work under this item consists of fabricating, furnishing and placing steel reinforcement of the quality, grade, type, size and quantity designated, in conformance with the details on the Project Plans, and in accordance with these special provisions and as directed by the Engineer. All work under this Section will conform to SECTION 605 – STEEL REINFORCEMENT of the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, except as noted herein and on the Project Plans.

Construction Requirements

Section 605-3 of the ADOT Standard Specifications of modified to add:
605-3.05 Shop Drawings:

The Contractor will submit shop drawings and lists showing the bending of reinforcement bars, splice locations and details and complete manufacturer's information on proprietary splices to the Engineer for review and approval prior to proceeding with the work. Approval of the submittal will not relieve the Contractor of responsibility for the correctness of the shop drawings and lists.

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department

Revised October 23, 2007

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran population of desert tortoises occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40 degrees Celsius (105 degrees Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site, or alternate burrow, is unavailable within this distance, and ambient air temperature exceeds 40 degrees Celsius (105 degrees Fahrenheit), the Department should be contacted to place the tortoise into a Department- regulated desert tortoise adoption program. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, will also be placed in desert tortoise adoption programs. *Managers of projects likely to affect desert tortoises should obtain a scientific collecting permit from the Department to facilitate temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- These guidelines do not apply to the Mohave population of desert tortoises (north and west of the Colorado River). Mohave desert tortoises are specifically protected under the Endangered Species Act, as administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department. We recommend that the Department be contacted during the planning stages of any project that may affect desert tortoises.
- Take, possession, or harassment of wild desert tortoises is prohibited by state law. Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN

Add the following new Section, 233 STORM WATER POLLUTION PREVENTION PLAN SUBMITTAL PROCESS

233.1 DESCRIPTION

The Contractor will use the Arizona Department of Environmental Quality (ADEQ) Smart NOI program for all submittals located at this web address:

https://az.gov/app/smartnoi/

The location of this process may change and it is the responsibility of the Contractor to verify the correct web address. All fees are the responsibility of the Contractor. The Contractor will apply for a "Stormwater Construction General Permit" with the project type "MUNICIPAL/PUBLIC".

Before any construction on site begins, the Contractor will submit the Notice of Intent (NOI) and the SWPPP through the Smart NOI program as the sole permitee. The Contractor will not commence any construction activities until the ADEQ send a written Notice Of Intent assigning an AZCON number.

As required by ADEQ the Contractor will submit a Notice of Termination (NOT) through the Smart NOI program. The Contactor will receive final payment only after receiving a written Notice of Termination Acknowledgement from ADEQ.

Projects Impacting Impaired Waters

Projects that will have any construction taking place within ¼ mile of the Salt River between 23rd Avenue and the confluence of the Gila River will impact "Impaired Waters". These projects will require the Contractor to design, implement, and evaluate a Monitoring Plan for stormwater runoff from their construction activities. The Monitoring Plan must be site specific and will be submitted to ADEQ as an appendix to the SWPPP. ADEQ is the final authority in the approval of the monitoring plan. A copy of the SWPPP and the Monitoring Plan will be kept on-site at all times. Additional copies of the Monitoring Plan should be made available to all personnel who anticipate participating in stormwater monitoring activities. The Contractor will have a copy of the monitoring plan, approved SWPPP, NOI, and ADEQ Authorization to Discharge posted at the jobsite prior to ground disturbance.

Subcontractors

All subcontractors will comply with all AZPDES requirements under the supervision of the General Contractor, and will submit a completed, signed subcontractor certification form, thereby designating themselves as co-permittees.

233.2 SAMPLE SWPPP STRUCTURE

The following is a sample outline of the City requirement for a SWPPP submittal modeled after the ADEQ Construction General Permit Checklist. It will be the Contractor's responsibility to meet all the ADEQ requirements for a SWPPP and retain a qualified consultant to complete the SWPPP if necessary at no additional cost to the City.

1 SITE DESCRIPTION

1.1 Project Name: CONTRACTOR WILL FILL IN PROJECT NAME

Project No(s): CONTRACTOR WILL FILL IN PROJECT NUMBER

1.2 Project Location: CONTRACTOR WILL FILL IN FOR PROJECT SITE LOCATION

1.3 Owner's Name:

City of Phoenix, Street Transportation Department

1.4 Owner's Address:

200 West Washington Street, 5th Floor, Phoenix, Arizona 85003

1.5 Project Description: CONTRACTOR WILL FILL IN PROJECT DESCRIPTION

1.6 Runoff Coefficient and Soils Information:

A. Overall runoff coefficient of upstream drainage area will be unchanged by project.

B. Surface Soils Information: (EXAMPLE ONLY, CONTRACTOR WILL FILL IN FOR PROJECT SITE LOCATION)

SOIL UNIT	SOIL TYPE (USDA TEXTURE)	PERMEABILITY (IN./HR.)
Laveen	Loam	0.6-2.0
Mohall	Clay Loam	0.2-0.6
Tucson	Clay Loam	0.2-0.6
Vecont	Clay	0.06-0.2

1.7 Name of Receiving Water:
EXAMPLE: SALT RIVER, CONTRACTOR WILL FILL FOR PROJECT SITE LOCATION

2 CONTROLS

2.1 Erosion and Sediment Controls

2.1.a Stabilization Practices:

Stabilization practices on this site include:

- Permanent planting.
- Save selected existing trees.

- Decomposed granite
- CONTRACTOR WILL ADD OR REMOVE STABILIZATION PRACTICES AS NECESSARY

2.1.b Structural Practices:

May include:

- Temporary retention areas (subgrade excavation areas).
- Temporary catch basin inlet protection.
- Silt fence.
- Gravel filter berm.
- Temporary diversion dike.
- Straw bale barriers.
- Sandbag berm
- CONTRACTOR WILL ADD OR REMOVE STABILIZATION PRACTICES AS NECESSARY

2.1.c Narrative: Sequence of major activities.

CONTRACTOR WILL COMPLETE NARRATIVE

2.1.d Storm Water Management: (CONTRACTOR WILL EDIT AS NECESSARY)

Storm water drainage on will be provided by curb and gutter, catch basin inlets, and storm drains. No appreciable changes in runoff coefficients or in finished roadway grades will take place as a result of this project; therefore, no significant alterations of storm water drainage patterns or runoff quantities are expected.

During construction, storm water runoff will be managed by the following means, as conditions require:

- Temporary retention will be provided during roadway construction in areas excavated for subgrade.
- Silt fence, straw bales, sandbag berms, temporary diversion dikes, gravel filter berms or other BMP's as necessary to eliminate erosion may be used to prevent storm runoff from entering open storm drain pipes in excavated trenches. Temporary catch basin inlet protection may also be provided to remove sediment from drainage water before it enters the drainage system. Straw bale protection at outfall pipe locations may be employed during construction.

3 OTHER CONTROLS

3.1 Waste Disposal:

Waste Materials:

All waste materials including trash and construction debris from the site will be either disposed to a designated area immediately or collected and stored in securely-lidded metal dumpsters. The dumpsters will meet all local and State solid waste management regulations. The dumpsters will be emptied a minimum of once per week, or more often if necessary, and the trash will be hauled to an acceptable dump site. Lids will be closed at all times after work hours and during rain events. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these practices will be posted on site, and the site superintendent who manages the day-to-day site operations, will be responsible for seeing that these procedures are followed.

ENTER PHONE NUMBER AND NAME OF SITE SUPERINTENDENT

Concrete washout will only be allowed in designated areas. The hardened waste will be disposed of weekly and before final inspection of the project.

Hazardous Waste:

All hazardous waste materials will be disposed of in the manner specified by local or State regulations or by the manufacturer. Site personnel will be instructed in these practices, and the site superintendent who manages day-to-day site operations, will be responsible for seeing that these practices are followed.

Sanitary Waste:

All sanitary sewage generated on-site will be collected from the portable units a minimum of twice per week or as required by local regulations. Units will have a berm placed around them to ensure no spillage can occur.

3.2 Off-Site Vehicle Tracking:

Traffic will be maintained on paved roadway throughout construction in order to reduce vehicle tracking of sediments. The paved street beyond the start and end of the project will be swept as often as necessary to remove any excess mud, dirt, or rock that may be tracked from the site by construction vehicles, but not less than once per week. Dump trucks hauling material to or from the construction site will be covered with tarpaulin before leaving the site.

4 DEMONSTRATION OF COMPLIANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS

The following Federal, State, and City regulations are followed in the preparation of this storm water pollution prevention plan:

- Section 402(p) of the Clean Water Act.
- Amended Section 405 of the Water Quality Act.
- “ADEQ Arizona Pollutant Discharge Elimination System General Permit for Discharge from Construction Activities to Waters of the United States, Permit AZG-2008-001.”
- Flood Control District of Maricopa County "Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control."
- City of Phoenix Code 32C, "Storm Water Quality Protection."
- City of Phoenix "Grading and Drainage Ordinance for Purpose of Fulfilling NPDES Requirements."

5 MAINTENANCE/INSPECTION PROCEDURES

5.1 Erosion and Sediment Control Practices:

The following is a list of erosion and sediment controls to be used during the construction period:

5.1.a Stabilization practices for this site include:

- Permanent planting.
- Save selected existing trees.

- Decomposed granite.
- CONTRACTOR TO ADD/DELETE AS NECESARRY

5.1.b Structural practices for this site will include:

- Silt fence/straw bale barriers.
- Temporary diversion dike/gravel filter berm.
- Sandbag berm.
- Storm drain, curb and gutter, catch basins.
- Temporary catch basin inlet protection.
- Temporary retention in subgrade excavation areas.
- CONTRACTOR TO ADD/DELETE AS NECESSARY

5.2 Erosion and Sediment Control Maintenance and Inspection Practice:

Following is a list of the inspection and maintenance practices that will be used to maintain erosion and sediment control:

- All control measures will be inspected at least once every 7 days and within 24 hours after each rain event of 0.1 inch or greater.
- All measures will be maintained in good working order; if repair is necessary, it will be initiated within 24 hours of report. All changes will be completed within 14 days after an observation.
- Built-up sediment will be removed from silt fence when it has reduced the design capacity by 50%.
- Erosion control fabric and erosion control dikes will be inspected and any breaches promptly repaired.
- Permanent planting will be inspected for washout and healthy growth per specification requirements.
- A Compliance Evaluation Report will be made at each inspection to ensure all BMP's are functioning correctly.
- The site superintendent will be responsible for inspection, maintenance, and repair activities, and filling out the Compliance Evaluation Report.
- Personnel selected for inspection and maintenance responsibility will receive training from the site superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on-site in good working order.
- Only one side of roadways will be excavated for subgrade preparation at a time. This area will serve as temporary retention while traffic is maintained on the paved other half of the road. This will serve to control storm water and minimize tracking of sediments.

6 <u>INVENTORY FOR POLLUTION PREVENTION PLAN</u> (CONTRACTOR TO EDIT AS NECESSARY)

The materials or substances listed below are expected to be present on-site during construction:

- Concrete
- Asphaltic Concrete
- Fertilizers
- Petroleum-Based Products
- Cleaning Solvents/Agents
- Sealants
- Wood
- Paints
- Herbicide/Pesticide
- Soil Treatment Products
- Other Building Materials
- Water Used in Dust Control

6.1 Spill Prevention

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff:

6.1.a Good Housekeeping:

The following good housekeeping practices will be followed on-site during the construction period:

- An effort will be made to store only enough product required to do the immediate job.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under proper cover and palletized.
- Liquid products will be placed on secondary containment pallets.
- Fuel tanks will be double walled.
- Drip pans will be used under all spigots unless on secondary containment.
- Products will be kept in their original containers with the original manufacturers' label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The site superintendent will inspect daily to ensure proper use and disposal of materials.
- Concrete washout will only be allowed in designated areas. The hardened waste will be disposed of weekly and before final inspection of the project.

6.1.b Hazardous Products:

These practices are used to reduce the risks associated with hazardous materials:

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data sheets will be retained.
- If surplus product must be disposed of, manufacturers', or local and State recommended methods for proper disposal will be followed.
- Products will be monitored, an inventory will be conducted regularly, and documentation of all use and disposal will be maintained.

6.2 Product Specific Practices:

The following product specific practices will be followed on-site:

6.2.a Petroleum Products:

All on-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce any chance of leakage. Petroleum products will be stored in tightly-sealed containers which are clearly labeled. Any petroleum substances used on-site will be applied according to the manufacturer's recommendations. Spills and leaks from vehicles will be stopped immediately. Any leaking vehicle will have a drip pan placed under the leak until the unit is repaired. Secondary containment will be provided for all petroleum products stored onsite.

6.2.b Fertilizers, Herbicide, Pesticide, Soil Treatment:

All materials used will be applied only in the minimum amounts recommended by the manufacturer or as per specification. Once applied, materials will be worked into the soil to limit exposure to storm water.

On-site storage will be covered and palletized to limit contact with storm water. The contents of any partially-used bags or containers will be transferred to a sealable plastic bin to avoid spills.

6.2.c Paints:

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm drain system or on the ground, but will be properly disposed of according to manufacturers' instructions or State and local regulations.

6.2.d Concrete Trucks:

Concrete trucks will not be allowed to wash out or discharge surplus concrete or dump wash water other than in a designated wash-out area. The hardened waste will be disposed of weekly and before final inspection of the project.

6.3 Spill Prevention Practices:

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically designed for this purpose.
- All spills will be cleaned up immediately after discovery using dry cleanup methods.
- The spill area will be kept well-ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size—ADEQ Hotline: (602) 771-4505; City of Phoenix Hazardous Spills Emergency: 911; City of Phoenix Hazardous Spills Safety Section: (602) 262-7555.
- The spill prevention plan will be adjusted to include measures to prevent this type of spill from recurring and procedures to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
- The site superintendent will be responsible for the day-to-day site operations, will be the spill prevention and cleanup coordinator. He will designate other site personnel who will receive spill prevention and cleanup training.

6.4 Documentation:

Documentation of all inspections, failed BMP's, corrective action and training will be maintained onsite with the SWPPP at all times during the project, and will be maintained for not less than three (3) years after the project is complete.

OTHER REQUIRED CERTIFICATIONS

The Contractor will complete and submit the following certification forms to the City before construction

begins:

- Permitee Certification
- Contractor Certification
- Subcontractor Certification (for all Subcontractors as necessary)
- Operator's Compliance Evaluation Report

PERMITTEE'S CERTIFICATION

As Contractor of the Riverview Drive 18th Place to 22nd Street Roadway Improvement project, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____
Company

Name: _____

Title: _____

Signature: _____

Date: _____

CONTRACTOR CERTIFICATION

I certify under penalty of law that I understand the terms and condition of the General Arizona Pollutant Discharge Elimination System (AZPDES) Permit that authorizes the storm water discharges associated with industrial activities from the construction site identified as part of this certification. Further, by my signature, I understand that I am becoming a co-permittee, along with the subcontractors signing such certifications, to the general (AZPDES) Permit for the storm water discharges associated with construction activities of the Riverview Drive 18th Place to 22nd Street Roadway Improvement project. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act, to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under the AZPDES Permit and the terms of the AZPDES Permit.

_____

General Contractor and Responsibility

Name: _____

Title: _____

Signature: _____

SUBCONTRACTOR'S CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the General Arizona Pollutant Discharge Elimination System (AZPDES) Permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification. Further, by my signature, I understand that I am becoming a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the general AZPDES permit for the storm water discharges associated with construction activities of the Riverview Drive 18th Place to 22nd Street Roadway Improvement project. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act, to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under the AZPDES permit and the terms of the AZPDES permit.

Authorized Representative of Subcontractor: _____

Signature: _____ Date: _____

For (Subcontractor Name): _____

Construction Activities: _____

_____

_____

_____

Verification of Completion and Acceptance of Subcontractor's Work

All work to be performed by _____ (Subcontractor) as part of the _____ (Project) has been completed and accepted. Execution of this form absolves said subcontractor from liability for AZPDES violations which may occur subsequent to this date as a result of activities of the general contractor or other subcontractors.

Authorized Representative of Subcontractor: _____

Signature: _____ Date: _____

For (Subcontractor Name): _____

Verified by (General Contractor): _____

Authorized Representative of General Contractor: _____

Signature: _____ Date: _____

AZG-2008-001 General Permit for Construction Activities
Operator's Compliance Evaluation Report

This project requires inspection of storm water pollution controls (BMPs) on a choice of frequency described in the General Permit, Part IV. H. Attach sheets if more space is needed.

Project: _____ Date: _____

Name & Title of Inspector: _____

Qualifications of Inspector: ☐ Attached; or ☐ Shown in Sec. _____ of the SWPPP.

☐ Periodic Inspection; or ☐ Rain Event inspection
Relevant weather information: _____

1. Location(s) of discharge from the site: ☐ None; or ☐ Description: _____

2. Location(s) of and identification of BMPs that need to be maintained; failed to operate or proved to be inadequate: ☐ None; or ☐ Description: _____

3. Location(s) where additional BMPs are needed: ☐ None; or ☐ Description: _____

4. Corrective actions required, including changes and target dates: ☐ None; or ☐ Description: _____

5. Identify all sources of non-storm water and the associated pollution control measures: ☐ None; or ☐ Description: _____

6. Identify material storage areas and evidence of, or potential for pollutant discharge from these areas: ☐ None; or ☐ Description: _____

7. Identify any other apparent incidents of non-compliance: ☐ None; or ☐ Description: _____

_____

_____

8. If no incidents of non-compliance are identified in items 1 through 7 above, the inspector certifies that the construction project is being operated in compliance with the SWPPP and the General Permit.

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

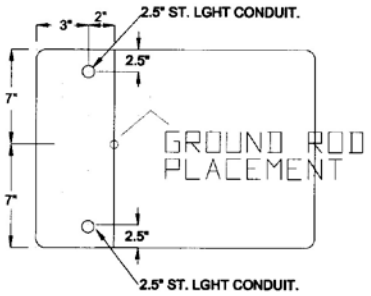
Certifying Signature: _____ Date: _____

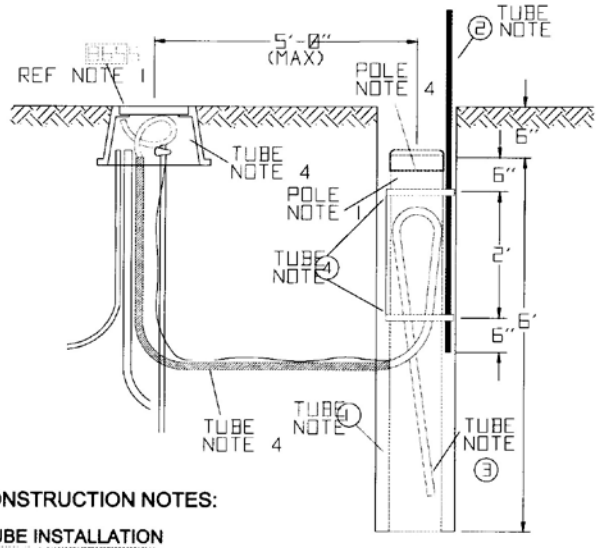
Printed Name: _____

APS STREET LIGHT SONOTUBE, J-BOX, CONDUIT ETC (DWG)

1911

TYPICAL SMALL J-BOX
CONDUIT LAYOUT





CONSTRUCTION NOTES:

TUBE INSTALLATION

1. DIG HOLE FOR TUBE 6'- 6"DEEP BY EITHER OF THE FOLLOWING:
   A. AUGERRED HOLE (16"MAX.)
   B. SLOTTED STUB-OUT TRENCH
2. PLACE RED PLASTIC LOCATOR MARKER OUTSIDE OF TUBE AND STRAP IN TWO LOCATIONS.
3. PLACE STREET LIGHT FLEXIBLE CONDUIT IN TUBE WITH 10' COILED INSIDE. DO NOT MAKE SHARP BENDS. BEND END OF CONDUIT OVER AND INSERT DOWN INTO TUBE AS SHOWN. INSPECTOR TO INSURE FLEX IS NOT KINKED.
4. INSTALL OTHER END OF FLEX IN J-BOX. LEAVE SMALL COIL TO ALLOW LEVELING FOR FINAL GRADE. BACKFILL AFTER INSPECTION IS COMPLETE.
5. COMPACT SOIL TO AT LEAST 85% AROUND TUBE.

POLE INSTALLATION

1. ELECTRONIC MARKER WILL INDICATE LID LOCATION PER BLUE STAKE MARKINGS. WORK FORCES WILL DIG DOWN TO LID,REMOVE LID AND PULL FLEX FROM TUBE.
2. INSERT END OF FLEX THROUGH ACCESS HOLE AND PUSH IT UP THROUGH HAND HOLE AS STREET LIGHT POLE IS LOWERED INTO THE TUBE.
3. HOLD POLE SECURELY WHILE BACKFILLING TO AT LEAST 85% COMPACTION. TO COMPACT POLE IN PLACE, PEA GRAVEL (<3/4") MAY BE USED NEAR THE TUBE.
4. THE MARKER BALL ATTACHED TO THE BOTTOM OF THE "SONO" TUBE LID SHOULD BE RETURNED TO STOCK.

REFERENCES:

1. FOR J-BOX SEE SPEC 8655 THRU 8663.

CODE	1911	MATERIAL LIST	
ITEM	QTY	DESCRIPTION	APN
1	20	CONDUIT 1" PVC FLEX CORR	32900891
2	1	LOCATOR U. G. SERVICE	33101586
3	1	"SONO" TUBE 6FT X12IN	64672
4	2	TIE 30" SELF LOCKING	33107350
5	2	FOAM BACKFILL	00072046

APS	Street Light Sonotube, J-Box, Conduit & Pole Installation	
WO#:		DATE: 5/14/03
BY:		SCALE:
FILENAME:		SHEET OF

GEOTECHNICAL EVALUATION
RIVERVIEW DRIVE
18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PREPARED FOR:
City of Phoenix
1034 East Madison Street
Phoenix, Arizona 85034

PREPARED BY:
Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
3001 South 35th Street, Suite 6
Phoenix, Arizona 85034

December 29, 2009
Project No. 602526001

December 29, 2009
Project No. 602526001

Mr. Equbalali Charania, P.E.
City of Phoenix
1034 East Madison Street
Phoenix, Arizona 85034

Subject: Geotechnical Evaluation
Riverview Drive; 18th Street to 22nd Street
Phoenix, Arizona

Dear Mr. Charania:

In accordance with our revised proposal dated March 3, 2009, Ninyo & Moore is pleased to submit this Geotechnical Evaluation for the proposed Riverview Drive project from 18th Street to 22nd Street in Phoenix, Arizona. This report presents our findings, conclusions, and geotechnical recommendations for the project.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE

Registered Professional Engineer (Civil) CERTIFICATE NO. 41716 KEVIN L. PORTER Date Signed 12/29/09 ARIZONA, U.S.A.

Kevin L. Porter, P.E.
Senior Engineer

EXPIRES 12/31/2010

Registered Professional Engineer (Civil) CERTIFICATE NO. 14875 STEVEN A. HAIRE Date Signed 12-29-09 ARIZONA, U.S.A.

Steven A. Haire, P.E.
Chief Geotechnical Engineer

EXPIRES 3/31/12

KLP/SAH/SDN/hle

Distribution: (2) Addressee
(6) Mike Lopez/Stanley Consultants, Inc

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1. INTRODUCTION

This report presents the results of our geotechnical evaluation for planned improvements to Riverview Drive between 18th Street and 22nd Street in Phoenix, Arizona. The objectives of this evaluation were to assess the soil and geologic conditions at the project site, and provide recommendations relative to the geotechnical aspects of the planned improvements.

2. SCOPE OF SERVICES

Our scope of services for this project generally included:

- Reviewing readily available as-built plans, subsurface data, geologic literature, reports, and published maps pertaining to the vicinity under study.
- Preparing drilling plans for submittal to City of Phoenix for clearance and permits needed to perform the field work.
- Establishing boring locations in the field and locating the nearby underground utilities through Arizona Blue Stake.
- Drilling five exploratory soil borings to depths of approximately 25 to 99 feet below the existing ground surface (bgs). The borings were logged in general accordance with industry standard methods and soil samples were obtained for laboratory testing. The boring logs are included in Appendix A.
- Conducting laboratory tests of representative samples obtained from the borings including, in situ moisture content and dry density, grain size analysis, Atterberg limits, maximum density/optimum moisture relationship, consolidation tests, R-value, organic content, and corrosivity characteristics (including pH, minimum electrical resistivity, soluble sulfates, and chlorides). The laboratory results are included in Appendix B.
- Performing two seismic refraction lines near the planned bridge approaches. Results are included in Appendix C.
- Preparing this report that presents our findings, conclusions, and geotechnical recommendations.

3. SITE DESCRIPTION

The project site is located in the southwest quarter of Section 22, Township 1 North, Range 3 East, on a parcel of land situated parallel to the north bank of the Salt River between 18th Street and 22nd Street in Phoenix, Arizona. An existing concrete-lined Arizona Department of Transportation (ADOT) drainage channel, which extends roughly 25 feet below adjacent grade, crosses the site in a north-south orientation. The approximate location of the site is depicted on the Site Location Map (Figure 1). According to information obtained from the project team, the site lies at an average elevation of roughly 1,085 feet relative to mean sea level (MSL).

At the time of our exploration, Riverview Drive was a two-lane asphalt paved roadway extending east from 16th Street and terminating approximately at 18th Place. Several industrial buildings were observed along the north side of Riverview Drive. There was also a narrow asphalt-paved access road from 24th Street along the north bank of the river that extended approximately to the drainage channel. Along this access road, we observed new landscaping with irrigation systems which had been installed as part of the Rio Salado Restoration project in this area.

4. PROJECT DESCRIPTION

The project includes the design and construction of a new segment of Riverview Drive extending east from the existing roadway for a distance of approximately 1,200 feet. The alignment parallels the Salt River and crosses over the existing ADOT drainage channel mentioned above. A bridge over the drainage channel will be needed and may consist of a single span structure. We understand retaining walls and up to 8 feet of grade-raise fill may also be needed for the bridge approach fills in this vicinity. Alternatively, a box culvert (roughly 32 feet wide by 14 feet tall and 60 feet long) with its bottom situated near the invert of the existing drainage channel is also being considered. For the box culvert alternative, we understand no retaining walls beyond the limits of the ADOT channel are needed.

5. BACKGROUND

Review of background documents and aerial photographs reveal that the area north of the site was undeveloped land until sand and gravel mining operations adjacent to the Salt River began in the late 1960's. Mining continued to occur near the site until the 1980's to early 1990's, when the portions of the site became an inert materials landfill, reportedly accepting brick block, soil, concrete, rock, plaster, asphalt, clay roof tiles, and miscellaneous inert materials. A 1998 aerial photograph shows the existing ADOT drainage channel and a 2002 aerial photograph shows the mining pits located west of the channel had been filled. Partial filling of the pit east of the channel is indicated in a 2003 aerial photograph, with a majority of the pit filled by 2004. Aerial photographs from 2006 to the present indicate grading and construction of industrial buildings on the western portion of the site, similar to its present condition. The final filling of the east mining pit area occurred after 2007.

We also reviewed as-built drawings of the drainage channel dated 1990 and 1992. The 1990 drawings indicate the channel was constructed with 3 feet of dumped riprap on the channel bottom and 18-inch gabion lining on the side slopes. The 1992 as-builts show that 5 inches of fiber reinforced shotcrete lining was applied to the existing gabion surfaces with 9 inches or more penetration into the gabions.

6. GEOTECHNICAL FIELD EXPLORATION AND LABORATORY TESTING

Our field exploration was conducted in two phases, due to the desire to collect additional subsurface information during design of various project alternatives. We first mobilized to the site on May 14, 2009 and our initial field work was finished on May 26, 2009. For subsequent field work, we mobilized to the site on October 28, 2009 and the field work was finished on October 29, 2009. The following sections describe our activities and procedures associated with the excavation, logging, and sampling of the exploratory borings.

Enviro-Drill Inc. (EDI), of Phoenix, Arizona, was retained by Ninyo & Moore to drill four soil borings with a CME-75 truck-mounted drill rig using air percussion drilling techniques. These

borings were drilled on either side of the ADOT drainage channel, roughly within the anticipated roadway footprint. Of these borings, two borings (denoted as B-1 and B-4) were drilled for planned retaining walls and two borings (denoted as B-2 and B-3) for the planned bridge structure over the ADOT drainage channel. The approximate locations of the borings are provided on Figures 2A and 2B.

D&S Drilling, of Phoenix, Arizona, was retained by Ninyo & Moore to drill one soil boring with a Diedrich D-120 truck-mounted drill rig using air percussion drilling techniques. This boring (denoted as B-5) was drilled within the existing ADOT drainage channel for the planned box culvert alternative as part of the subsequent field work. The approximate locations of the borings are provided on Figures 2A and 2B.

Soil samples were obtained by driving a split-spoon sampler, approximately 18 inches into the soil at the bottom of the borehole at selected depths using a 140-pound hammer falling approximately 30 inches, operated by an automatic trip hammer or spooling cable. California Modified and Standard Penetration Test (SPT) split-spoon samplers were used in generally alternating intervals. Samples were typically taken every 2.5 feet for the first 10 feet and every 5 feet thereafter. Relatively undisturbed ring samples were obtained with the California Modified sampler and small bag samples were obtained using the unlined SPT sampler. The equipment and sampling methodology are described in detail in Appendix A.

Ninyo & Moore personnel logged the borings in general accordance with the Unified Soil Classification System (USCS) and American Society for Testing and Materials (ASTM) D 2488 by observing cuttings and split-spoon samples. The ring samples were trimmed in the field, wrapped in plastic bags, and placed in moisture-tight cylindrical plastic containers, while the SPT samples were placed in zip-lock baggies to help preserve their natural moisture. Bulk samples were also collected from the cuttings and placed in large plastic bags. Field classifications and other pertinent data are presented on the boring logs in Appendix A.

Samples collected from our exploratory excavations were transported to the Ninyo & Moore laboratory in Phoenix, Arizona for geotechnical laboratory analyses. The laboratory analyses in-

cluded in-situ moisture content and dry density, grain size analysis, Atterberg limits, maximum density/optimum moisture relationship, consolidation tests, R-value, organic content, and corrosivity characteristics (including pH, minimum electrical resistivity, soluble sulfates, and chlorides). The results of the in-situ moisture and density testing are presented on the logs in Appendix A. A description of each test method and the remainder of the laboratory results are presented in Appendix B.

Ninyo and Moore personnel conducted seismic refraction surveys at the site on June 30, 2009 to evaluate the rippability characteristics of the near surface materials. The seismic refraction data were collected with a SmartSeis S12, high performance exploration seismograph and 12 vertical component geophones. A 10-pound hammer and metal plate were used as the seismic wave source. A total of two seismic refraction traverses were performed, and the approximate locations of the traverses are depicted on Figures 2A and 2B. A description of the method used and the results obtained are presented in Appendix C.

7. GEOLOGIC SETTING

The project site is located in the Sonoran Desert subprovince of the Basin and Range physiographic province, which is typified by broad alluvial valleys separated by steep, discontinuous subparallel mountain ranges. The mountain ranges generally trend north-south and northwest-southeast. The basins consist of alluvium with thicknesses extending to several thousands of feet.

The basins and surrounding mountains were formed approximately 10 to 18 million years ago during the mid- to late-Tertiary. Extensional tectonics resulted in the formation of horsts (mountains) and grabens (basins) with vertical displacement along high-angle normal faults. Intermittent volcanic activity also occurred during this time. The surrounding basins filled with alluvium from the erosion of the surrounding mountains, as well as from deposition from rivers. Coarser-grained alluvial material was deposited at the margins of the basins near the mountains.

8. SURFICIAL GEOLOGY

The surficial geology of the site is described as being Holocene (<10,000 years) age active channel deposits, alluvial fan deposits, and terrace deposits. These deposits are described as being composed of silt, sand, and gravel. Stage I to II (low degree of cementation) is described in these units (Demsey, 1989).

8.1. Subsurface Conditions

Our knowledge of the subsurface conditions at the project site is based on our review of background documents, field exploration, laboratory testing, and our general experience in the area. The following sections provide generalized descriptions of the materials encountered. More detailed descriptions are presented on the boring logs in Appendix A.

8.1.1. Fill

Undocumented fill soils were encountered in each of our borings excavated and extended to depths ranging from about 48 to 51 feet deep in borings B-1 through B-4. Undocumented fill soil is fill material where controls on the material and placement methods are unknown. Fill was found in boring B-5 and extended to a depth of about 17 feet. The fill material in our borings generally consisted of loose to dense silty and clayey sand with gravel, cobbles, and boulders with varying amounts of construction debris and refuse. Although no significant quantities of construction debris was observed in our borings, due to the history of the site, inert construction debris should be anticipated within the fill soils.

8.1.2. Alluvium

The native alluvium was encountered below the fill soils and extended to the depths explored. The alluvium generally consisted of a medium dense to very dense silty sand and poorly-graded sand, with gravel, abundant cobbles, and possible boulders in our borings. This material is commonly referred to as SGC in the Phoenix area.

8.2. Groundwater

Groundwater was encountered at depths ranging from about 50 to 60 feet bgs in our deeper borings at the time of our exploration. Due to the close proximity of the Salt River, groundwater levels at the site will likely respond quickly to sustained flows in the river, could be much higher than what was encountered in our borings, and should be considered during construction. Aerial photos show water ponding into the ADOT drainage channel during flood flows in the Salt River. Groundwater levels can fluctuate due to seasonal variations, irrigation, groundwater withdrawal or injection, and other factors and should be assumed to be at or near the ground surface for design and construction planning.

9. GEOLOGIC HAZARDS AND CONDITIONS

The following sections describe potential geologic hazards at the site, including land subsidence and earth fissures, and faulting and seismicity.

9.1. Land Subsidence and Earth Fissures

Groundwater depletion due to groundwater pumping has caused land subsidence and earth fissures in numerous alluvial basins in southern Arizona. It has been estimated that subsidence has affected more than 3,000 square miles and has caused damage to a variety of engineered structures and agricultural land (Schumann and Genualdi, 1986).

In southern Arizona earth fissures are generally associated with land subsidence and pose an on-going geologic hazard. Earth fissures generally form near the margins of geomorphic basins where significant amounts of groundwater depletion have occurred. Reportedly, earth fissures have also formed due to tensional stress caused by differential subsidence of the unconsolidated alluvial materials over buried bedrock ridges and irregular bedrock surfaces (Schumann and Genualdi, 1986).

Based on our research of referenced material, aerial photograph review, and geologic reconnaissance, there are no known earth fissures underlying, or adjacent to, the site. The closest

documented earth fissure to the site is approximately 13 miles to the northwest (Shipman, 2007). In general, land subsidence and earth fissures are not anticipated to be a constraint to the construction of this project.

9.2. Faulting

The site lies within the Sonoran Zone, which is a relatively stable tectonic region located in southwestern Arizona, southeastern California, southern Nevada, and northern Mexico (Euge et al., 1992). This zone is characterized by sparse seismicity and few Quaternary faults. Based on our field observations, review of pertinent geologic data and analysis of aerial photographs, faults are not located on or adjacent to the property. The closest fault to the site is the Carefree fault zone, located approximately 25 miles to the north-northeast of the site (Pearthree, 1998). The Carefree Fault Zone is a series of northwest striking normal faults that dip to the southwest. Recent movement along this fault was approximately 750,000 years ago during the Middle Pleistocene epoch. The slip-rate category of this fault is less than 0.2 millimeters per year (Pearthree, 1998). Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the project site. Therefore, the probability of damage from seismically induced ground surface rupture is considered to be low. Seismic parameters recommended for the design of the proposed improvements are presented in Section 10.3.

9.3. Liquefaction Potential

Based on the SPT values at the site, the lack of near surface water (except during flood events), and the low ground motion hazard (relatively low ground accelerations), the likelihood or potential for liquefaction is considered to be negligible and is therefore not a design consideration.

10. RECOMMENDATIONS

The following sections present our geotechnical recommendations for earthwork, bridges, lateral earth pressures, and pavement design for the proposed project. Ninyo & Moore should be contacted for additional recommendations if the actual design details change from those detailed or assumed in our report.

10.1. General Earthwork

The following sections provide our earthwork recommendations for this project. In general, we understand that the City of Phoenix generally follows the earthwork specifications contained in Maricopa Association of Governments (MAG), *Uniform Standard Specifications and Details for Public Works Construction* as amended by the City of Phoenix. These specifications are expected to apply, unless specifically noted in the following sections.

10.1.1. Excavations

Our evaluation of the excavation characteristics of the on-site surface materials is based on the results of our exploratory borings and seismic refraction surveys performed for this project, our site observations, and our experience on similar projects. In our opinion, excavation of the on-site surface materials can be accomplished with heavy-duty earthmoving or excavation equipment in good operating condition. We observed gravels, cobbles, and possible boulders and/or construction debris in our borings, but due to the limitations of subsurface exploration methods, we were unable to evaluate the quantity of those materials that could be encountered. The contractor should be prepared to encounter cobbles, boulders, and/or large size construction debris during construction, which could call for more aggressive excavation measures and could slow excavation rates.

Excavations that penetrate the ADOT drainage channel's existing shotcrete/gabion lining should be stabilized to prevent raveling or loosening of the materials. Following

construction, the shotcrete/gabion lining should be restored to the satisfaction of ADOT and the engineer.

10.1.2. Grading, Fill Placement, and Compaction

After rough grade has been achieved and prior to placement of engineered fill, the exposed subgrade should be visually checked for the presence of debris, organic matter and other unsuitable materials. If unsuitable subgrade soils are encountered at subgrade level during earthwork operations, these soils should be removed to their full depth and be replaced with engineered fill.

As shown by our field and laboratory tests, some of the on-site soils within the undocumented fill materials may exhibit significant vertical movement when exposed to water. Further, due to the uncertainty of the fill material composition and methods by which it was placed, significant vertical movement should be anticipated.

We recommend the subgrade soils beneath planned at-grade roadway improvements be improved in-place by discing or ripping, moisture-conditioning and compacting the existing soils to a depth of 12 inches below the bottom of the pavement section. The subgrade improvement zone should extend laterally 2 feet or more horizontally beyond the roadway footprint.

We understand that grade-raise fill may be needed to obtain the vertical profile of the proposed improvements, particularly in the vicinity of the channel crossing where up to approximately 8 vertical feet of fill may be placed. We recommend that the areas to receive embankment fill be prepared by scarifying, or removing and replacing, and compacting the upper 24 inches prior to the placement of grade-raise fill. The subgrade improvement zone should extend laterally 2 feet or more horizontally beyond the roadway footprint.

In order to reduce the potential for significant post-construction settlement beneath planned structures with shallow foundations, we recommend the undocumented fill

soils be removed to dense native material and replaced with compacted engineered fill. Alternatively, a partial remove and replace, in combination with deep dynamic compaction, could also be considered. However, as either of these ground improvement techniques may be cost-prohibitive, an alternative recommendation is being provided below with the understanding that post-construction settlement could occur, and by implementing this recommendation, the associated risks are accepted.

As an alternative to a full-depth remove/replace or deep dynamic compaction options, we recommend that structures supported on shallow foundations (including MSE retaining walls) be founded on a zone of moisture-conditioned and compacted engineered fill, extending 2 or more feet below the bottom of the footing elevation. The overexcavated zone should extend the same distance horizontally (beyond the base footprint) as it extends below the bottom of the base.

Following the overexcavation recommendations described above, and prior to the placement of new fill, the resulting exposed surface should be carefully evaluated by the geotechnical consultant for the presence of loose and/or unsuitable soil. The exposed surface should be proof-rolled with heavy compaction equipment to identify potential soft or loose zones. Based on this evaluation, additional remediation may be needed. This could include scarification of the exposed surface. This additional remediation, if needed, should be addressed by the geotechnical consultant during the earthwork operations.

New fill in these overexcavated zones should be placed in horizontal lifts no more than approximately 8 inches in loose thickness and compacted by appropriate mechanical methods to 100 percent relative compaction as evaluated by ASTM D698 and at a moisture content slightly above the laboratory optimum.

10.1.3. Suitable Fill and Borrow Material

Suitable engineered fill should not include deleterious or organic material, clay lumps, construction debris, rock particles, and other non-soil fill materials larger than 6 inches in dimension.

In addition, suitable fill material should exhibit low plasticity and very low to low expansive potential. Low plasticity soils should have a Plasticity Index (by ASTM D4318) of 20 or less. Very low to low expansive potential soils are defined as having an Expansion Index (by ASTM D4829) of 50 or less. Our laboratory tests indicated plasticity indices of 0 (non-plastic) to 13. Furthermore, organic content tests performed on two samples indicated organic contents of 2.1 and 1.6 percent. As such, many of the on-site soils may be suitable for re-use as engineered fill with appropriate screening or processing, as needed. We also recommend suitable fill material placed within 3 feet of the finished roadway have an R-value of 30 or more.

Imported fill, if utilized, should consist of granular material with a very low or low expansion potential. Import material in contact with ferrous metals should preferably have low corrosion potential (minimum resistivity greater than 2,000 ohm-cm, chloride content less than 25 parts per million [ppm]). Import material in contact with concrete should have a soluble sulfate content of less than 0.1 percent. The geotechnical consultant should evaluate borrow materials prior to importation.

10.1.4. Shrinkage and Ground Compaction Factor

Potential bidders should consider the earthwork factor in preparing estimates and should review the available data to make their own conclusions regarding excavation conditions.

We recommend that a ground compaction factor of 0.2 feet be used for soil on this project. The ground compaction factor given should be compensated when constructing

embankment fill sections outside the existing roadway prism. We recommend a shrinkage factor of approximately 15 percent for soil excavation associated with this project.

10.2. Constructed Slopes

We recommend that permanent fill slopes associated with this project be constructed no steeper than 2:1 (H:V). This fill slope recommendation assumes that the fill material used to construct the slope meets the criteria in this report. Fill slopes should be benched and constructed in a manner (e.g., overfilling and cutting to grade) such that the recommended degree of compaction is achieved to the finished slope face. Fill slopes should be protected from erosion.

For temporary slopes associated with construction activities, we recommend cut slopes be constructed no steeper than 1.5:1. Furthermore, we recommend any significant external loads (i.e. crane loads) applied at the ground surface be a distance of about 25 feet or more from the top of the ADOT drainage channel slope face in order to maintain slope stability. This distance was estimated using assumed soil strength parameters and a crane load of about 320 pounds per square inch (psi). If the contractor needs to place loads closer than 25 feet to the slope face, additional analysis using the actual equipment loads should be performed to demonstrate slope stability is maintained.

10.3. Seismic Design Considerations

Based on Seismic Contour Acceleration Maps for Arizona issued in Report Number AZ92-344 by ADOT (1992), the site is located in a zone where the horizontal peak bedrock accelerations of 0.03g have a 10 percent probability of being exceeded in 50 years. The requirements of the governing jurisdictions and applicable building codes should be considered in the seismic design of structures.

Seismic design parameters according to the AASHTO LRFD Bridge Design Specifications (Fourth Edition, 2007) are presented in Table 1.

Table 1 – Seismic Design Parameters

Parameter	Value	AASHTO LRFD Bridge Design Specifications
Soil Profile Type	Type II	Section 3.10.5.1
Seismic Zone	1	Table 3.10.4-1
Site Coefficient, S	1.2	Table 3.10.5.1-1

10.4. Drilled Shaft Foundations

Drilled shaft foundations may be utilized for support of the proposed bridge structure. Drilled shafts are commonly used in Arizona, and there are a number of qualified contractors with local experience. Due to the possibility of encountering cobbles, possible boulders, or other oversize material, drilled shaft diameters less than 4 feet are not recommended. Larger diameter shafts or deeper shafts could be used if this proves to be more convenient or if they are needed due to lateral load concerns. However, additional geotechnical exploration may be needed if the drilled shafts are extended to elevations that are lower than 20 feet above the bottom elevations of the corresponding borings. We recommend that the drilled shafts be designed and installed according to ADOT Standard Specification 609 and the recommendations outlined in this report.

10.4.1. Downward Axial Capacities

Axial drilled shaft capacities were formulated using skin friction resistance and end bearing resistance in accordance with the methods outlined in AASHTO LRFD Bridge Design Specifications (4th Edition - 2007), Section 10.8. Specifically, the Beta Method, for drained soil conditions, was used to estimate shaft axial capacities. Resistance in the undocumented fill was discounted in the analysis for conservatism by assigning the material a relatively low unit weight (100 pounds per cubic foot [pcf]). Further, due to the proximity of the River, it is conceivable the groundwater level could rise into the undocumented fill materials. Our analyses were based on a groundwater level corresponding to the bottom of the drainage channel at approximate Elevation 1,060. The analyses also assume the foundation elements are adequately protected from the ef-

fects of scour. Also, the effects of downdrag loads at the abutments were neglected due to the limited heights of planned fills and due to the placement of the drilled shafts near the edge of the embankment or approach fill footprint. The axial capacities provided are for uncased holes. If permanent casing is used, the axial capacities should be revised to account for a reduced skin friction.

A Factored Axial Resistance Chart (Strength Limit State) is presented in Figure 3. The chart was formulated in accordance with AASHTO (2007) Section 10.8.3.5.2 using N-values obtained from our borings, an average unit weight of 115 pcf obtained from laboratory testing, and the Beta Method for sandy soils with $N_{60} \geq 15$. This chart is for a redundant shaft in a group spaced with center-to-center spacing of 4.0 diameters or more. In accordance with AASHTO Section 10.8, drilled shafts in a group may be considered to act individually when the center-to-center (CTC) spacing is more than 4 diameters. For a drilled shaft in a group with center-to-center spacing of 2.5B (where B is the diameter of the shaft in question), the strength limit resistances should be reduced by multiplying the strength limit chart capacity by an efficiency factor, $\eta = 0.65$. This reduction factor should linearly increase until a spacing of 4B is achieved, at which point the reduction factor is not applied ($\eta = 1.0$). For intermediate spacing, the reduction factor may be evaluated by linear interpolation.

For a single non-redundant drilled shaft foundation (such as a single shaft supporting a bridge pier), the strength limit chart resistances should be reduced by 20 percent to account for a reduction in resistance factors for this case. Similarly, for a group of 5 or more shafts, the strength limit chart resistances may be increased by 20 percent to account for an increase in resistance factors due to increased redundancy.

Service Axial Resistance Charts are attached for selected values of settlement at the top of the drilled shaft (Figures 4A through 4F). These charts are for the case of a single shaft and for this site are also applicable for a shaft in a group consisting of a single row of shafts. The charts were formulated using methods found in O'Neill and Reese (1999)

using normalized load-transfer vs. settlement curves. For our analyses we included the effects of elastic shortening of the shaft due to the axial loads.

10.4.2. Lateral Capacities

Soil parameters recommended for lateral load analyses of drilled shafts using computer programs COM624P or LPILE are presented on Figure 5. We understand that lateral load analysis of drilled shafts will be performed by others. For lateral loading in the direction in-line with the group of drilled shafts, the lateral resistance (p-y curves) should be modified within the COM624P or LPILE program to account for group effects. This may be accomplished by using a p-multiplier to reduce the apparent resistance to lateral movement. Group effect reduction factors for drilled shaft spacing between 3B and 5B center-to-center (where B is the diameter of the pile or shaft) are discussed below.

Table 2 presents the lateral load reduction factors to be applied for various drilled shaft or pile spacing for in-line loading, where Row 1 is the lead pile being pushed into the soil mass, with the remaining rows shadowing behind Row 1.

Table 2 – Pile P-Multipliers, *Pm*, for Multiple Row Shading

Pile *CTC* spacing (in the direction of loading)	*P*-Multipliers, *Pm*		
	Row 1	Row 2	Row 3 and higher
3B	0.7	0.5	0.35
5B	1.0	0.85	0.7

If the loading direction for a single row of piles is perpendicular to the row, a group reduction factor of less than 1.0 should only be used if the pile spacing is 5*B* or more, i.e., a *Pm* of 0.7 for a spacing of 3*B*.

For the case of lateral loading on a shaft away from the channel slope (load in the downhill direction), ignore the lateral resistance above the depth where the slope face is closer to the shaft than four shaft diameters or ten feet, whichever is more.

10.4.3. Drilled Shaft Construction Considerations

Our evaluation of the excavation characteristics of the on-site materials is based on the results of our exploratory borings, site observations, and our experience with similar materials. In our opinion, excavation of the on-site materials can generally be accomplished with conventional heavy-duty equipment in good operating condition. Due to the possibility of encountering cobbles, possible boulders, or other oversize materials, drilled shaft diameters less than 4 feet are not recommended. Coring equipment may also be needed. Larger diameter shafts or deeper shafts could be used if this proves to be more convenient or if they are needed due to lateral load concerns.

The drilled shafts should be observed and evaluated to check adequate bearing material has been reached and that the bearing surface has been suitably cleaned. This evaluation can typically be done from the ground surface. The concrete mix should be designed, including maximum aggregate size and slump, so that it satisfies the requirements of Sections 609 and 1006 of the ADOT Standard Specifications.

Where possible, the drilled shafts should be constructed in the "dry" (i.e., no more than 3 inches of water covering the bottom of the shaft excavation). In such cases, the concrete may be placed by the free-fall method in accordance with Section 609 of the ADOT Standard Specifications. This method consists of using a vertical section of concrete chute (or other means) to allow the concrete to flow out of the mixing truck in a vertical stream of concrete with a relatively small discharge diameter. The stream should be diverted to avoid hitting the sides of the drilled shaft or the reinforcing steel, which could cause concrete segregation.

If the drilled shafts are constructed in the "wet," a tremie pipe connected either to a hopper or concrete pump should be used to displace the water in the drilled shaft excavation upwards as the concrete is placed. If this method of concrete placement is used, Ninyo & Moore should be consulted and the shafts will need to be equipped with special casing to house equipment that can be used to evaluate the integrity of the concrete after it has been cured.

Due to the presence of undocumented fill and encountering groundwater during drilled shaft installation, we recommend the use of temporary casing or the slurry method while installing the shafts. The contractor should be prepared to use a temporary full-length casing, if needed. If temporary casing is abandoned in the shaft, the loss of frictional capacity in the cased zone should be compensated for. The contractor's drilling means and methods should also anticipate that cobbles, possible boulders, or other oversize material might be encountered. Aggressive drilling methods, such as special auger and coring techniques, may be needed and should be anticipated. Concrete overruns should also be anticipated.

We recommend that the drilled shafts be constructed and foundation concrete mix designed according to ADOT Standard Specification 609 and the recommendations outlined in this report. In accordance with AASHTO (2007), if the CTC spacing of drilled shafts is less than 6B, the construction sequence of drilled shaft installation should be specified in the contract documents.

10.5. Box Culvert

As an alternative, we understand the new roadway may be supported using a box culvert within the drainage channel. We understand the box culvert foundation will be placed near the invert of the existing drainage channel. As such, we recommend that the proposed culvert base slab be founded on a zone of moisture-conditioned and compacted engineered fill, extending 5 or more feet below the proposed bottom-of-base-slab elevation. This improved zone should be compacted by appropriate mechanical methods to a relative compaction of

100 percent in accordance with ASTM D 698 at a moisture content generally near its laboratory optimum. The improved zone should extend the same distance horizontally (beyond the base slab footprint) as it extends below the bottom of the base slab. We recommend an allowable gross soil bearing pressure of up to 3,000 pounds per square foot (psf) for the culvert base slab founded on engineered fill.

Culverts that are subject to lateral loadings may be designed using a coefficient of friction of 0.4 (total frictional resistance equals the coefficient of friction multiplied by the dead load). A passive resistance value of 200 psf per foot of depth below finished grade can be used to resist lateral loads. The lateral resistance can be taken as the sum of the frictional resistance and passive resistance, provided that the passive resistance does not exceed one-half of the total allowable resistance. The passive resistance may be increased by one-third when considering loads of short duration such as wind or seismic forces.

The "at-rest" earth pressure against box culvert walls that are restrained at the top so that they cannot yield, and with level backfill, may be taken as equivalent to the pressure exerted by a fluid weighing 57 pcf above the groundwater table elevation, and 90 pcf below the groundwater table elevation.

Following the overexcavation as described above, and prior to the placement of any new fill, the resulting exposed surface should be carefully evaluated by the geotechnical consultant. This evaluation could consist of proof-rolling, soil probing, visual assessment and/or additional laboratory testing. Based on this evaluation, additional remediation may be needed. This additional remediation, if needed, should be addressed by the geotechnical consultant during the earthwork operations.

Based on our boring logs and the anticipated soil conditions within the undocumented fill, we estimate settlement of the box culvert could be on the order of 1-inch. This estimate is based on the materials supporting the box culvert being similar to those encountered in our borings.

10.6. Retaining Walls

Based on the results of our borings, and the uncertainty of the undocumented fill materials, we recommend MSE retaining walls be used to support approach embankments for this project. MSE walls provide added flexibility and can tolerate larger differential settlements than conventional retaining walls. However, recommendations for conventional retaining walls are also provided.

10.6.1. MSE Walls

MSE walls used for this project should be designed and constructed in accordance with the project specifications. We have attached the ADOT Special Provisions for MSE walls as an example in Appendix D. These Special Provisions were provided by ADOT Materials Geotechnical Design Section in August, 2008. Detailed requirements for the MSE Wall designer, as well as material and compaction requirements, are presented in these Special Provisions.

We recommend that MSE walls have a foundation embedment depth of 2 feet or more and be founded on 2 or more feet of engineered fill, as noted above. The embedment depth should be measured from the finished grade at the toe of the wall to the top of the leveling pad for the wall unit. We also recommend that the leveling pad have a thickness of 6 or more inches and a width of 12 or more inches and is constructed of Portland cement concrete.

We further recommend that slip joints, which allow for independent vertical movement between adjacent wall panels to accommodate large differential movements, be considered. Also, multistage construction, in which the first stage facing is typically a wire facing, could also be implemented to reduce the effects of post-construction soil movement.

10.6.1.1. Stability of MSE Walls

External stability of MSE walls should be designed to resist four potential failure mechanisms. These include sliding, overturning, bearing capacity, and deep-seated stability. In addition, the wall designer should check compound stability, for the case of a potential failure surface that passes through both the reinforced mass and the foundation soils. We analyzed the overall deep-seated stability of a MSE cross-section, assuming that the proposed MSE wall will have a height of approximately 8 feet or less and a base width of about 70 percent of the wall height. We also assumed that the earthwork recommendations contained herein would be incorporated into the design and construction of the project.

Our analyses considered the material parameters summarized in Table 3. Since there is variation of the soil conditions across the site, the values in Table 3 represent conservative soil conditions based on the analysis of the soil data collected during this study and our experience with similar materials. Drained strength parameters were used for the analysis.

Table 3 – Summary of Stability Analysis Parameters

Description	Unit Weight, pcf	Drained Strength Parameters	
		Effective Friction Angle φ, degrees	Cohesion, pcf
Subgrade soils	120	30	0
Retained backfill	125	32	0
Reinforced backfill	125	34	0

For our analysis of bearing capacity, based on the recommendations above for compacted engineered fill, we anticipate the bearing capacity of the foundation soil to be more than 10 kips per square foot (ksf) for a MSE wall foundation width more than 5 feet.

For deep-seated stability, we used the modified Bishop method, a limit equilibrium method, to evaluate the factor of safety (FOS) against sliding for an assumed circular failure surface because it provides conservative solutions when compared with other limit equilibrium methods. Our analysis used the computer program GSTABL7 (Gregory, 2003) to search for failure surfaces for the proposed embankment.

Slope stability is typically evaluated for the following cases:

- Static Conditions - Assumes static loading conditions and 250 psf live load.
- Seismic Event - In addition to the static loading conditions, assumes that approximately two-thirds of the peak ground acceleration is applied to the horizontal forces that drive slope instability.

Typical design requirements for MSE Walls suggest that the FOS against sliding under static and seismic conditions should be more than 1.5 and 1.1 respectively; for overturning it should be 2 and 1.5 respectively; and for deep-seated stability, the FOS should be more than 1.5 and 1.1 for static and seismic analyses, respectively. The FOS should be more than 2.5 for bearing capacity.

The results of our analyses for the cases listed above are summarized in Table 4 below and show that the analyses meet typical requirements for external stability of MSE walls.

Table 4 – MSE Wall External Stability Results

Sliding		Overturning		Bearing Capacity		Deep-Seated Stability	
Static	Seismic	Static	Seismic	Static	Seismic	Static	Seismic
2.52	2.60	3.56	3.70	6.67	7.29	2.42	2.34

External stability, as well as internal stability and compound stability, of the MSE wall and associated components should be made the responsibility of the contractor and/or their designer and should be based on the actual geometry of the MSE wall.

10.6.1.2. MSE Wall Settlement

Settlements were estimated for the MSE wall geometry presented above. The settlements were evaluated for a contact pressure of approximately 2,000 pounds per square foot. There is some uncertainty in the estimated settlements due to the potential unknown composition and/or consistency of the existing fills between our borings. However, we estimate settlements could be on the order of 1 inch, assuming the supporting materials are similar to those found in our borings. Although not encountered in our borings, any zones of loose rubble or organic waste in the undocumented fills could result in higher settlements. MSE wall facings and panel joint details to accommodate significant differential settlement should be considered. An MSE wall with wire-grid facing backed by a zone of river cobbles or gravel could be considered.

10.6.1.3. Reinforced Backfill

For MSE walls, the reinforced backfill shall extend to a distance of 1-foot beyond the free end of the reinforcement. However, for back-to-back walls wherein the free ends of the reinforcement of the two walls are spaced apart less than or equal to one-half the design height of the wall, reinforced backfill should be used for the space between the free ends of the reinforcements as well.

The recommendations for reinforced backfill include, but are not limited to, a Plasticity Index less than 6, a percent fines (percent passing the No. 200 Sieve) less than 15, a compacted shear strength (effective internal friction angle not less than 34 degrees), and other soundness and electrochemical requirements. Some of the soils tested from our test borings did not meet the gradation and/or plasticity re-

quirements for reinforced backfill. It is possible that some of the soils will meet the gradation and plasticity guidelines; however, additional testing would be needed to check if the remaining guidelines would be met for reinforced backfill. Importing material for reinforced backfill should be anticipated.

10.6.1.4. Retained Backfill

Backfill behind the limits of the reinforced backfill should be considered as retained backfill for a distance equal to 50 percent of the design height of the MSE wall, except for back-to-back MSE walls as noted above.

The recommendations for retained backfill include, but are not limited to, a Plasticity Index less than 20, a Liquid Limit less than 40, a percent fines (percent passing the No. 200 Sieve) less than 50, and compacted shear strength requirements (effective internal friction angle not less than 32 degrees). It is our opinion that many of the soils from shallow on-site excavations may be suitable for use as retained backfill. However, some additional testing would be needed to check if the remaining guidelines would be met for retained backfill.

10.6.2. Conventional Retaining Walls

The spread footings for the planned retaining structures should be constructed according to the recommendations outlined in this report. Beneath spread type foundations for the planned retaining walls, we recommend the existing soils be overexcavated to a depth of 5 feet or more below the footing level and replaced with compacted fill as noted above. The weight of any soil above the footings should be added to the weight of the structure when calculating the actual bearing pressures. An estimated unit weight of 125 pcf may be assumed for compacted soil above spread footings.

Based on the results of our borings for the retaining walls, we recommend an allowable equivalent uniform soil bearing pressure of 2.5 ksf for spread or continuous foundations

located 2 or more feet below finished grade, bearing on 5 or more feet of compacted fill, as discussed above.

As noted above for MSE walls, we estimate settlements could be on the order of 1 inch. These settlement estimates are based on the estimated loading conditions and the available soil boring information. The actual settlement will depend on the size, elevation and location of the specific foundation and the characteristics of the undocumented fill. Although not encountered in our borings, any zones of loose rubble or organic waste in the undocumented fills could result in higher settlements. Design and construction procedures to tolerate large differential settlements, such as additional reinforcing, more frequent joints, or other measures deemed appropriate by the structural engineer, should be considered. In our opinion, MSE walls should generally be preferred over cantilever walls due to a greater ability to accommodate differential settlement.

10.7. Lateral Earth Pressure Recommendations

The abutments, wing walls, and retaining walls associated with this project should be designed in accordance with AASHTO (17th Edition - 2002) Section 5.5. Active earth pressure occurs when the wall moves away from the soil and the soil mass stretches horizontally, sufficient to mobilize its shear strength, and a condition of plastic equilibrium is reached. For a drained granular backfill, an equivalent fluid active earth pressure of 35 psf per foot (psf/ft) of wall height should be used for the design of cantilevered, yielding walls. Drainage should consist of free-draining granular material and could be accompanied by weepholes through the walls or corrugated, perforated pipe placed parallel to the wall or abutment bottom, wrapped in a filter fabric, and surrounded by 6 or more inches of a granular filter material (e.g., pea gravel). In lieu of the wrapped open-graded gravel, a geocomposite drainage mat attached to the wall and discharging to a drain pipe or weepholes may be considered. Retaining wall drainage guidelines are presented graphically on Figure 6. If drainage is not provided, an equivalent fluid active earth pressure of 85 psf/ft of wall height should be used for design of the walls. These earth pressures are based on the walls being flexible enough to

allow mobilization of the active earth pressure condition. An outward lateral movement of about 0.001H (where H is the height of the wall) at the top of the wall is generally needed to mobilize the active earth pressure condition.

A soil mass that is neither stretched nor compressed is said to be in an at-rest state. If the wall is rigidly restrained, so that it does not rotate sufficiently to reach the active earth pressure condition, at-rest earth pressure conditions will exist. An equivalent fluid at-rest earth pressure of 57 psf/ft should be used for the drained condition, and 90 psf/ft should be used for the undrained condition below the groundwater table.

Passive earth pressure occurs when the wall or foundation moves into the soil and the soil mass is compressed horizontally, mobilizing its shear strength. For below-grade portions of the walls with granular backfill (derived from on-site soils) in front of the toe of the wall, an equivalent fluid passive earth pressure of 300 psf/ft of wall height can be utilized (triangular pressure distribution). However, since significant movement of the wall or abutment will be needed to mobilize full passive earth pressure, passive pressures should be neglected in the design of abutments, wing walls and retaining walls unless analysis indicates that the structure can tolerate this movement, and there is certainty that the soil providing the passive restraint will be present. Passive resistance should be neglected in soils located within the upper 3 feet of the finished subgrade.

If the walls are partially restrained, the actual lateral earth pressure may be somewhere between the active and at-rest pressure conditions. The actual pressure distribution will depend on the stiffness of the wall. Also, any additional lateral wall loads resulting from surcharge loading, such as traffic loads, should be added to the above earth pressures. Precautions should be taken to avoid overstressing of the below-grade walls during backfilling. Temporary bracing of the walls during backfilling may be needed to help avoid this problem.

10.8. Pavement Subgrade

For design of new pavements associated with this project, we recommend a design R-value of 40 be used. This assumes that asphalt concrete would be used and the subgrade preparation recommendations outlined in this report would be employed.

10.9. Site Drainage

Drainage should be provided to divert water away from the paved surfaces and foundation elements. Surface water should not be permitted to pond on pavement areas. Positive drainage is defined as a slope of 2 percent or more for a distance of 5 feet or more away from the pavements. Grading associated with the proposed soil improvements below the new pavement sections should be sloped toward the outside edge of the roadway.

Erosion protection may be needed for new soil embankments. These protection measures may include grading, riprap, geotextiles, gabion mats, concrete lining, bio-reinforcement or methods considered appropriate by the design engineer.

11. LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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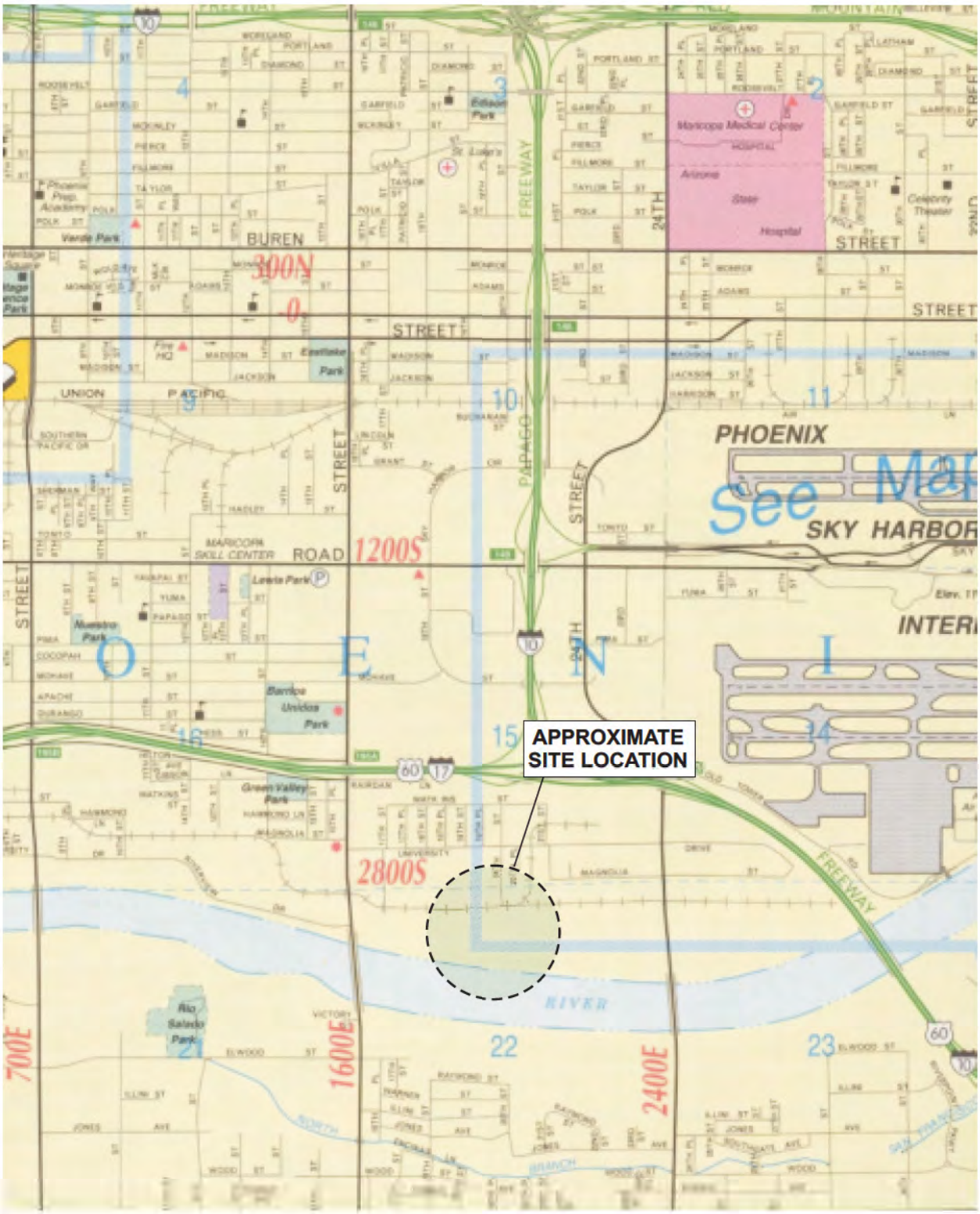
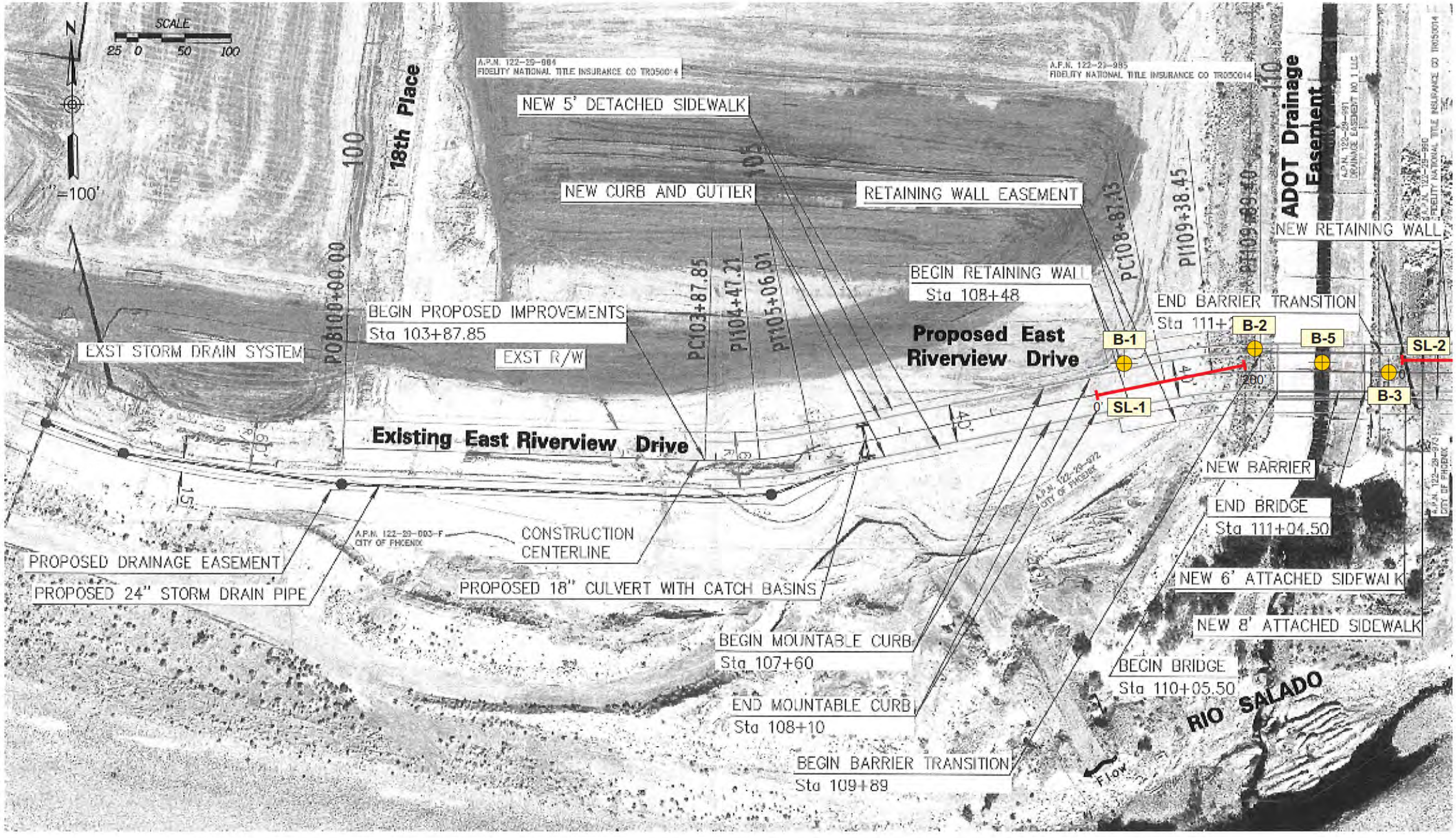
Wilson et. al, 1957, Geologic Map of Maricopa County, Arizona, Arizona Bureau of Mines, University of Arizona. Scale = 1:375,000 (1 in. ≈ 31,250 ft.)



Source: Phoenix Mapping Service, Phoenix Metro Edition, 2002.

Ninyo & Moore	SITE LOCATION MAP	FIGURE
PROJECT NO: 602526001 / DATE: 12/09	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	1

file no: 2526vmap0709



LEGEND

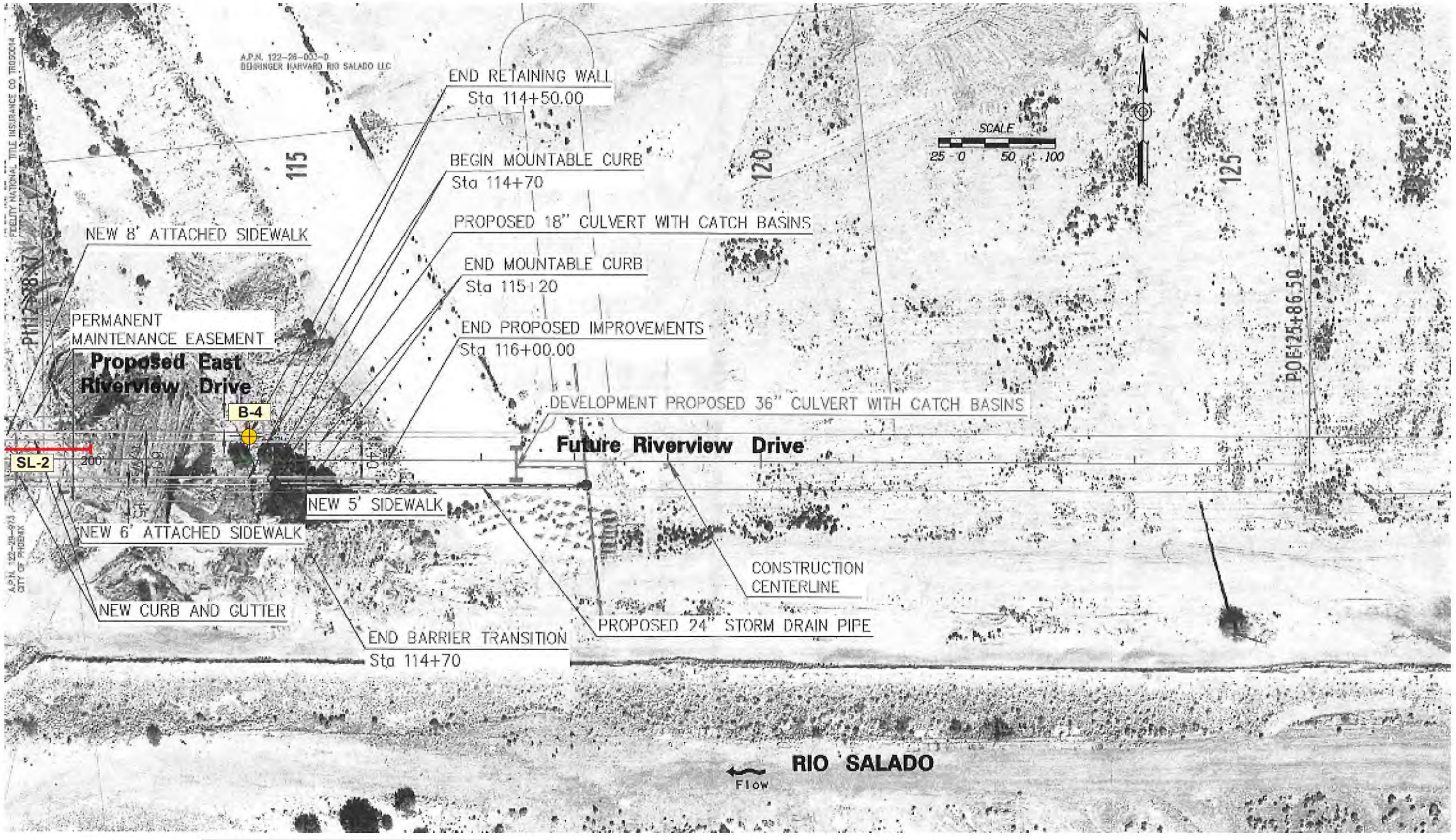
B-5 Approximate Boring Location

SL-2 Approximate Seismic Refraction Survey Location

Source: Basemap supplied from TY LIN International, 2008.

Ninyo & Moore	EXPLORATION LOCATION MAP	FIGURE
PROJECT NO: 602526001 / DATE: 12/09	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	2A

file no: 2526sp0709a



LEGEND

B-3 Approximate Boring Location

SL-2 Approximate Seismic Refraction Survey Location

Source: Basemap supplied from TY LIN International, 2008.

Ninyo & Moore	EXPLORATION LOCATION MAP	FIGURE
PROJECT NO: 602526001 / DATE: 12/09	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	2B

file no: 2526sp0709b

Figure 3
Drilled Shaft Factored Nominal Axial Compression Resistance Chart (Strength Limit State)
Riverview Drive Bridge - Abutments

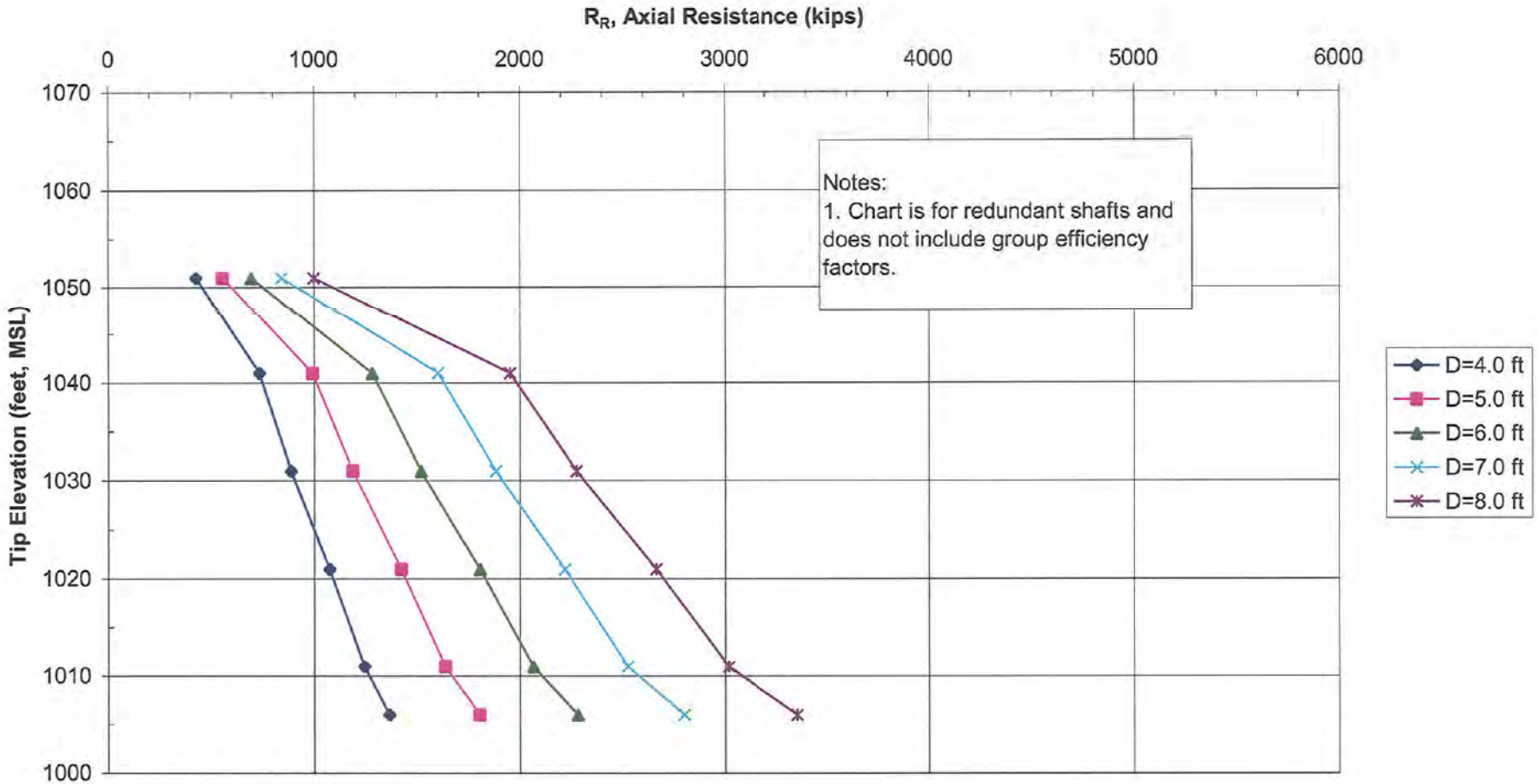


Figure 4A
Drilled Shaft Service Limit Axial Resistance Chart for Settlement at Top of Shaft, w_t = 0.1 inch
Riverview Drive Bridge - Abutments

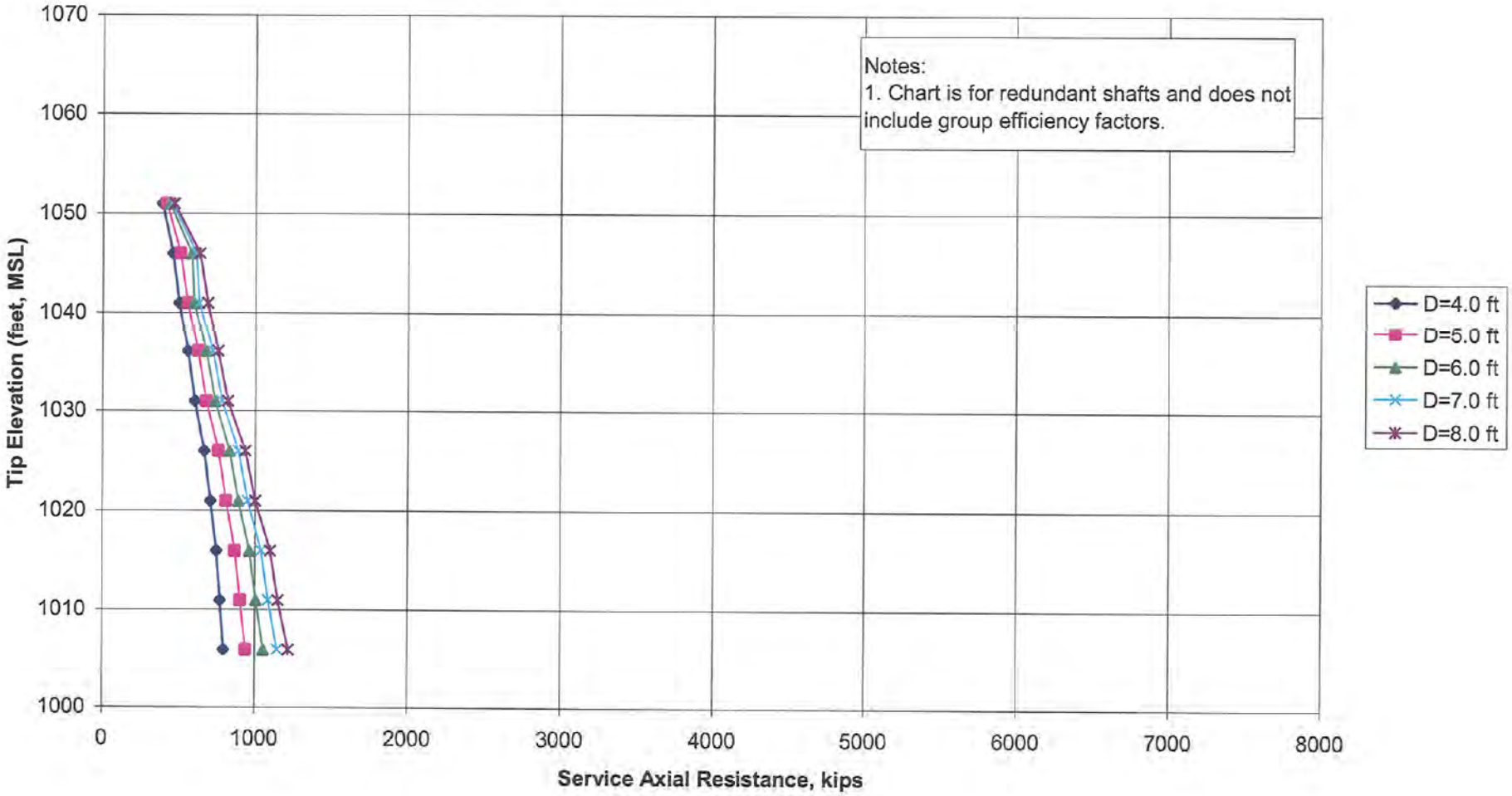


Figure 4B
Drilled Shaft Service Limit Axial Resistance Chart for Settlement at Top of Shaft, w_t = 0.25 inch
Riverview Drive Bridge - Abutments

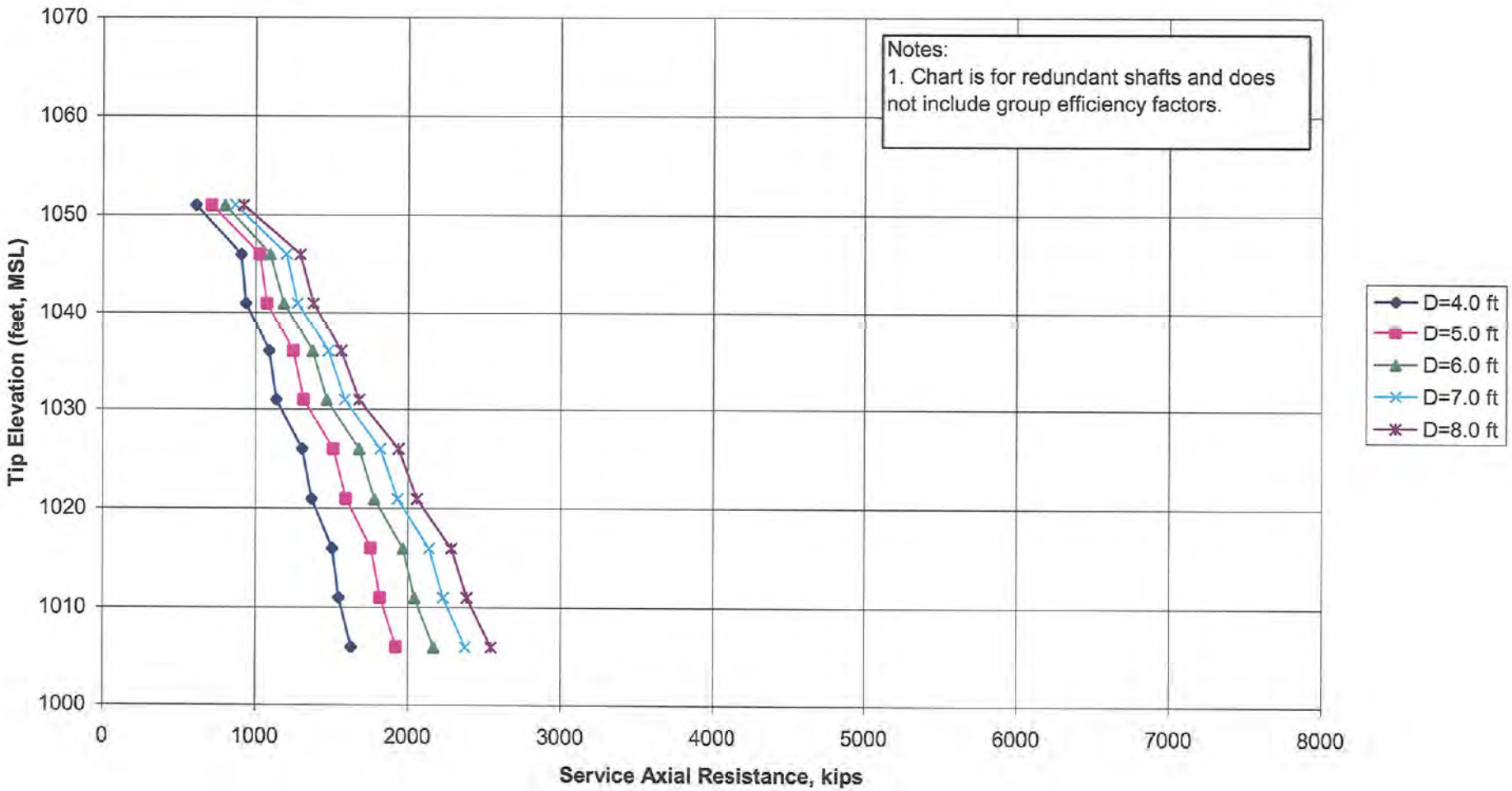


Figure 4C
Drilled Shaft Service Limit Axial Resistance Chart for Settlement at Top of Shaft, w_t = 0.5 inch
Riverview Drive Bridge - Abutments

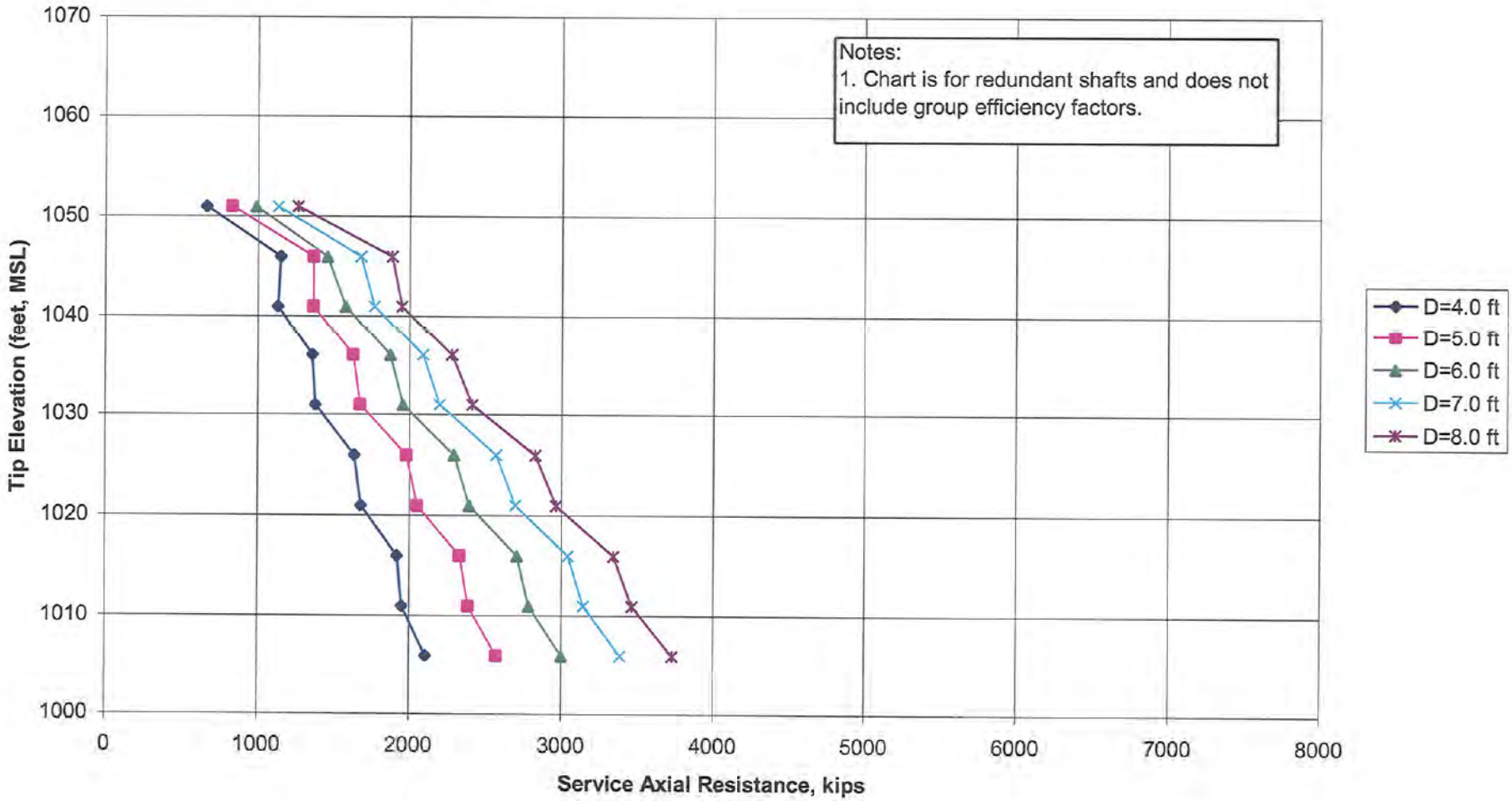


Figure 4D
Drilled Shaft Service Limit Axial Resistance Chart for Settlement at Top of Shaft, w_t = 0.75 inch
Riverview Drive Bridge - Abutments

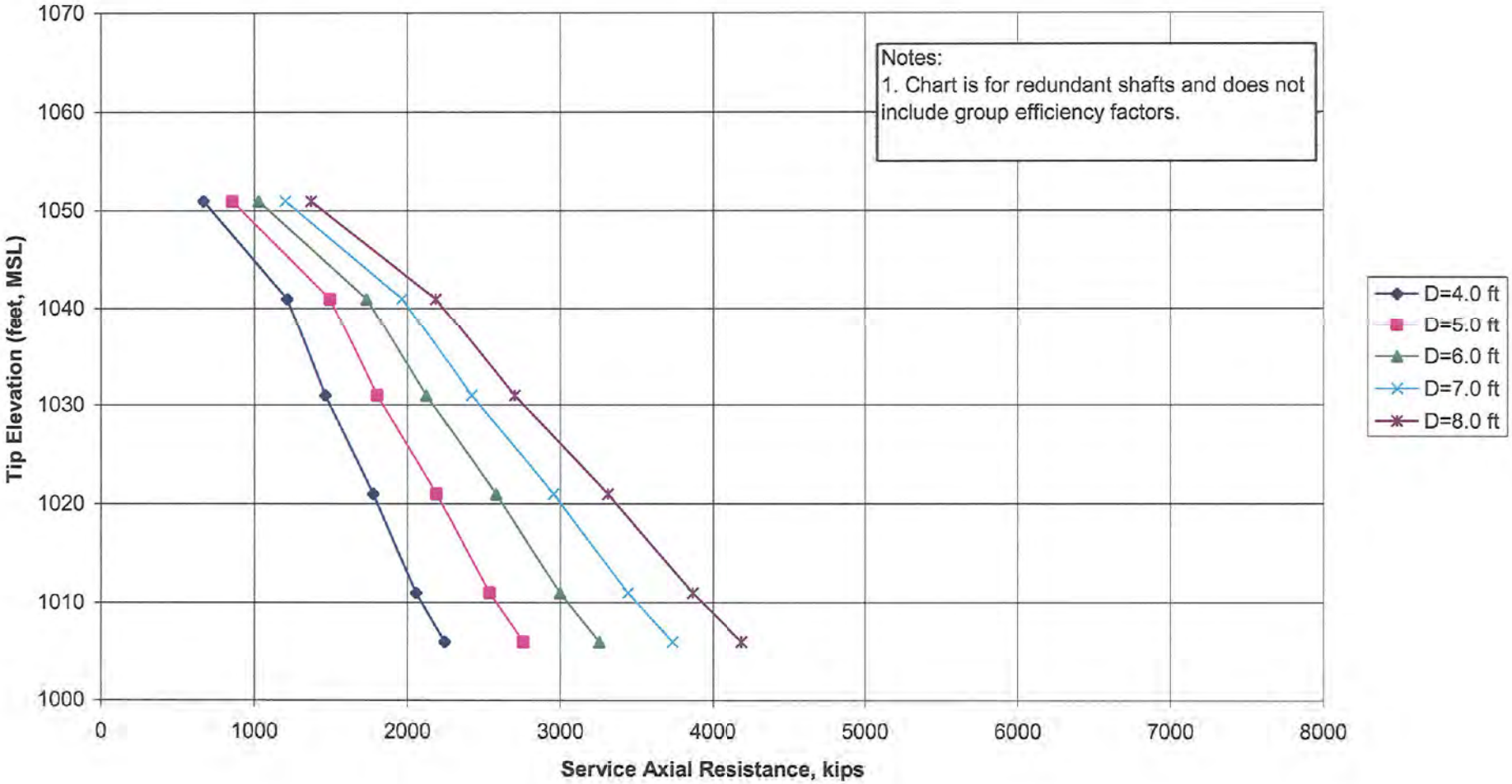


Figure 4E
Drilled Shaft Service Limit Axial Resistance Chart for Settlement at Top of Shaft, w_t = 1 inch
Riverview Drive Bridge - Abutments

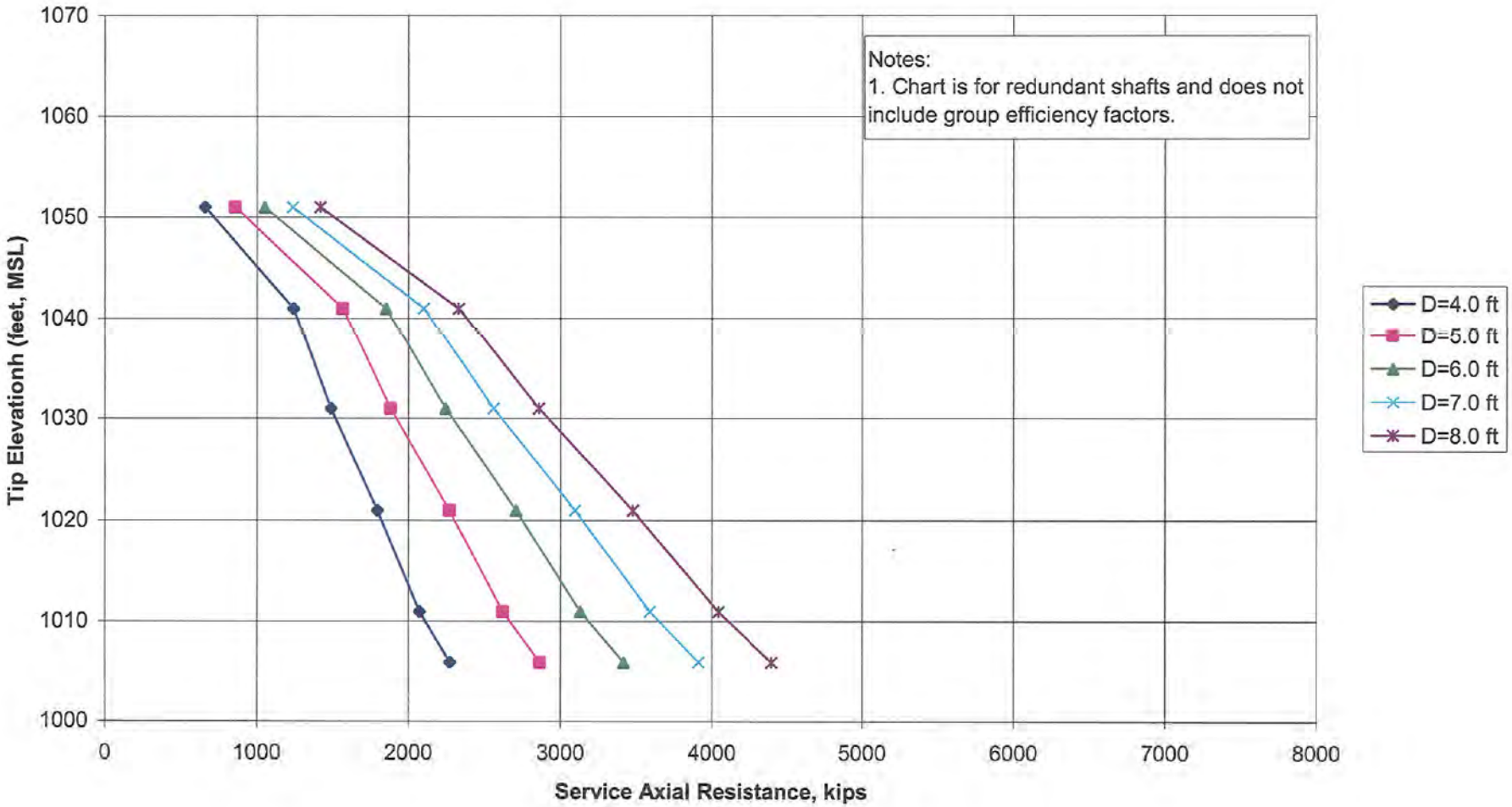


Figure 4F
Drilled Shaft Service Limit Axial Resistance Chart for Settlement at Top of Shaft, w_t = 2 inch
Riverview Drive Bridge - Abutments

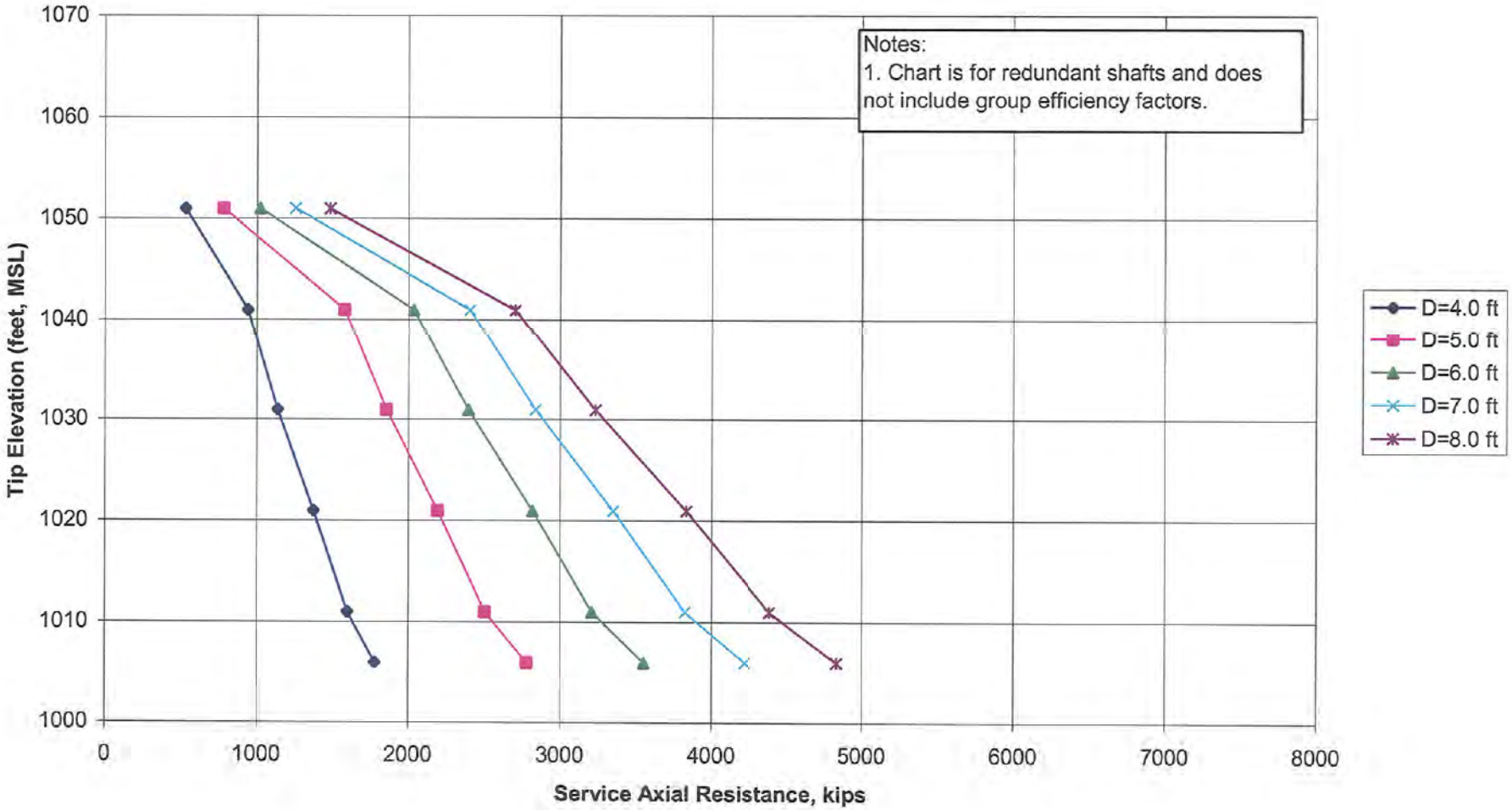
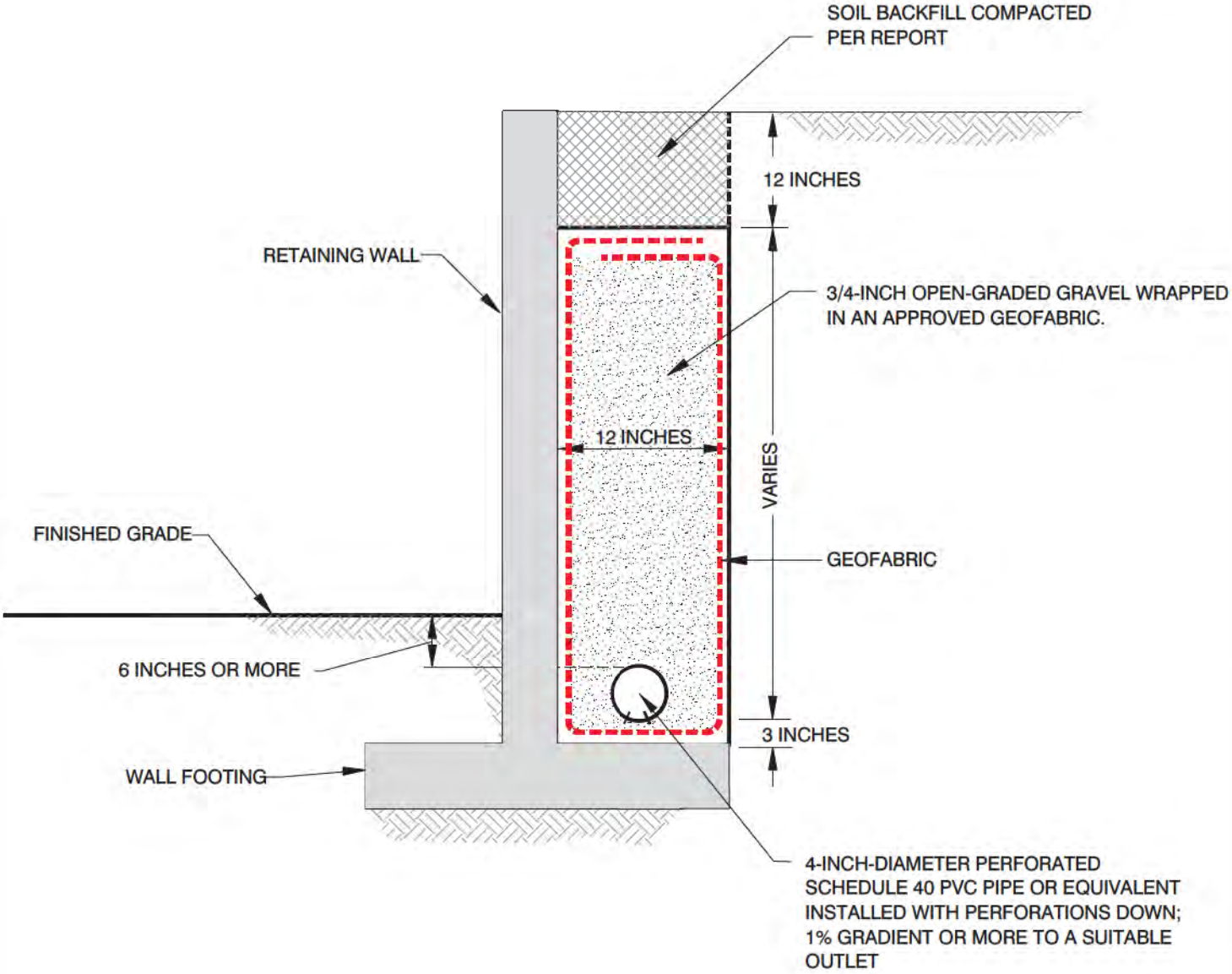


Figure 5
Suggested Soil Parameters for Lateral Load Analysis
Riverview Drive; 18th Street to 22nd Street
Phoenix, Arizona

Location	Approximate Elevation (ft, MSL)	Soil type to be used in Lateral Load Analysis	Effective Unit Weight (pcf)	Cohesion (psf)	Angle of Internal Friction (ϕ) (degrees)	k_ϕ (lb/in^3)	Remarks
Abutments 1 & 2	1,086 - 1,060	Sand (Reese)	100	0	30	90	Fill
	1,060 - 1,036	Sand (Reese)	38	0	30	60	Fill (below water table)
	1,036 - 1,007	Sand (Reese)	68	0	36	110	Alluvium

Notes:

1. Soil layering was aggregated based on boring logs.
2. For those parameters for which laboratory or field data was not available, presumptive values were obtained from relevant published literature.



NOTE:

IN LIEU OF THE WRAPPED OPEN-GRADED GRAVEL, A GEOCOMPOSITE DRAINAGE MAT ATTACHED TO THE WALL AND DISCHARGING INTO THE DRAIN PIPE OR WEEP HOLES MAY BE CONSIDERED.

NOT TO SCALE

Ninyo & Moore		RETAINING WALL DRAINAGE GUIDELINES	FIGURE
PROJECT NO: 602526001	DATE: 12/09	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	6

file no: 2526rwd0709

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Spoon

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test spoon sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The spoon was driven into the ground 12 to 18 inches with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the spoon, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following methods.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer or the Kelly bar of the drill rig in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer or bar, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

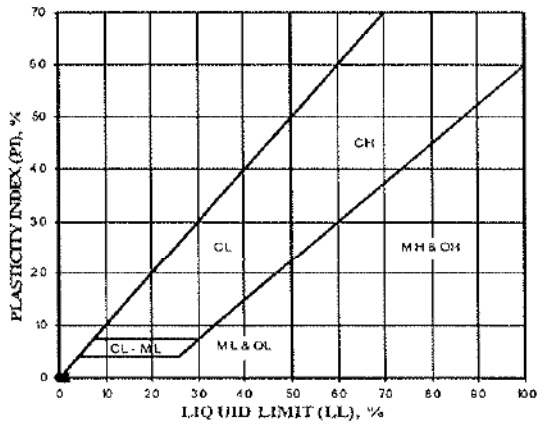
U.S.C.S. METHOD OF SOIL CLASSIFICATION

MAJOR DIVISIONS		SYMBOL	TYPICAL NAMES
COARSE-GRAINED SOILS (More than 1/2 of soil >No. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction <No. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than 1/2 of soil <No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

GRAIN SIZE CHART

CLASSIFICATION	RANGE OF GRAIN SIZE	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL Coarse Fine	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.76 76.2 to 19.1 19.1 to 4.76
SAND Coarse Medium Fine	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.76 to 0.075 4.76 to 2.00 2.00 to 0.420 0.420 to 0.075
SILT & CLAY	Below No. 200	Below 0.075

PLASTICITY CHART



Ninyo & Moore | U.S.C.S. METHOD OF SOIL CLASSIFICATION

BORING LOG EXPLANATION SHEET

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	
0	■							Bulk sample.
		■						Modified split-barrel drive sampler.
		☒						No recovery with modified split-barrel drive sampler.
		▬						Sample retained by others.
		◤						Standard Penetration Test (SPT).
5		◥						No recovery with a SPT.
		▭	XX/XX					Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
		◥						No recovery with Shelby tube sampler.
		▭						Continuous Push Sample.
				♀				Seepage.
10				▽				Groundwater encountered during drilling.
				▼				Groundwater measured after drilling.
						▦	SM	ALLUVIUM: Solid line denotes unit change.
								Dashed line denotes material change.
15								Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Sheared Bedding Surface
20								The total depth line is a solid line that is drawn at the bottom of the boring.

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BORING LOG

EXPLANATION OF BORING LOG SYMBOLS

PROJECT NO.	DATE	FIGURE
	Rev. 01/03	

DATE DRILLED 5/14/09 BORING NO. B-1

GROUND ELEVATION 1,085' ± MSL SHEET 1 OF 2

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		50/6"				GP	FILL: Grayish brown, dry, very dense, poorly graded GRAVEL; cobbles and possible boulders.
5		50/3"				SP-SM	Brown, damp, very dense, poorly graded SAND with silt and gravel; cobbles and possible boulders.
10		50/2"					
15		71				ML	Brown, damp, very dense, SILT with sand.
20		80				SM	Brown, damp, very dense, silty fine to coarse SAND with gravel; cobbles and possible boulders.

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-1

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							SM	FILL: (Continued) Brown, damp, very dense, silty fine to coarse SAND with gravel; cobbles and possible boulders.
			9					Medium dense.
25								Total Depth = 25 feet. Groundwater not encountered in this boring during drilling. Backfilled on 5/14/09 promptly after completion of drilling. Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
30								
35								
40								

DATE DRILLED 5/14/09 BORING NO. B-1

GROUND ELEVATION 1,085' ± MSL SHEET 2 OF 2

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-2

DATE DRILLED 5/14/09 - 5/15/09 BORING NO. B-2

GROUND ELEVATION 1,086' ± MSL SHEET 1 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		68				GM	FILL: Brown, damp, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
		50/5"					
5							
						SP-SM	Brown, damp, loose to medium dense, poorly graded SAND with silt and gravel.
		7					
10							
		16					
15							
						GM	Brown, damp, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
		85/11"					
20							

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-3

DATE DRILLED 5/14/09 - 5/15/09 BORING NO. B-2

GROUND ELEVATION 1,086' ± MSL SHEET 2 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20						GM	FILL: (Continued) Brown, damp, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
		84					
25							
						SP-SM	Brown, damp, medium dense, poorly graded SAND with silt. Scattered plastic debris observed.
		11					
30							
		15	10.3	91.7			Grayish brown; moist.
35							
						SM	Gray, moist, very dense, silty fine to coarse SAND.
		34					Layer of unnatural material (composition unknown) observed.
40							

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-4

DATE DRILLED 5/14/09 - 5/15/09 BORING NO. B-2

GROUND ELEVATION 1,086' ± MSL SHEET 3 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40							FILL: (Continued) Gray, moist, very dense, silty fine to coarse SAND; few gravel.
						GP-GM	ALLUVIUM: Brown, damp, very dense, poorly graded GRAVEL with silt and sand; cobbles and possible boulders.
	Driven	50/2"					
45							
	Driven	50/5"					
50							
	Driven	50/3"					
55							
	Driven	50/3"	▽				Saturated.
60							

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-5

DATE DRILLED 5/14/09 - 5/15/09 BORING NO. B-2

GROUND ELEVATION 1,086' ± MSL SHEET 4 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
60						GP-GM	ALLUVIUM: (Continued) Brown, saturated, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
		50/4"					
65							
		50/4"					
70							
		50/5"	10.1	127.3		SP-SM	Brown, saturated, very dense, silty fine to coarse SAND with gravel.
75							
		29				GP	Brown, saturated, dense, poorly graded GRAVEL with sand; cobbles and possible boulders.
80							

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-6

DATE DRILLED 5/14/09 - 5/15/09 BORING NO. B-2

GROUND ELEVATION 1,086' ± MSL SHEET 5 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
80						GP	ALLUVIUM: (Continued) Brown, saturated, dense, poorly graded GRAVEL with sand; cobbles and possible boulders.
		50/3"					Very dense.
85							
						GM	Brown, damp, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
		50/5"					
90							
		50/5"					
95							
		50/5"					
100							Total Depth = 98.9 feet. Groundwater encountered at approximately 58.5 feet during drilling. Grouted and backfilled on 5/15/09 promptly after completion of drilling.

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BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-7

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
100								Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
105								
110								
115								
120								

DATE DRILLED 5/14/09 - 5/15/09 BORING NO. B-2

GROUND ELEVATION 1,086' ± MSL SHEET 6 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-8

DATE DRILLED 5/26/09 BORING NO. B-3

GROUND ELEVATION 1,086' ± MSL SHEET 1 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						GC	FILL: Brown, damp, dense, clayey fine to coarse GRAVEL with sand; cobbles and possible boulders.
		55	2.3	137.7			
		10				SC	Brown, damp, medium dense, clayey fine to coarse SAND with gravel.
5							
		4					Very loose.
10							
		9				GP	Brown, damp, medium dense, poorly graded GRAVEL with sand.
15							
		50/4"					Very dense; cobbles and possible boulders.
20							

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-9

DATE DRILLED 5/26/09 BORING NO. B-3

GROUND ELEVATION 1,086' ± MSL SHEET 2 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20						GP	FILL: (Continued) Brown, damp, very dense, poorly graded GRAVEL with sand; cobbles and possible boulders.
		28				GP-GM	Brown, damp, dense, poorly graded GRAVEL with silt and sand; cobbles and possible boulders.
25							
		50/3"					Very dense.
30							
		75/9"					
35							
		94/10"					
40							

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-10

DATE DRILLED 5/26/09 BORING NO. B-3

GROUND ELEVATION 1,086' ± MSL SHEET 3 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40						GP-GM	FILL: (Continued) Brown, damp, very dense, poorly graded GRAVEL with silt and sand; cobbles and possible boulders.
		82					
45							
		50/2"					
50							
						GP-GM	ALLUVIUM: Brown, saturated, very dense, poorly graded GRAVEL with silt and sand; cobbles and possible boulders.
		50/6"					
55							
		50/3"					
60							

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-11

DATE DRILLED 5/26/09 BORING NO. B-3

GROUND ELEVATION 1,086' ± MSL SHEET 4 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
60							GP-GM	ALLUVIUM: (Continued) Brown, saturated, very dense, poorly graded GRAVEL with silt and sand; cobbles and possible boulders.
			50/3"					
65								
			50/2"					
70								
			50/3"					
75								
			50/5"				SP-SM	Brown, saturated, very dense, poorly graded SAND with silt and gravel.
80								

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-12

DATE DRILLED 5/26/09 BORING NO. B-3

GROUND ELEVATION 1,086' ± MSL SHEET 5 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
80						SP-SM	ALLUVIUM: (Continued) Brown, saturated, very dense, poorly graded SAND with silt and gravel.
						GP-GM	Brown, saturated, very dense, poorly graded GRAVEL with silt and sand; cobbles and possible boulders.
		50/3"					
85							
		50/3"					
90							
		50/2"					
95							
		50/2"					
100							Total Depth = 98.6 feet. Groundwater encountered at approximately 51 feet during drilling. Backfilled and grouted on 5/26/09 promptly after completion of drilling.

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-13

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
100								Groundwater may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
105								
110								
115								
120								

DATE DRILLED 5/26/09 BORING NO. B-3

GROUND ELEVATION 1,086' ± MSL SHEET 6 OF 6

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-14

DATE DRILLED 5/15/09 BORING NO. B-4

GROUND ELEVATION 1,085' ± MSL SHEET 1 OF 2

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		68				GP	FILL: Grayish brown, dry, very dense, poorly graded GRAVEL with sand; cobbles and possible boulders.
		30	16.7			SC	Brown, damp, medium dense, clayey fine to coarse SAND; few gravel.
5							
		9					Increase in gravel content.
10							
		50/6"				GC	Brown, moist, very dense, clayey fine to coarse GRAVEL with sand; cobbles and possible boulders.
15							
		14					
20							

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-15

DATE DRILLED 5/15/09 BORING NO. B-4

GROUND ELEVATION 1,085' ± MSL SHEET 2 OF 2

METHOD OF DRILLING CME-75, 4.5" Diameter Percussion (Enviro-Drill, Inc.)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							GC	FILL: (Continued) Brown, moist, very dense, clayey fine to coarse GRAVEL with sand; cobbles and possible boulders.
		X	50/5"					
								Total Depth = 23.9 feet. Groundwater not encountered in this boring during drilling. Backfilled on 5/15/09 promptly after completion of drilling. Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25								
30								
35								
40								

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-16

DATE DRILLED 10/29/09 BORING NO. B-5

GROUND ELEVATION 1,060' ± MSL SHEET 1 OF 3

METHOD OF DRILLING ODEX, 6" Diameter Air Percussion (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								CONCRETE: Approximately 7 inches thick.
							GP	FILL: Brown, damp, very dense, poorly graded GRAVEL; cobbles and possible boulders.
5								
		X	52					
10								
							SP	Brown, moist, loose, poorly graded SAND with gravel.
			13					
15								
							SM	ALLUVIUM: Brown, wet, very dense, silty fine to coarse SAND with gravel; cobbles and possible boulders.
			58/10"					
20								

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-17

DATE DRILLED 10/29/09 BORING NO. B-5

GROUND ELEVATION 1,060' ± MSL SHEET 2 OF 3

METHOD OF DRILLING ODEX, 6" Diameter Air Percussion (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							SM	ALLUVIUM: (Continued) Brown, wet, very dense, silty fine to coarse SAND with gravel; cobbles and possible boulders.
			50/1"					
25								
			50/6"				GM	Brown, wet, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
30								
			50/1"					
35								
			50/2"					
40								

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-18

DATE DRILLED 10/29/09 BORING NO. B-5

GROUND ELEVATION 1,060' ± MSL SHEET 3 OF 3

METHOD OF DRILLING ODEX, 6" Diameter Air Percussion (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40							GM	ALLUVIUM: (Continued) Brown, wet, very dense, silty fine to coarse GRAVEL with sand; cabbies and possible boulders.
			50/2"				GP	Brown, wet, very dense, poorly graded GRAVEL; cobbles and possible boulders.
45								
			50/1"					Coarse gravel and possible cobbles and boulders.
								Total Depth = 48.6 feet. Groundwater not encountered in this boring during drilling. Backfilled and grouted upper 20 feet on 10/29/09 promptly after completion of drilling. Groundwater, though not encountered in this boring at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
50								
55								
60								

Ninyo & Moore

BORING LOG

RIVERVIEW DRIVE: 18TH STREET TO 22ND STREET
PHOENIX, ARIZONA

PROJECT NO.	DATE	FIGURE
602526001	12/09	A-19

APPENDIX B

GEOTECHNICAL LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with AASHTO T265. These test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-4. These test results were utilized in evaluating the soil classifications in accordance with the Unified Soil Classification System.

Atterberg Limits

Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System. The test results and classifications are shown on Figure B-5.

Maximum Dry Density and Optimum Moisture Content Tests

The maximum dry density and optimum moisture content of selected representative soil samples were evaluated in general accordance with ASTM D 698. The results of these tests are summarized on Figure B-6.

Consolidation Tests

Consolidation tests were performed on selected relatively undisturbed soil samples in general accordance with ASTM D 2435. The samples were inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the tests are summarized on Figure B-7.

R-value

The resistance value, or R-value, for base, subbase, and basement soils was evaluated in general accordance with ASTM D 2844. Samples were prepared and each was tested for exudation pressure and R-value. The graphically evaluated R-value at an exudation pressure of 300 pounds per square inch is reported. The test results are shown on Figure B-8.

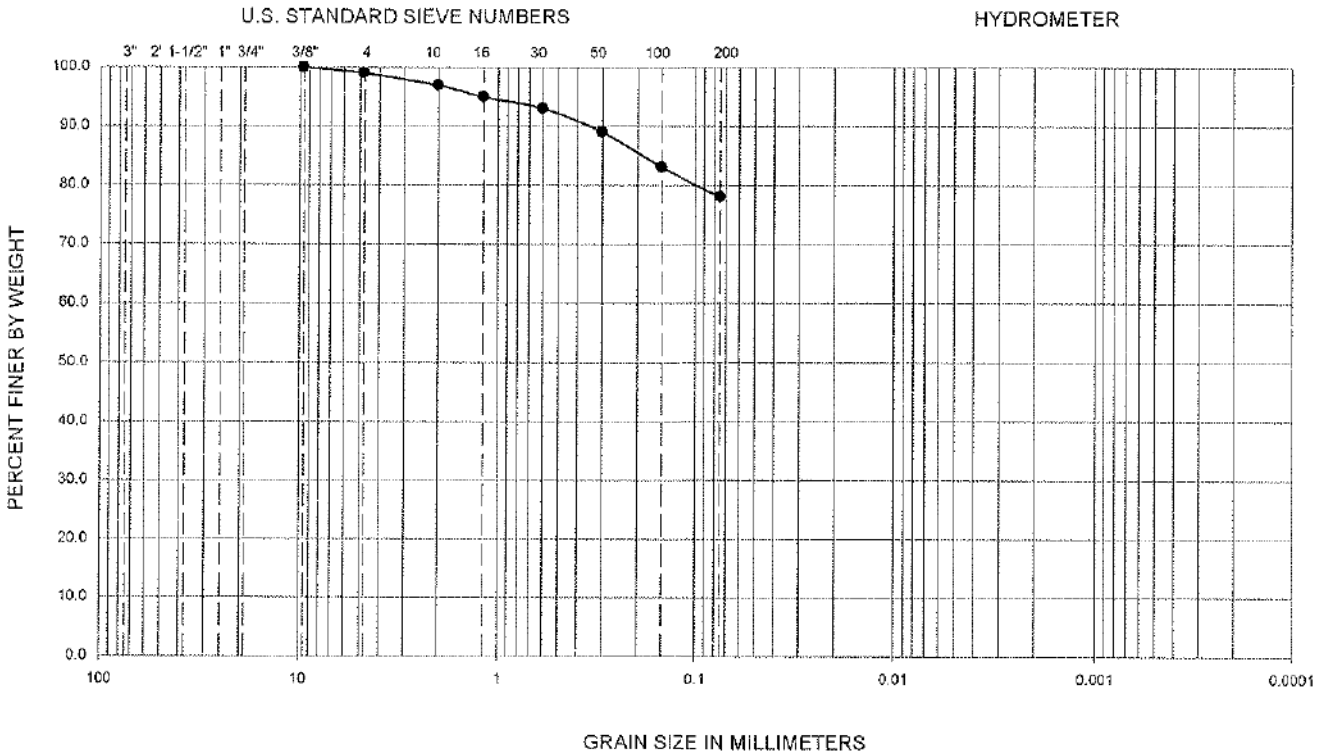
Soil Corrosivity Tests

Soil pH, and minimum resistivity tests were performed on representative samples in general accordance with Arizona test method, ARIZ 236b. The chloride content of selected samples was evaluated in general accordance with ARIZ 736. The sulfate content of selected samples was evaluated in general accordance with ARIZ 733. The test results are shown on Figure B-9.

Organic Matter Test

Organic content tests were performed on representative samples in general accordance with ASTM D 2974. The test results are presented on Figure B-10.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

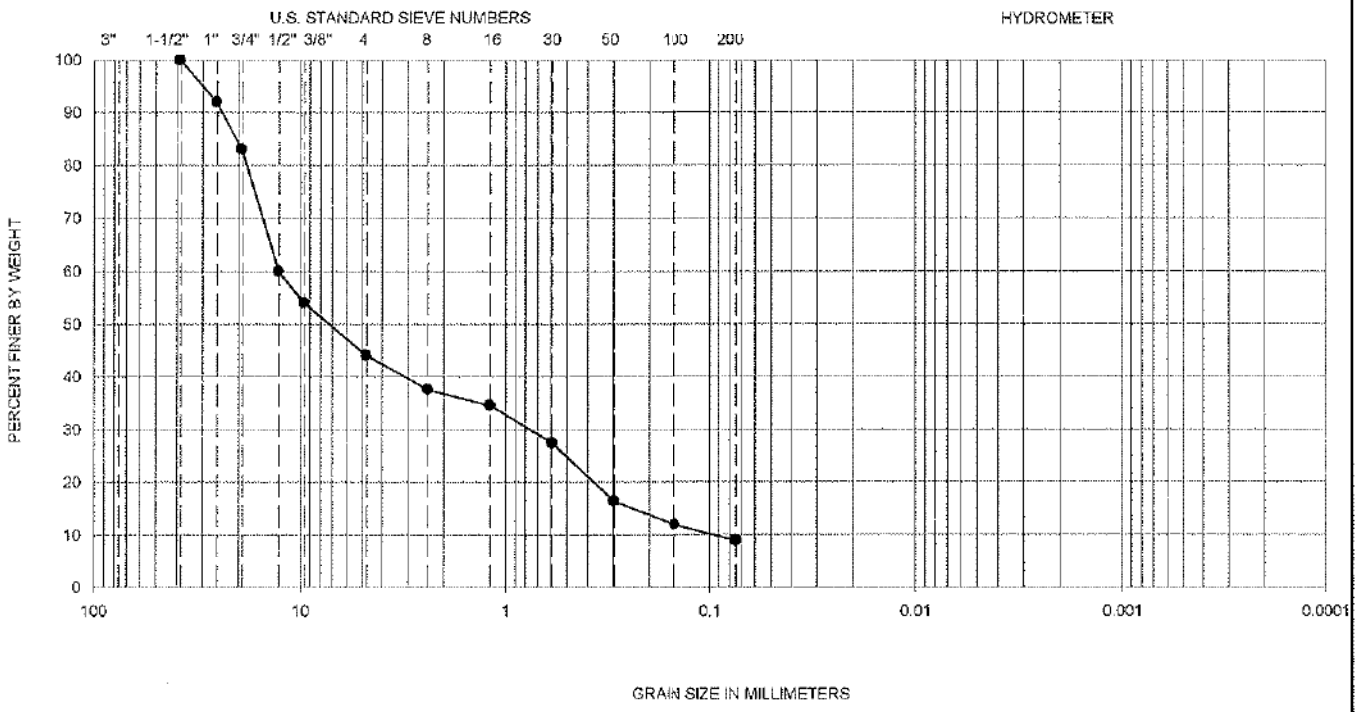


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-1	13.5-15	--	--	--	--	--	--	--	--	78	ML

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-1
602526001 / 12/09		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

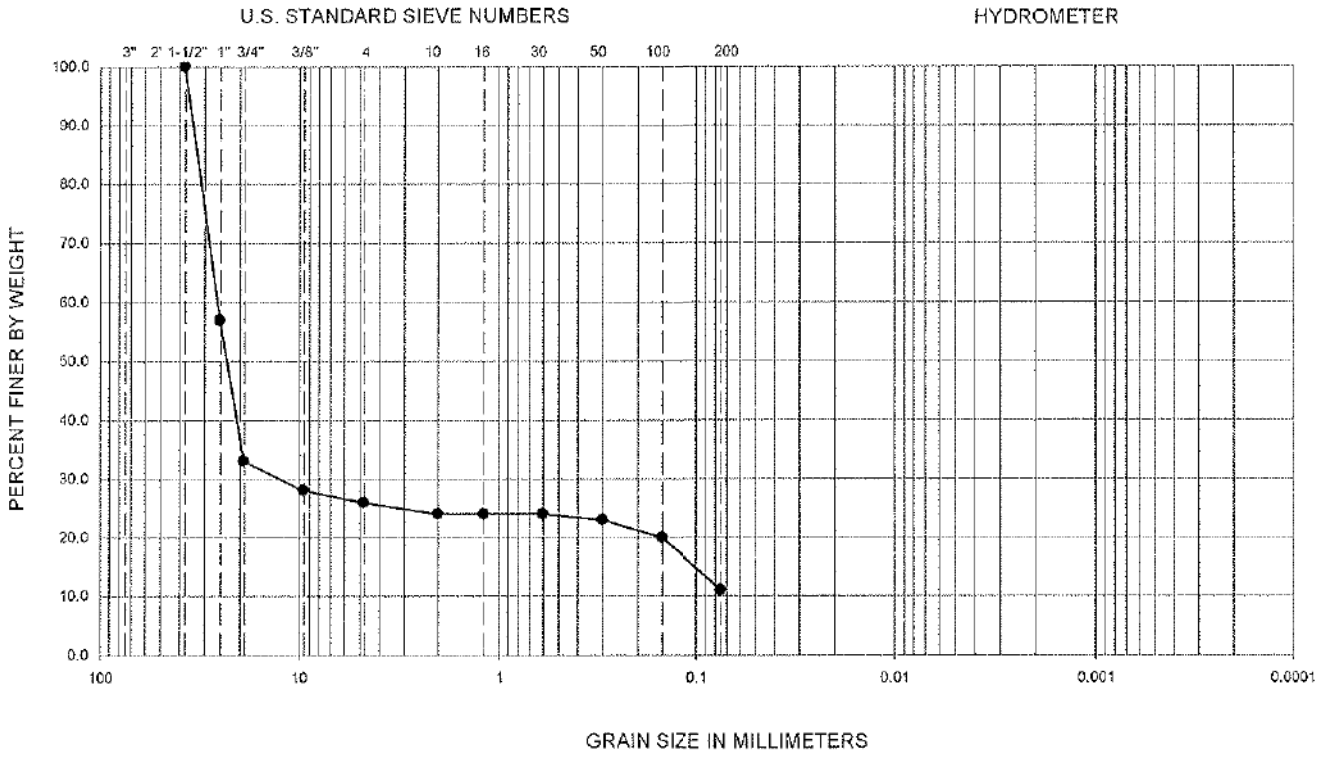


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	U.S.C.S
●	B-2	68.5-69.3	--	--	--	0.10	0.75	13.00	130.0	0.4	9	GP-GM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-2
602526001 / 12/09		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

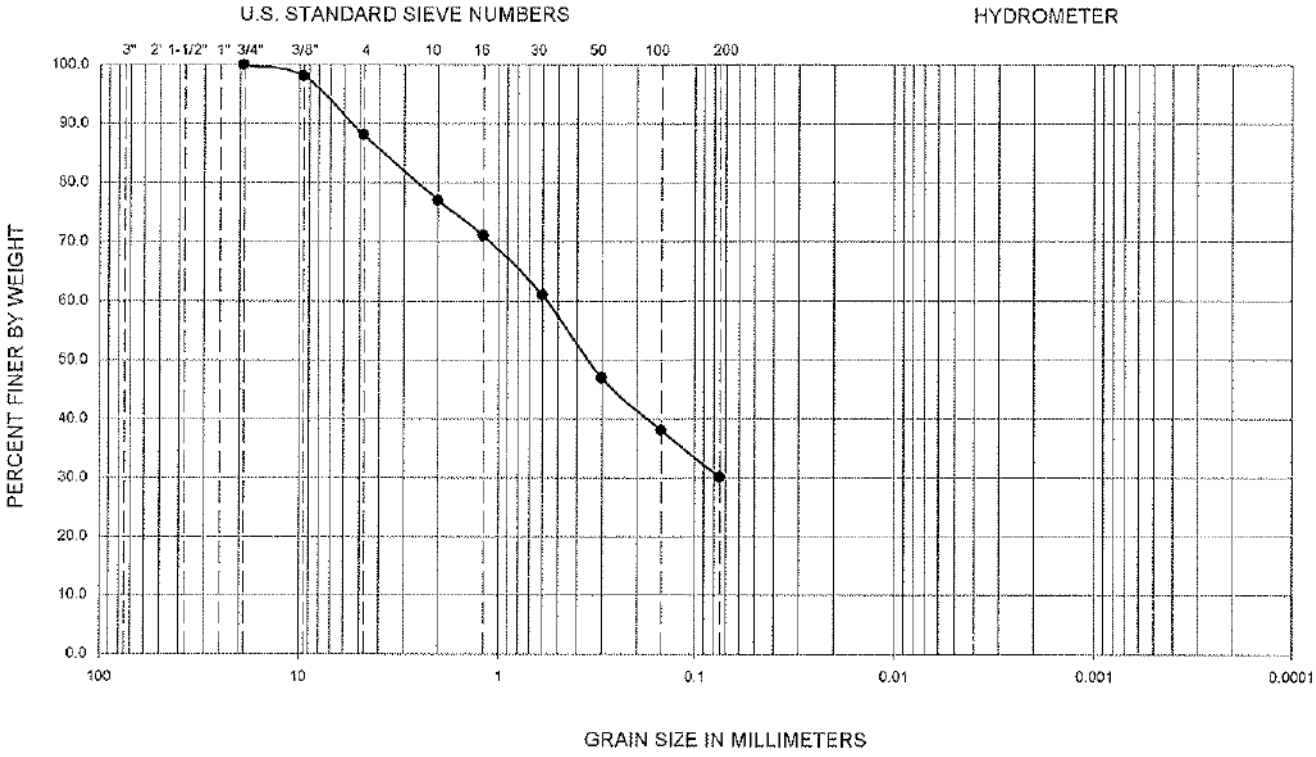


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-3	33.5-34.8	--	--	--	0.07	17.00	26.00	371.4	158.8	11	GP-GM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-3
602526001 / 12/09		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

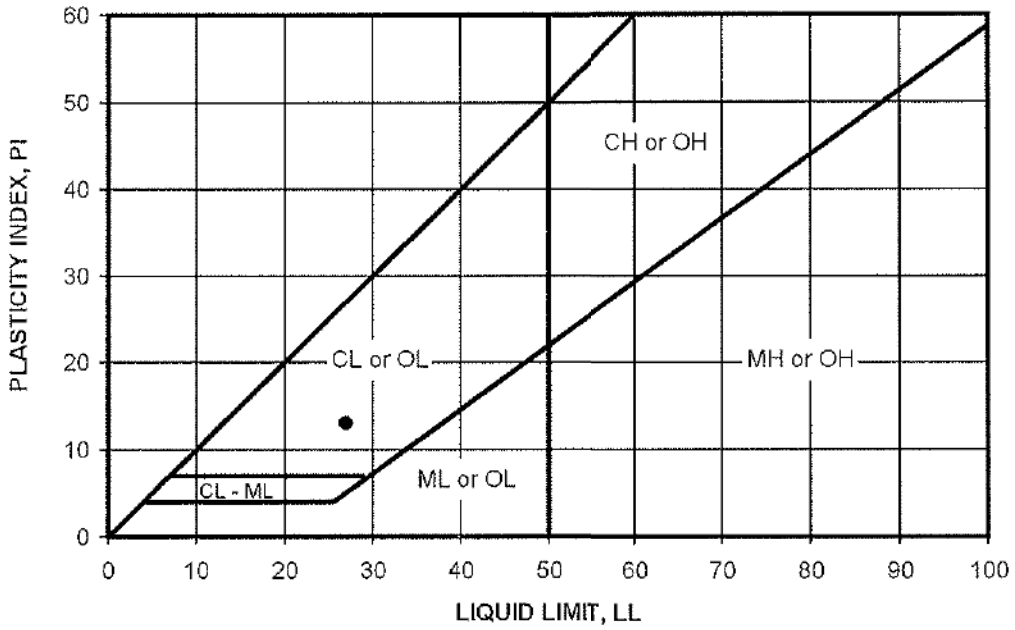


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-4	8.5-10	27	14	13	--	--	--	--	--	30	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

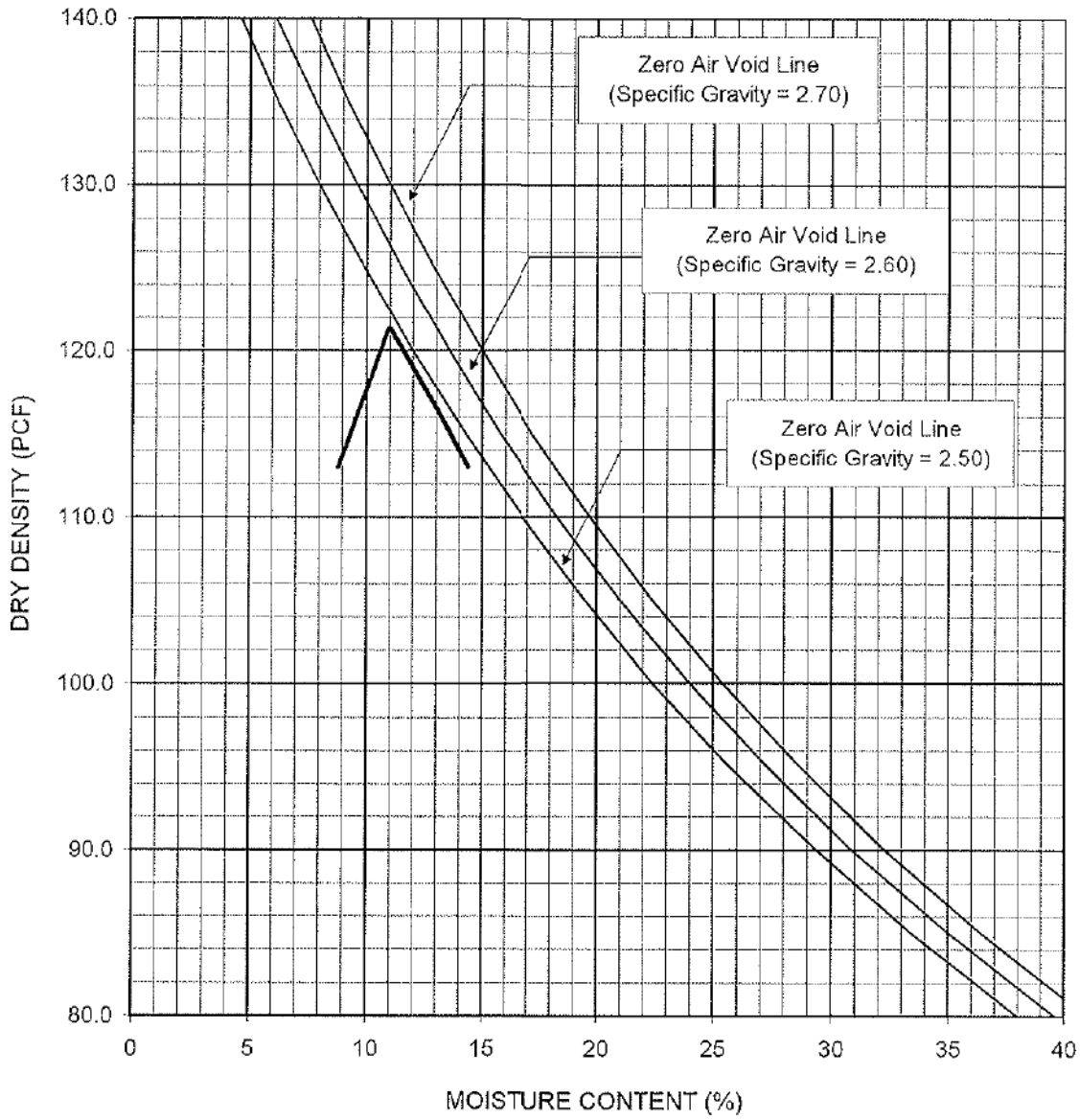
Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-4
602526001 / 12/09		

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-4	8.5-10	27	14	13	CL	SC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

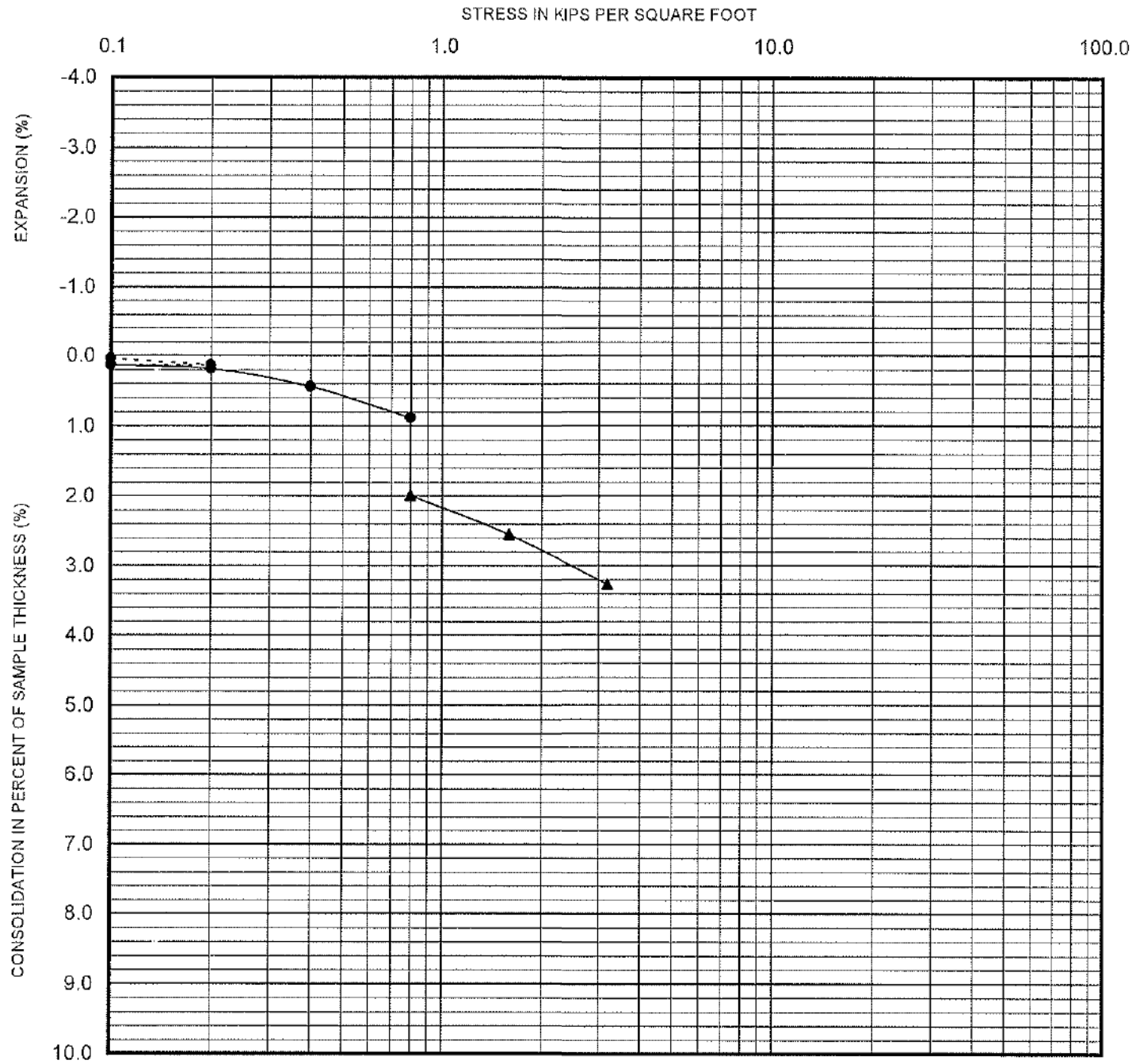
Ninyo & Moore	ATTERBERG LIMITS TEST RESULTS	FIGURE
PROJECT NO. 602526001 / DATE 12/09	RIVERVIEW DRIVE 16TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-5



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-4	3-5	CLAYEY SAND	121.3	11.0
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718-87)			128.5	8.5

PERFORMED IN GENERAL ACCORDANCE WITH ☐ ASTM D 1557 ☑ ASTM D 698 METHOD ☑ A ☐ B ☐ C

Ninyo & Moore	PROCTOR DENSITY TEST RESULTS	FIGURE
PROJECT NO. / DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-6
602526001 / 12/09		



Sample Location	B-2
Depth (ft.)	33.5-35
Soil Type	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

Ninyo & Moore	CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-7
602526001 / 12/09		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	SOIL TYPE	R-VALUE
B-3	0-5	CLAYEY SAND AND GRAVEL	72

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844

Ninyo & Moore		R-VALUE TEST RESULTS	FIGURE
PROJECT NO.	DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-8
602526001	12/09		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH [1]	RESISTIVITY [1] (Ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-2	1-5	7.7	3,010	53	0.005	240
B-4	0-5	8.2	308	31	0.003	1200

[1] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TES~ METHOD 236b
[2] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TES~ METHOD 733
[3] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TES~ METHOD 736

Ninyo & Moore		CORROSIVITY TEST RESULTS	FIGURE
PROJECT NO.	DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-9
602526001	12/09		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	PERCENTAGE ORGANIC CONTENT
B-1	13.5-15	2.1
B-4	8.5-10	1.6

Ninyo & Moore		ORGANIC CONTENT	FIGURE
PROJECT NO.	DATE	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	B-10
602526001	12/09		

APPENDIX C

GEOPHYSICAL SEISMIC REFRACTION SURVEY

Ninyo and Moore personnel conducted seismic refraction surveys at the site on June 30, 2009 to evaluate the rippability characteristics of the near surface materials. The seismic refraction data were collected with a SmartSeis S12, high performance exploration seismograph and 12 vertical component geophones. A 10-pound hammer and metal plate were used as the seismic wave source. A total of two seismic refraction traverses were performed, and the approximate locations of the traverses are depicted on Figures 2A and 2B.

The seismic refraction method uses first-arrival times of refracted seismic waves in units of milliseconds to evaluate the thicknesses and seismic velocities of subsurface layers. Seismic waves generated by hammer at the ground surface at a given "shot" point are refracted at boundaries separating materials of contrasting material velocities. These refracted seismic waves are then detected by a series of surface geophones and recorded with a seismograph. The measured time that the seismic wave signals take to travel to each geophone are used in conjunction with the known shot-to-geophone horizontal distances to obtain thickness and velocity information about the subsurface materials.

The refraction method requires that subsurface velocities (and therefore material density) increase with depth. A layer having a velocity lower than that of the layer which overlies it will not be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. This is known as a "velocity inversion" problem. In addition, relatively significant lateral variations in velocity, such as those which occur at shallow buried discontinuous caliche deposits that are surrounded by lower velocity soils, can also result in the misinterpretation of the subsurface conditions when using this method. Near surface accumulations of significant caliche deposits can create velocity inversion problems as the caliche generally has a higher velocity than surrounding non-caliche soils, and will often mimic bedrock velocities.

In general, seismic wave velocities can be correlated to material density and/or rock hardness. The relationship between rippability and seismic velocity is empirical and assumes a homogenous mass for each detected layer. Localized areas of differing composition, texture, or structure may affect both the measured data and the actual rippability of the mass. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

The following rippability chart (Table C-1) is based on our experience with similar materials. It assumes that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that soil characteristics can play a significant role in estimating excavation rates and rippability. In addition, where excavations encounter or penetrate weathered or fresh bedrock, rock characteristics, such as depth of and degree of weathering, degree of cementation (if any), the presence or absence of fractures and/or joints, and fracture/joint spacing and orientation, also play a significant role in estimating rock rippability. These soil and rock characteristics may also vary with location and depth.

Table C-1 - Qualitative Rippability Classification

0 to 2000 ft/s	Easy Ripping
2000 to 4000 ft/s	Moderate Ripping
4000 to 5500 ft/s	Difficult Ripping, Possible Blasting
5500 to 7000 ft/s	Very Difficult Ripping, Probable Blasting
Greater than 7000 ft/s	Blasting Generally Required

For trenching and other relatively narrow excavation operations, the rippability figures should be scaled downward. For example, velocities as low as 3,200 feet per second might indicate difficult ripping or possible blasting during trenching operations. In addition, the presence of cobbles and boulders, and possible fill materials including nested masses of concrete construction debris, which can be troublesome in trench excavations, should be anticipated. Based on our visual field observations and our seismic refraction survey results, the presence of relatively near-surface fill materials possibly containing construction debris including nested concrete debris, boulders, and

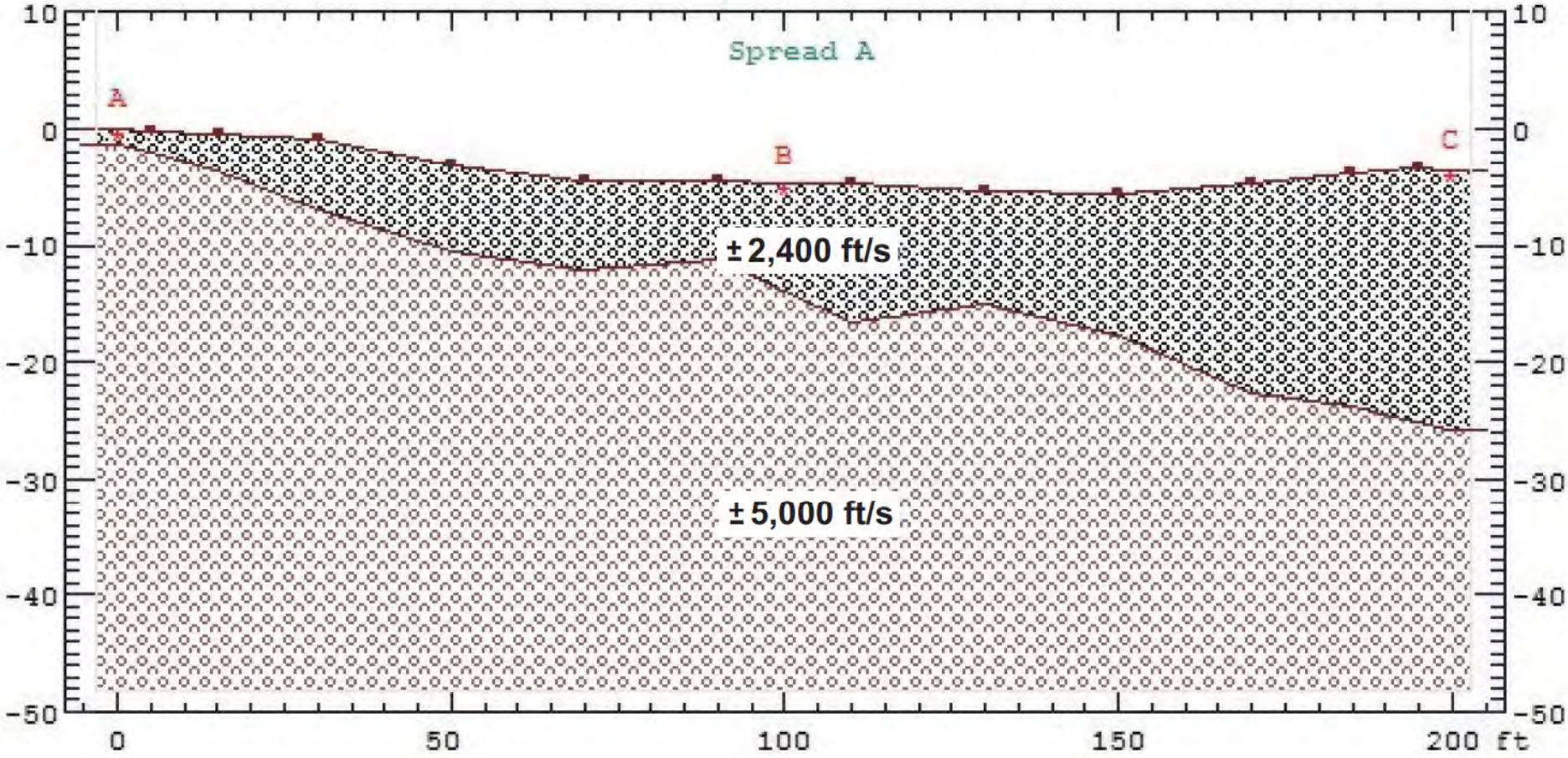
cobbles are anticipated in this area. It is also possible that variations in erosion rates and fracture density and spacing may have caused variable depths to bedrock and/or cemented soils that might not be detected by our methods. It is also possible that a spatially varying presence of cemented soils and/or concrete debris and other fill materials, in addition to boulders and cobbles, might be encountered in areas of the site. The above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids. Table C-2 lists the average velocities and depths calculated from the seismic refraction traverses conducted during this evaluation. Our seismic refraction layer profiles are presented as Figures 3A and 3B.

It should also be noted that, as a general rule of thumb, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth the length of the refraction line. The lengths of the seismic refraction lines are listed, with our interpretations, in Table C-2.

Table C-2 – Seismic Refraction Results

Traverse No. And Length	Approximate Velocity Feet/Second	Approximate Depth to Bottom of Layer (range in feet below ground surface)	Approximate Rippability
SL-1 200 feet	V1 = 2,400 V2 = 5,000	1-25 --	Moderate Ripping Difficult Ripping, Possible Blasting
SL-2 200 feet	V1 = 2,000 V2 = 7,300	45-48 --	Moderate Ripping Blasting Generally Required

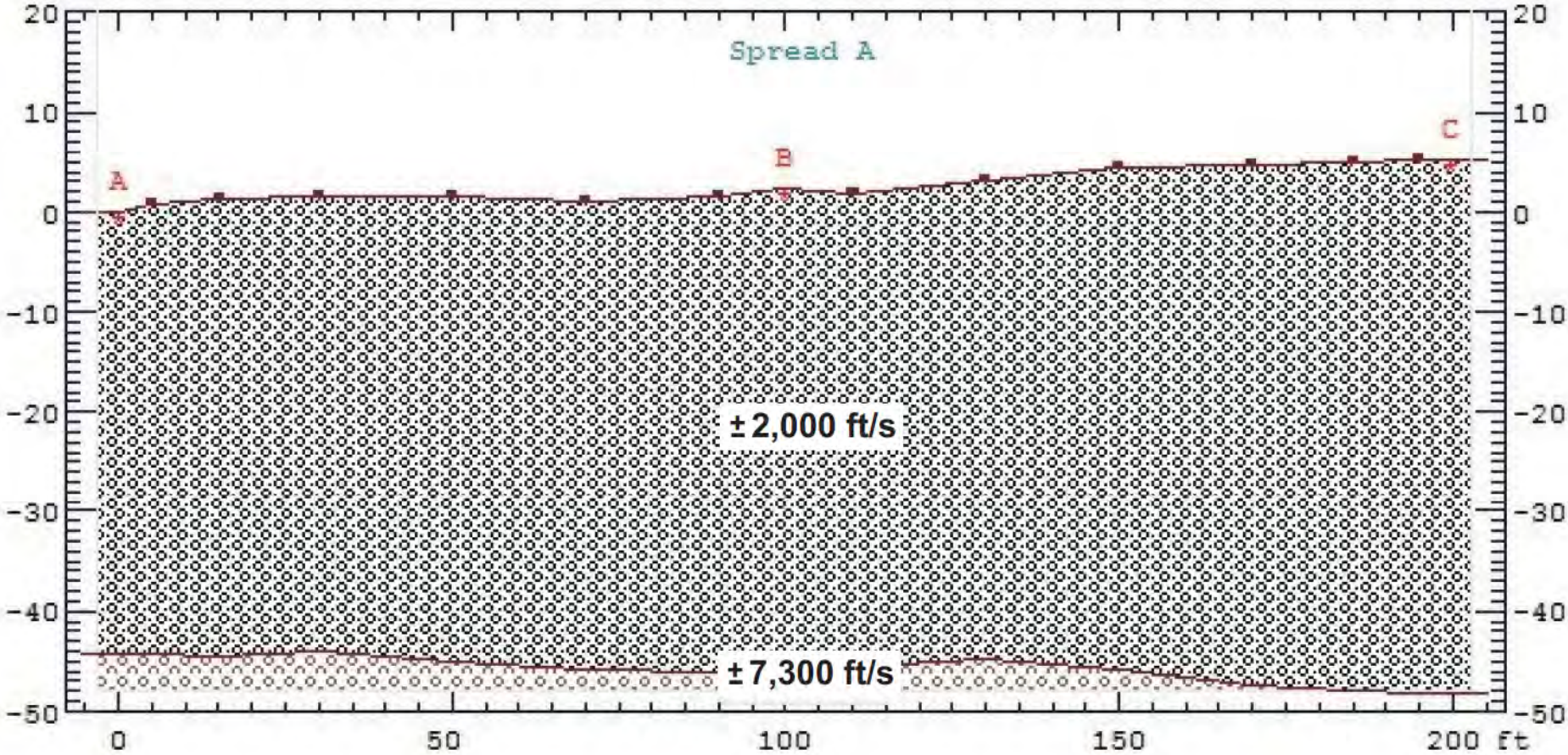
RIVERVIEW DRIVE; 18TH STREET TO 22ND STREET, SEISMIC REFRACTION SURVEY, SL-1



Ninyo & Moore		SEISMIC REFRACTION SURVEY SL-1	FIGURE
PROJECT NO: 602526001	DATE: 12/09	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	C-1

file no:2526sel0709a

RIVERVIEW DRIVE; 18TH STREET TO 22ND STREET, SEISMIC REFRACTION SURVEY, SL-2



Ninyo & Moore		SEISMIC REFRACTION SURVEY SL-2	FIGURE
PROJECT NO: 602526001	DATE: 12/09	RIVERVIEW DRIVE 18TH STREET TO 22ND STREET PHOENIX, ARIZONA	C-2

file no:2526sel0709b

APPENDIX D

MECHANICALLY STABILIZED EARTH (MSE) WALLS: SPECIAL PROVISIONS FROM ADOT

SECTION 929 MECHANICALLY STABILIZED EARTH (MSE) WALLS:

929-1 Description:

929-1.01 General:

The work under this section consists of designing, furnishing all materials and constructing Mechanically Stabilized Earth (MSE) retaining walls in accordance with these specifications and in compliance with the lines and grades, dimensions and details shown on the project plans and as directed by the Engineer.

The contractor shall provide the MSE wall designer with a complete set of project plans and specifications and shall ensure that the wall design is compatible with all other project features that can impact the design and construction of the wall. The following terms are used in this specification for identification of various entities for which the contractor shall be fully responsible:

Term	Entity
Wall Manufacturer	The entity contractually retained by the contractor to provide materials and construction services for an accepted MSE wall system as identified in Subsection 929-1.03.
Wall Designer	The entity contractually retained by the contractor to provide design of an accepted MSE wall system as identified in Subsection 929-1.03. The wall designer may be a representative of the wall manufacturer.

929-1.02 Certifications:

(A) Certification of Review of Geotechnical Report(s):

The contractor shall be responsible to review all available geotechnical investigation reports, and the contractor's signature on the proposal form shall certify that this review has been performed and that this specification and any relevant geotechnical information has been provided to the firms designing and supplying the MSE wall.

The Geotechnical Report(s), when available, will be at Contracts and Specifications Section, 1651 West Jackson, Phoenix, Arizona 85007. For projects where a Department-furnished Geotechnical Report is not available, the contractor shall be responsible for developing a Geotechnical Report that is acceptable to the Department.

Certification of Design Parameters:

See Subsection 929-2.01 herein specified.

(B) Certification of Materials:

See Subsection 929-3.06 herein specified.

929-1.03 Accepted Systems:

The contractor shall select one of the appropriate ADOT pre-approved earth retaining systems to be constructed for the MSE walls designated on the plans.

Pre-approved systems are listed under category C-1 (Proprietary Retaining Walls) in the Approved Products List (APL). Copies of the most current version of the APL are available on the Internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

The features of the system furnished, including design and configuration of precast elements, fasteners, connections, soil reinforcements, joint fillers, filter cloth and other necessary components, shall be those that have been pre-approved.

Heights and lengths of earth retaining walls may vary from, but shall not be less than, those shown on the plans. The height and length to be used for any system shall be the minimum for that system that will effectively retain the earth behind the wall for the loading conditions and the contours, profile, or slope lines shown on the plans, or on the approved working drawings, and in accordance with all relevant internal and external stability design criteria, but not more than the pre-approved height for the particular MSE wall system selected.

929-1.04 Manufacturer's Field Representative:

The manufacturer's field representative performing the work described in this specification shall have, in the past three years, successfully installed at least four MSE retaining walls of heights, lengths and complexity similar to those shown on the plans and meeting the tolerances specified herein. The manufacturer's field representative may make field changes subject to the approval of the Engineer. Any such changes shall be documented in writing within 24 hours of the approved changes. This written document shall be sealed by the manufacturer's design engineer, who is registered as a Civil Engineer in the State of Arizona.

929-1.05 MSE Pre-Activity Meeting:

A pre-activity meeting will be scheduled prior to commencement of MSE wall construction activity. As a minimum, this meeting shall be attended by the Engineer, contractor, the MSE wall sub-contractor, MSE wall manufacturer's and MSE Wall designer's repre-

sentatives. No wall construction activity shall be performed until the contractor's final submittals have been approved as having satisfactorily resolved all review comments and the pre-activity meeting concluded.

929-1.06 Wall Aesthetics:

Rustication for wall aesthetics shall be as specified in the project plans and special provisions.

929-2 Submittals (Working Drawings and Design):

929-2.01 Submittals:

The submittals required shall include working drawings, construction procedures, supporting design calculations, verification of experience, and a transmittal letter. The transmittal letter shall only list the documents included in the submittal. No technical information shall be included in the transmittal letter.

Working drawings and calculations shall be sealed by an engineer, who is registered as a Civil Engineer in the State of Arizona. The MSE wall designer/supplier shall document on the working drawings all assumptions made in the design. The following statement shall be included near the P.E. seal on the first sheet of the working drawings: "All design assumptions are validated through notes or details on these drawings."

Six complete sets of working drawings, design calculations and MSE supplier's construction procedures modified as necessary by the contractor and Wall Designer for site-specific conditions shall be submitted to the Engineer for review. The Engineer shall have 30 calendar days after receiving the six complete sets to finish a review. The revised package shall be resubmitted to the Engineer for review. The Engineer shall have 15 calendar days to complete this review. This review process shall be repeated until the entire submittal is accepted by the Engineer.

The Department assumes no responsibility for errors or omissions in the working drawings. Acceptance of the final working drawings submitted by the contractor shall not relieve the contractor of any responsibility under the contract for the successful completion of the work.

Construction of the wall shall not commence until the contractor receives a written Notification To Proceed (NTP) from the Engineer. The NTP will be issued once the complete wall package (drawings, calculations and construction procedures) is approved. Fabrication of any of the wall components before the NTP shall be at the sole risk of the contractor.

929-2.02 Working Drawings:

The contractor shall submit complete working drawings and specifications for each installation of the system in accordance with the requirements of Subsection 105.03 as modified herein.

Working drawings shall include the following at a minimum:

(1) Layout of the wall including plan and elevation views;

(2) All design parameters and assumptions including design life;

(3) Existing ground elevations and utilities impacted by the wall that have been field verified by the contractor for each location;

(4) Complete details of all elements and component parts required for the proper construction and repair of the system at each location and any required accommodations for drainage systems, foundation subgrades or other facilities shown on the contract documents;

(5) The working drawing submittal shall clearly detail any special design requirements. These special design requirements may include, but are not limited to; structural frames to place reinforcements around obstructions such as deep foundations and storm drain crossings, drainage systems, guardrail post installation, scour protection, foundation subgrade modification, all corner details (acute, obtuse and 90 degrees), slip joints, connection details of junctures of MSE walls with other cast-in-place structures, wedges, shims and other devices such as clamps and bracing to establish and maintain vertical and horizontal wall facing alignments;

(6) A complete listing of components and materials specifications; and

(7) Other site-specific or project specific information required by the contract.

929-2.03 MSE Wall Design:

(A) <u>General:</u>

The working drawings shall be supplemented with all design calculations for the particular installation as required herein. Installations that deviate from the pre-approved design shall be accompanied by supporting stability (internal, external, compound) calculations of the proposed structure as well as supporting calculations for all special details not contained in the pre-approved design. The MSE wall designer/supplier shall note all deviations of the proposed wall design from the pre-approved design.

The proposed design shall satisfy the design parameters shown on the project plans and listed in these specifications, and comply with the design requirements of the following documents:

- FHWA Publication No. FHWA NHI-00-043, "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines", March 2001; and
- AASHTO, "Standard Specifications for Highway Bridges," 17th Edition, including revisions (interims).

Maximum reinforcement loads shall be calculated using the "Simplified Coherent Gravity" approach. No other design method will be allowed. Live load shall be included in the computations to determine the maximum tensile forces in reinforcement layers, but shall be neglected in the computations for pullout resistance. Live load shall be considered as a uniform surcharge of 250 pounds per square foot.

Sample analyses and hand-calculations shall be submitted to verify the output from software used by the MSE wall designer. Sample analyses and hand-calculations shall be required for complex walls having geometries and loading conditions that are not readily amenable to computer analysis. Failure modes, including circular, non-circular, and multi-part wedge, shall be analyzed for deep-seated global stability and compound stability to verify the most critical failure case.

Unless otherwise specified in the contract, all structures shall be designed to conform to the requirements shown in Table 929-1 and other requirements specified herein.

TABLE 929-1		
DESIGN PARAMETERS		
Description	**Value**	**Note**
Design Life	75 Years	
Effective (Drained) Friction Angle - Retained Backfill	32 degrees minimum	
Effective (Drained) Friction Angle - Reinforced Backfill	34 degrees to maximum 40 degrees	Note 1
Coefficient of Sliding Friction	$\tan[\min(\varphi_r, \varphi_f, \varphi_i)]$	Note 2
Factor of Safety Against Sliding	1.5	Note 3
Factor of Safety Against Overturning	2.0	Note 3
Factor of Safety Against Deep Seated Stability	1.5	Note 3
Factor of Safety Against Compound Stability	1.5	Note 3
Factor of Safety Against Pullout	1.5	Note 3
Minimum length of the soil reinforcement	0.7H	Note 4

Note 1: A minimum friction angle of 34 degrees shall be substantiated by laboratory tests discussed in Subsection 929-3.04(B). If the measured friction angle in laboratory tests as per Subsection 929-3.04(B) is greater than 40-degrees then the friction angle in the analysis shall be limited to 40-degrees.

Note 2: φ_r= friction angle of reinforced backfill; φ_f = friction angle of foundation soil; φ_i = friction angle of the interface between reinforcement and soil for cases of sheet reinforcement such as geo-textiles. All friction angles are effective (drained) friction angles. Refer to Geotechnical Report for friction angle of foundation soil.

Note 3: For seismic analyses, use 75 percent of factor of safety value.

Note 4: At every critical location of the analysis, H is the design height of the wall and is defined as the difference in elevation between from the top of coping and the top of leveling pad. The top of the leveling pad shall always be below the minimum embedment reference line as indicated on the plans for that location. The length of the soil reinforcement is measured from the backface of the wall facing unit. In case of grid type reinforcements the length of the soil reinforcement is measured from the backface of the wall facing unit to the last full transverse member.

The design loading for the MSE retaining wall system shall not exceed the allowable general and local bearing capacities specified in the Geotechnical Report(s). Remedial options may include making the soil reinforcements longer than the minimum requirements.

(B) Subsurface Drainage Systems:

Walls shall be provided with subsurface drainage measures as shown on the project plans and specifications. As a minimum, an underdrain system shall be provided for leading subsurface and surface water away from the backfill and outside the limits of the wall. Geocomposite drains, if used for subsurface drainage, shall be in accordance with Subsection 203-5.02 and 203-5.03(C) of the specifications.

(C) Obstructions in Backfill:

(1) General:

Where obstructions, such as deep foundations or storm drains crossings, are located in the reinforced backfill zone, cutting of reinforcements to avoid obstructions shall not be permitted. A minimum offset of one diameter but not less than three feet shall be maintained between the face of any pipe crossings and the back face of retaining wall panels. A minimum clearance of three feet shall be maintained between the face of any other obstruction and the back face of retaining wall panels.

(2) Horizontal Deflection of Reinforcements:

In the horizontal plane at a reinforcing level, a deviation of any type of reinforcement up to five degrees from the normal to the face of the wall may be allowed. This deviation is herein referred to as the splay angle. For obstructions that cannot be accommodated

with splayed reinforcement, structural frames and connections shall be required, and shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, 17th Edition, Article 10, for the maximum tension in the reinforcements. The structural frame design shall be such that moments in the soil reinforcement or connection at the wall face are not generated. The design, along with supporting calculations, shall be included in the working drawings.

(3) Vertical Deflection of Reinforcements:

Vertical deflection of the reinforcement to avoid obstructions such as utilities along the wall face shall be limited to a maximum of 15 degrees from normal to face of wall. Bends in the reinforcement shall be smooth and gradual to ensure that galvanization remains intact.

(D) Hydrostatic Pressures:

As determined by the Engineer and/or as noted on the plans, for walls potentially subject to inundation, such as those located adjacent to rivers, canals, detention basins or retention basins, a minimum hydrostatic pressure equal to three feet shall be applied at the high-water level for the design flood event. Effective unit weights shall be used in the calculations for internal and external stability beginning at levels just below the equivalent surface of the pressure head line. Where the wall is influenced by water fluctuations, the wall shall be designed for rapid drawdown conditions which could result in differential hydrostatic pressure greater than three feet. As an alternative to designing for rapid drawdown conditions, size 57 coarse aggregate, as specified in AASHTO M 43, shall be provided as reinforced backfill for the full length of the wall and to the maximum height of submergence of the wall. Separation geotextile fabric, as specified in Subsection 1014-4.04(A), shall be provided at the interface of the size 57 coarse aggregate and reinforced backfill above it, and at the interface of the retained backfill behind it. Adjoining sections of separation geotextile fabric shall be overlapped by a minimum of 12 inches.

(E) Acute Angle Corners:

Wall corners with an included angle of less than 90 degrees shall be designed as bin walls for the extent of the wall where the full length of the reinforcement cannot be installed without encountering a wall face. Acute angle corner structures shall not be stand-alone separate structures. Computations shall be provided that demonstrate deformation compatibility between the acute angle corner structure and the rest of the MSE wall. Full-height vertical slip joints shall be provided at the acute angle corner and after the last column of panels where full length of the reinforcements can be placed with free ends not touching a wall face. The soil reinforcement attached to the slip joints shall be oriented perpendicular to the slip joint panels and shall be the full design length with free ends. Special connection and compaction details shall be provided on the working drawings.

(F) Spacing of Metallic Reinforcement for Flexible Face Wall systems:

For permanent walls, vertical and horizontal spacing of metallic reinforcements for flexible face (welded wire or similar) wall systems shall not exceed 24 inches. The stiffness of the facing and spacing of reinforcements shall be such that the maximum local deformation between soil reinforcement layers shall be limited to less than 1.5 inches. Facing elements shall not yield in bending and tension.

For temporary walls, i.e., walls with less than 12 months service life, the contractor may adjust the stiffness of the facing and spacing of the reinforcements such that the local deformation between the reinforcement is within the elastic range in bending and tension, and the overall geometry meets the line and grade requirements for the temporary walls.

(G) Initial Batter of Wall:

The initial batter of the wall, both during construction and upon completion, shall be within the vertical and horizontal alignment tolerances included in this specification. The initial batter of the wall at the start of construction and the means and methods necessary to achieve the batter shall be provided on the working drawings. Subject to Engineer's approval, the initial batter may be modified at the start of construction by the manufacturer's field representative based on the evaluation of the backfill material selected by the contractor. Any such changes shall be documented in writing within 24 hours of the approved changes. This written document shall be sealed by the manufacturer's design engineer who is registered as a Civil Engineer in the State of Arizona. Details of the wedges or shims or other devices, such as clamps and external bracing used to achieve or maintain the wall batter, shall be as shown on the working drawings. Permanent shims shall comply with the design life criteria, and shall maintain the design stress levels required for the walls.

929-3 Material Requirements:

929-3.01 Precast Concrete Elements:

Precast concrete elements shall conform to the requirements for precast minor structures in Sections 601 and 1006. The concrete shall be Class S with minimum design strength of 4,000 pounds per square inch. The mix design shall conform to the requirements of Subsection 1006-3.02.

Prior to casting, all embedded components shall be set in place to the dimensions and tolerances designated in the plans and specifications. Rustication for wall aesthetics

shall be in accordance with project plans, special provisions, and applicable requirements of Sections 601, 610, 1002 and 1006.

(A) Concrete Testing and Inspection:

Precast concrete elements shall be subjected to compressive strength testing in accordance with Subsection 1006-7.05, and inspected for dimensional tolerances and surface conditions in accordance with Subsections 601-3.05 and 601-4.02 respectively. Panels delivered to the site without the ADOT acceptance stamp will be rejected.

(B) Casting:

Precast concrete face panels shall be cast on a horizontal surface with the front face of the panel at the bottom of the form. Connection hardware shall be set in the rear face. The concrete in each precast concrete panel shall be placed without interruption and shall be consolidated by deploying an approved vibrator, supplemented by such hand tamping as may be necessary to force the concrete into the corner of the forms, and to eliminate the formation of stone pockets or cleavage planes. Form release agents as specified in Subsection 601-3.02(C)(1) shall be used on all form faces for all casting operations.

The contractor shall advise the Engineer of the starting date for concrete panel casting at least 14 calendar days prior to beginning the operation if the casting operation is within the State of Arizona, or 21 calendar days if the casting operation is outside the State of Arizona.

(C) Finish:

(1) Non-Exposed Surfaces:

Rear faces of precast concrete panels shall receive a Class I finish in accordance with Subsection 601-3.05.

(2) Exposed Surfaces:

The type of finish required on exposed surfaces shall be as shown in the plans.

(a) Exposed Aggregate Finish:

(1) Prior to placing concrete, a set retardant shall be applied to the casting forms in accordance with the manufacturer's instructions.

(2) After removal from the forms and after the concrete has set sufficiently to prevent its dislodging, the aggregate shall be exposed by a combination of brushing and washing with clear water. The depth of exposure shall be between 3/8 inch and 1/2 inch.

(3) An acrylic resin sealer consisting of 80 percent thinner and 20 percent acrylic solids by weight shall be applied to the exposed aggregate surface at a rate of one gallon per 250 square feet.

(b) Concrete Panel Finish:

Concrete panel finish shall be in accordance with Subsection 601-3.05.

(D) Tolerances:

Precast concrete elements shall comply with Subsection 601-4.02(B)(1) and 601-4.02(B)(4). Connection device placement shall be within ± 3/8 inch of the dimensions shown on the drawings. Panel squareness as determined by the difference between the two diagonals shall not exceed 1/2 inch.

(E) Identification and Markings:

The date of manufacture, the production lot number, and the piece mark shall be inscribed on a non-exposed surface of each element.

(F) Handling, Storage and Shipping:

All panels shall be handled, stored, and shipped in such a manner to eliminate the dangers of chipping, discoloration, cracks, fractures, and excessive bending stresses. Panels in storage shall be supported in firm blocking to protect panel connection devices and the exposed exterior finish. Storing and shipping shall be in accordance with the manufacturer's recommendations.

(G) Compressive Strength:

Precast concrete elements shall not be shipped or placed in the wall until a compressive strength of 3,400 pounds per square inch has been attained. The facing elements shall be cast on a flat and level area and shall be fully supported until a compressive strength of 1,000 pounds per square inch has been attained.

929-3.02 Steel Components:

Steel components shall conform to the applicable requirements of Sections 605 and 1003.

(A) Galvanization:

Soil reinforcement steel shall be hot-dip galvanized in accordance with AASHTO M 111 (ASTM A-123). Connection hardware steel can be galvanized by hot-dipping or other means, provided the method satisfies the requirements of AASHTO M 111 (ASTM A-123). Soil reinforcement steel shall be adequately supported while lifting and placing such that the galvanization remains intact and is not cracked. Steel members with damaged (cracked or peeled) galvanization shall be repaired according to ASTM A780-01 and as specified in approved working drawings, at no additional cost to the Department.

(B) Metallic Reinforcing Strips and Tie Strips:

Reinforcing strips shall be hot-rolled from bars to the required shape and dimensions. The strips' physical and mechanical properties shall conform to the requirements of ASTM A-572, Grade 65 minimum.

Tie strips shall be shop fabricated of hot-rolled steel conforming to the requirements of ASTM A 1101, Grade 50 minimum. The minimum bending radius of the tie strips shall be 3/8 inch. Galvanization shall be applied after the strips are fabricated, inclusive of punch holes for bolts as shown on approved drawings.

(C) Metallic Reinforcing Mesh:

Reinforcing mesh shall be shop fabricated of cold-drawn steel wire conforming to the requirements of AASHTO M 32, and shall be welded into the finished mesh fabric in accordance with AASHTO M 55. Galvanization shall be applied after the mesh is fabricated.

(D) Connector Pins:

Connector pins and mat bars shall be fabricated and connected to the soil reinforcement mats as shown in the approved working drawings. Connector bars shall be fabricated of cold drawn steel wire conforming to the requirements of AASHTO M 32.

(E) Welded Wire Fabric:

All wire and welded wire fabric shall conform to the requirements of AASHTO M 32, AASHTO M 55, and the approved working drawings. Welded wire fabric shall be galvanized in conformance with the requirements of ASTM A-123.

(F) Fasteners:

Connection hardware shall conform to the requirements shown in the approved working drawings. Connection hardware shall be cast in the precast concrete panels such that all connectors are in alignment and able to transfer full and even load to the soil reinforcement. Once the reinforcement is connected to the panel, the amount of slack shall not exceed 1/8 inch between the connector and the reinforcement during field installation. Fasteners shall be galvanized and conform to the requirements of AASHTO M 164 or equivalent.

(G) Precast Concrete Panel Joints:

(1) General:

Where the wall wraps around an inside corner, a corner block panel shall be provided with flange extensions that will allow for differential movement without exposing the panel joints. The back face of vertical and horizontal joints shall be covered with filter fabric. Joint filler, bearing pads, and filter fabric shall be as recommended by the wall manufacturer and shall meet the requirements shown on the approved working drawings.

If required, as indicated on the plans, flexible open-cell polyurethane foam strips shall be used for filler for vertical joints between panels, and in horizontal joints where pads are used.

All joints between panels on the back side of the wall shall be covered with a geotextile meeting the requirements for filtration applications as specified by AASHTO M 288. The minimum width shall be one foot.

(2) Bearing Pads:

All horizontal and diagonal joints between panels shall include bearing pads. Bearing pads shall meet or exceed the following material requirements:

- Preformed EPDM (Ethylene Propylene Diene Monomer) rubber pads conforming to ASTM D 2000 Grade 2, Type A, Class A with a Durometer Hardness of 70.
- Preformed HDPE (High Density Polyethylene) pads with a minimum density of 0.946 grams per cubic centimeter in accordance with ASTM D 1505.

The stiffness (axial and lateral), size, and number of bearing pads shall be determined such that the final joint opening shall be 3/4 inch unless otherwise shown on the plans. The MSE wall designer shall submit substantiating calculations verifying the stiffness (axial and lateral), size, and number of bearing pads assuming, as a minimum, a vertical loading at a given joint equal to 2.0 times the weight of facing panels directly above that level. As part of the substantiating calculations, the MSE wall designer shall submit re-

sults of certified laboratory tests in the form of vertical load-vertical strain and vertical load-lateral strain curves for the specific bearing pads proposed by the MSE wall designer. The vertical load-vertical strain curve should extend beyond the first yield point of the proposed bearing pad.

929-3.03 Geosynthetic Reinforcement:

Geosynthetic soil reinforcement shall be limited to geogrids manufactured from polypropylene or high density polyethylene. The geogrid shall be a regular network of integrally connected polymer tensile elements, with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil. Geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation.

The long-term allowable tensile strength (T-AL) of specific geosynthetic material shall meet or exceed the creep and durability reduction factors required by the wall manufacturer, as well as those required by those AASHTO or FHWA publications referenced herein. The minimum installation damage reduction factor shall be 1.5.

An overall factor of safety of 1.5 shall be incorporated in computation of the allowable tensile strength to account for uncertainties in the geometry of the structure, fill properties, reinforcement properties, and externally applied loads.

929-3.04 Reinforced Backfill Material:

(A) General:

Reinforced backfill material shall be free of shale, organic matter, mica, gypsum, smectite, montmorillonite, or other soft poor durability particles. No salvaged material (such as asphaltic concrete millings or Portland Cement Concrete rubble, etc.) will be allowed.

The reinforced backfill material shall have a soundness loss of 30 percent or less when tested in accordance with AASHTO T 104 using a magnesium sulfate solution with a test duration of four cycles. Alternatively, the material shall have a soundness loss of 15 percent or less when tested in accordance with AASHTO T 104 using a sodium sulfate solution with a test duration of five cycles.

Gradations will be determined by Arizona Test Method 201 and shall be in accordance with Table 929-2, unless otherwise specified. The backfill shall be a well graded material with a minimum coefficient of uniformity, $C_u > 4$ and coefficient of curvature, C_c between 1 and 3. Gap-graded backfill material shall not be used.

Plasticity Index (PI), as determined in accordance with AASHTO T 90, shall not exceed six.

Table 929-2
BACKFILL GRADATION REQUIREMENTS

Sieve Size	Percent Passing
4 inch (Note 1)	100
No. 40	0-60
No. 200	0-15

Note 1: Maximum particle size shall be limited to 3/4 inch for geosynthetics and epoxy- or PVC-coated reinforcements unless the contractor provides tests, acceptable to the Engineer, that have evaluated the extent of construction damage anticipated for the specific fill material and reinforcement combination. Construction damage testing shall be performed in accordance with the requirements of Chapter 5 of Publication No. FHWA NHI-00-044, dated March 2001 ("Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes.")

(B) Internal Friction Angle Requirement:

The reinforced backfill material shall exhibit an effective (drained) angle of internal friction of not less than 34 degrees, as determined in accordance with AASHTO T 236.

The test shall be run on the portion finer than the No. 10 sieve. The sample shall be compacted at optimum moisture content to 95 percent of the maximum dry density, as determined in accordance with the requirements of Arizona Test Method 225. The sample shall be tested at the compacted condition without addition of water.

No direct shear testing will be required when 80 percent or more of the material is larger than 3/4 inch.

(C) Electrochemical Requirements:

The reinforced backfill material shall meet the electrochemical requirements of Table 929-3 when metallic soil reinforcement is used and Table 929-4 when geosynthetic soil reinforcement is used. For all soil reinforcements, the organic content of backfill shall be less than one percent, determined in accordance with AASHTO T-267.

Table 929-3

ELECTROCHEMICAL REQUIREMENTS FOR METALLIC REINFORCEMENTS

Characteristic	Requirement	Test Method
pH	5.0 to 10.0	AASHTO T-289
Resistivity, min.*	2,500 ohm-cm	AASHTO T-288
Chlorides, max.	100 ppm	AASHTO T-291
Sulfates, max.	200 ppm	AASHTO T-290

* Backfill material will be acceptable when the moving average of the last three tests for resistivity is at least 2,500 ohm-cm, and no single test is less than 2,400 ohm-cm. For resistivity values greater than 5,000 ohm-cm, the sulfate and chlorides tests are not required.

Table 929-4 ELECTROCHEMICAL REQUIREMENTS FOR GEOSYNTHETIC REINFORCEMENTS			
Base Polymer	**Property**	**Requirement**	**Test Method**
Polyolefin (PP and HDPE)*	pH	> 3.0	AASHTO T-289
* PP: Polypropylene and HDPE: High Density Polyethylene.			

(D) Rock Backfill:

Material that is composed primarily of rock fragments (material having less than 25 percent passing a 3/4-inch sieve), but otherwise meets the requirements of Subsection 929-3.04 shall be considered to be a rock backfill. Such material shall meet all the other requirement of Subsection 929-3.04 including electrochemical requirements. When such material is used, a very high survivability separation fabric, meeting the minimum requirements for filtration applications specified in AASHTO M 288 and Subsection 1014-4.04(A), shall encapsulate the rock backfill to within three feet below the wall coping. Adjoining sections of separation fabric shall be overlapped by a minimum of 12 inches. Additionally, the upper three feet of backfill shall contain no stones greater than three inches in their greatest dimension, and shall be composed of material not considered to be rock backfill, as defined herein.

(E) Limits of Reinforced Backfill:

For all walls, except back-to-back walls, the reinforced backfill shall extend to at least one foot beyond the free end of the reinforcement. For back-to-back walls wherein the free ends of the reinforcement of the two walls are spaced apart less than or equal to one-half the design height of the taller wall, reinforced backfill shall be used for the space between the free ends of the reinforcements as well. The design height of the wall is defined as the difference in elevation between the difference in elevation between from the top of coping and the top of leveling pad. The top of the leveling pad shall always be below the minimum embedment reference line as indicated on the plans for that location.

929-3.05 Retained Backfill Material:

(A) General:

Backfill behind the limits of the reinforced backfill shall be considered as retained backfill for a distance equal to 50 percent of the design height of the MSE wall or as shown on the plans, except for back-to-back MSE wals as described in Subsection 929-3.04(E)

above. The retained backfill shall be free of shale, mica, gypsum, smectite, montmorillonite or other soft, poor durability particles. The percent fines (particles finer than No. 200 sieve) shall be less than 50 as determined in accordance with Arizona Test Method 201, and the Liquid Limit (LL) and the Plasticity Index (PI) shall be less than 40 and 20, respectively, as determined in accordance with AASHTO T-90.

(B) Internal Friction Angle Requirement:

Unless otherwise noted on the plans, the retained backfill material shall exhibit an effective (drained) angle of internal friction of not less than 32 degrees as determined by AASHTO T 236. The test shall be run on the portion finer than the No. 10 sieve. The sample shall be compacted at optimum moisture content and to 95 percent of maximum dry density, as determined in accordance with AASHTO T 180 (Modified Proctor) test. The sample shall be tested at the compacted condition without addition of water.

929-3.06 Certification of Reinforced and Retained Backfill Materials

At least three weeks prior to construction of the MSE wall, the contractor shall furnish the Engineer with an 80-pound representative sample of each of the backfill material and a Certificate of Analysis conforming to the requirements of Subsection 106.05 certifying that the backfill materials comply with the requirements specified herein. A new sample and Certificate of Analysis shall be provided any time the contractor changes the source of the backfill materials or the material within a given source changes as noted in Table 929-5. During construction the reinforced backfill shall be sampled and tested by the Contractor for acceptance and quality control testing in accordance with the requirements stated in Table 929-5.

Table 929-5
Sampling Frequency for Reinforced and Retained Backfill Material

Test	Frequency
Proctor density, Optimum Moisture (Arizona Test Method 225), Internal friction angle (AASHTO T 236) Test pad section (Subsection 929-4.06(B))	One per material change*
Resistivity, pH, Organic Content, Chlorides, Sulfates (Table 929-3)	One per 500 CY At job site
Gradation (Arizona Test Method 201), Plasticity Index (AASHTO T 90)	One per 500 CY At job site

* New tests shall be required with each change in the material as identified by change in gradation characteristics and Plasticity Index (PI). Compared to a previously acceptable material, a change in the material is deemed to occur if any of the following criteria is met:

- Increase in %fines (the fraction passing No. 200 sieve) ≥ 5%
- Increase in PI value ≥ 5 points
- Absolute change ≥ 0.70 for $Log_{10}(D75)$, $Log_{10}(D50)$, or $Log_{10}(D15)$, where D## is the diameter (in mm) of the soil particle for which ## percent of the soil sample is finer

Example:
Assume that Sample A was the first acceptable sample. Sample B is the new sample under consideration. Determine if Sample B constitutes a material change. Values of the pertinent parameters as obtained from the soil gradation curves are as follows:

- Sample A: D75 = 9 mm, D50 = 2 mm, D15 = 0.2 mm, % fines = 2%, PI = 0
- Sample B: D75 = 2 mm, D50 = 1 mm, D15 = 0.3 mm, % fines = 8%, PI = 2

Evaluation:

Sample	% Fines	PI	$Log_{10}(D75)$	$Log_{10}(D50)$	$Log_{10}(D15)$
A	2	0	0.95	0.30	-0.70
B	8	2	0.30	0.00	-0.52
Difference	6	2	0.65	0.30	0.18
Criterion	≥ 5	≥ 5	≥ 0.70	≥ 0.70	≥ 0.70
Material Change?	Yes	No	No	No	No

Material Change? Yes

929-3.07 Cast-in-Place Concrete:

Cast-in-place concrete shall conform to the requirements of Sections 601 and 1006. Unless otherwise approved, all cast-in-place concrete shall be Class S with a minimum compressive strength of 4,000 pounds per square inch.

929-3.08 Certificate of Analysis:

The contractor shall furnish the Engineer with a Certificate of Analysis conforming to the requirements of Subsection 106.05 for all material,

For geosynthetics, the Certificate of Analysis shall verify that the supplied geosynthetic is the type approved by the Engineer and as measured in full accordance with all test methods and standards specified herein. The manufacturer's certificate shall state that the furnished geosynthetic meets the requirements of the specifications, as evaluated by the manufacturer's quality control program. In case of dispute over validity of values, the Engineer can require the contractor to supply test data from an agency-approved laboratory to support the certified values submitted, at no additional cost to the Department.

For metallic wall reinforcement, a mill test report containing the ultimate tensile strength for the soil reinforcement shall be included in the certification.

929-4 Construction Requirements:

929-4.01 Excavation:

The contractor shall ensure that temporary slopes are safe during the period of wall construction, and shall adhere to all applicable local, state and federal regulations. During construction of the MSE walls, the contractor shall design, construct, maintain and, when called for, remove temporary excavation support systems (shoring). Temporary excavation support systems may be left in place if approved by the Engineer. The back slope of the excavation shall be benched. Where shoring is required, the contractor shall submit the shoring design, and a plan outlining construction and removal procedures, to the Engineer for review and approval prior to proceeding with the work. Shoring plans shall be prepared and submitted as part of the working drawings, as specified in Subsection 105.03 and shall bear the seal and signature of a licensed Professional Civil or Structural Engineer, registered in the State of Arizona. All shoring design shall include appropriate input and review by a geotechnical engineer.

929-4.02 Foundation Preparation:

(A) General:

In the absence of specific ground improvement requirements in the plans and special provisions, the following applies:

The foundation for the reinforced and retained backfill shall be graded level for the entire area of the base of such backfills, plus an additional 12 inches on all sides, or to the limits shown in the plans.

If metal reinforcement components are to be positioned on native soil, the top one foot of native soil shall meet the requirements of the reinforced backfill material specified in Subsection 929-3.04.

If metal reinforcement components are to be positioned on native rock mass, the rock mass shall be classified as at least Class II rock mass in accordance with Section 10 of 4th Edition of AASHTO (2007) Bridge Specifications. Otherwise the top foot of native rock mass on which the MSE structure is to be constructed shall be scarified and compacted to a dry density not less than 100 percent of maximum dry density as determined in accordance with Arizona Test Method 225.

(B) Proof-Rolling:

The contractor shall perform proof-rolling to evaluate the stability and uniformity of the subgrades on which the MSE structure will be constructed. Proof rolling shall be performed on the entire areas at the following locations:

1. At the bottom of the overexcavation and recompaction zones, if specified on the plans.

2. At the bottom of the overexcavation and replacement zones, if specified on the plans.
3. At the base of all walls.
4. At the top of native soil layers that have been scarified, moisture-conditioned, and recompacted (if different from the bottom of the overexcavation and recompaction zones, or overexcavation and replacement zones).

Proof-rolling shall be done immediately after subgrade compaction while the moisture content of the subgrade soil is near optimum, or at the moisture content that was used to achieve the required compaction.

If proof-rolling is performed after installation of pipe underdrains, the proof-roller shall not be used within 1.5 feet of the underdrains.

Proof-rolling shall be performed with a pneumatic-tired tandem axle roller with at least three wheels on each axle, a gross weight of 25 tons (50 kips), a minimum tire pressure of 75 pounds per square inch, and a minimum rolling width of 75 inches. A Caterpillar PS-300B (or PF-300B), Ingersoll-Rand PT-240R, BOMAG BW24R, Dynapac CP271, or equipment with equivalent capabilities shall be used for proof-rolling.

Proof-rolling equipment shall be operated at a speed between 1.5 and 3 miles per hour, or slower as required by the Engineer to permit measurements of the deformations, ruts and/or pumping.

Proof-rolling shall be carried out in two directions at right angles to each other with no more than 24 inches between tire tracks of adjacent passes. The contractor shall operate the proof-roller in a pattern that readily allows for the recording of deformation data and complete coverage of the subgrade.

The following actions shall be taken based on the results of the proof-rolling activity:

1. Rutting less than 1/4 inch – The grade is acceptable.
2. Rutting greater than 1/4 inch and less than 1.5 inches – The grade shall be scarified and re-compacted.
3. Rutting greater than 1.5 inches – The compacted area shall be removed and reconstructed.
4. Pumping (deformation that rebounds, or materials that are squeezed out of a wheel's path) greater than one inch – The area shall be remediated as directed by the Engineer.

The contractor shall be responsible for maintaining the condition of the approved proof-rolled soils throughout the duration of the retaining wall construction. Wall construction shall not commence until the foundation has been approved by the Engineer.

929-4.03 Concrete Leveling Pad:

Leveling pads shall be constructed of unreinforced concrete as shown on the working drawings. Gravel leveling pads shall not be allowed. As a minimum, the concrete for leveling pads shall meet the requirements of Section 922. The elevation of the top of leveling pad shall be within 1/8 inch from the design elevation when measured by a straightedge over any 10-foot run of the leveling pad. The centerline of the leveling pad shall be within 1/2 inch from design location. Cast-in-place leveling pads shall be cured for a minimum of 24 hours before placement of wall facing units. Openings between the facing units and leveling pad steps shall be filled with Class S concrete, conforming to Section 1006, and having a minimum compressive strength of 3,000 pounds per square inch. Geotextile fabric shall be applied over the back of the area for a minimum of six inches beyond the edges of the opening.

929-4.04 Subsurface Drainage:

Prior to wall erection, the contractor shall install a subsurface drainage system as shown on the working drawings.

929-4.05 Wall Erection:

(A) General:

Walls shall be erected in accordance with the manufacturer's written instructions. The contractor shall be responsible for ensuring that a field representative from the manufacturer is available at the site during construction of the initial 10-foot height of the full length of wall, and as called upon thereafter by the Engineer, to assist the contractor and Engineer at no additional cost to the Department. All temporary construction aids (e.g., wedges, clamps, etc.) shall be in accordance with the manufacturer's recommendations.

(B) Placement Tolerances for Walls with Rigid (Precast) Facing:

For walls with rigid facing, such as precast concrete panels, the panels shall be placed such that their final position is vertical or battered as shown on the working drawings. As backfill material is placed, the panels shall be maintained in the correct vertical alignment by means of temporary wedges, clamps, or bracing as recommended by the manufacturer. A minimum of two, but not more than three, rows of panel wedges shall remain in place at all times during wall erection. Wedges shall be removed from lower rows as panel erection progresses, so as to prevent chipping or cracking of concrete panels. The contractor shall repair any damage to erected concrete panels as directed by the Engineer and to the Engineer's satisfaction. No external wedges in front of the wall shall remain in place when the wall is complete.

Erection of walls with rigid facing shall be in accordance with the following tolerances:

- Vertical and horizontal alignment of the wall face shall not vary by more than 3/4 inch when measured along a 10-foot straightedge.
- The overall vertical tolerance (plumbness) of the finished wall shall not exceed 1/2 inch per 10 feet of wall height.
- The maximum permissible offset at any panel joint shall not exceed 3/8 inch.
- The final joint gaps between adjacent facing panel units shall be within 1/8 inch of the design final joint opening per the approved calculations required in Subsection 929-3.02(G).

Wall sections not conforming to these tolerances shall be reconstructed at no additional cost to the Department.

(C) Placement Tolerances for Permanent Walls with Flexible Facing:

Erection of permanent walls with flexible facing (such as welded wire mesh) shall be in accordance with the following tolerances:

- Vertical and horizontal alignment of the wall face shall not vary by more than 2 inches when measured along a 10-foot straightedge, or as shown in the plans and specifications.
- The overall vertical tolerance (plumbness) of the wall shall not exceed one inch per 10 feet of wall height.

Wall sections not conforming to these tolerances shall be reconstructed at no additional cost to the Department.

(D) Placement of Metallic Reinforcement Elements:

Metallic reinforcement elements shall be placed normal (perpendicular) to the face of the wall, unless otherwise shown on the approved plans. All reinforcement shall be structurally connected to the wall face.

At each level of the soil reinforcement, the backfill material shall be roughly leveled and compacted before placing the next layer of reinforcement. The reinforcement shall bear uniformly on the compacted reinforced soil from the connection to the wall to the free end of the reinforcing elements. The reinforcement placement elevation shall be two inches higher than the connection elevation.

Where overlapping of reinforcing may occur, such as at corners, reinforcing connections to panels shall be adjusted to maintain at least six inches of vertical separation between overlapping reinforcement.

(E) Placement of Geotextile Fabric:

All joints between precast concrete panels shall be covered with geotextile fabric on the back side of the wall. Adhesive shall be applied to panels only. Adhesive shall not be applied to geotextile fabric or within two inches of a joint. The contractor shall provide geotextile fabric having a minimum width of 12 inches, and shall overlap fabric a minimum of four inches.

(F) Joint Pads and Fillers:

The contractor shall install joint pads and fillers as shown on the working drawings.

(G) Placement of Geosynthetic Reinforcement:

Geosynthetic reinforcement shall be installed in accordance with the manufacturer's site-specific wall erection instructions.

Geosynthetic reinforcement shall be placed in continuous longitudinal rolls in the direction of the main reinforcement. Joints parallel to the wall shall not be permitted, except as shown on the working drawings.

Reinforcement coverage shall be 100 percent of embedment area unless otherwise shown in the working drawings. Adjacent sections of geosynthetic reinforcement need not be overlapped except when exposed in a wrap-around face system, at which time the reinforcement rolls shall be overlapped or mechanically connected per the manufacturer's requirements.

Geosynthetic reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geosynthetic reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geosynthetic reinforcement in position until the subsequent soil layer can be placed.

During construction, the surface of the fill shall be kept approximately horizontal. Geosynthetic reinforcement shall be placed directly on the compacted horizontal fill surface. Geosynthetic reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view, unless otherwise directed by the Engineer.

929-4.06 Backfill Placement:

(A) General:

Backfill placement shall closely follow erection of each course of facing panels. Backfill shall be placed in such a manner to avoid damage or disturbance of the wall materials, misalignment of facing panels, or damage to soil reinforcement or facing members. The contractor shall place backfill to the level of the connection and in such a manner as to ensure that no voids exist directly beneath reinforcing elements.

The maximum lift thickness before compaction shall not exceed eight inches. The contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

For geosynthetic reinforcements, the fill shall be spread by moving the machinery parallel to or away from the wall facing and in such a manner that the geogrid remains taut. Construction equipment shall not operate directly on the geogrid. A minimum fill thickness of 6 inches over the geogrid shall be required prior to operation of vehicles. Sudden braking and sharp turning shall be avoided.

For metallic reinforcements, the fill shall be spread by moving the machinery parallel to or away from the wall facing and in such a manner that the steel reinforcement remains normal to the face of the wall. Construction equipment shall not operate directly on the steel reinforcement. A minimum fill thickness of 3 inches over the steel reinforcement shall be required prior to operation of vehicles. Sudden braking and sharp turning shall be avoided.

Wall materials which are damaged during backfill placement shall be removed and replaced by the contractor, at no additional cost to the Department. The contractor may submit alternative corrective procedures to the Engineer for consideration. Proposed alternative corrective procedures shall have the concurrence of the MSE wall supplier and designer, in writing, prior to submission to the Engineer for consideration. All corrective actions shall be at no additional cost to the Department.

(B) Compaction:

Reinforced backfill shall be compacted to 95 percent of the maximum dry density as determined in accordance with the requirements of Arizona Test Method 225.

Retained backfill shall be compacted to 95 percent of the maximum dry density as determined in accordance with the requirements of AASHTO T 180 (Modified Proctor).

Backfill shall be compacted using a static-weighted or vibratory roller. Sheeps-foot or grid-type rollers shall not be used for compacting material within the limits of the soil reinforcement. The contractor shall take soil density tests, in accordance with Arizona Test Method 230, to ensure compliance with the specified compaction requirements. Soil density tests shall be taken at intervals of not less than one for every 500 cubic yards,

with a minimum of one test per lift. Compaction tests shall be taken at locations determined by the Engineer.

The backfill density requirement within three feet of the wall facing shall be 90 percent of maximum dry density as determined by Arizona Test Method 225. No compaction testing within three feet of the wall facing will be required. Compaction within three feet of the wall shall be achieved by a minimum number of passes of a lightweight mechanical tamper or roller system. The minimum number of passes and rolling pattern shall be determined, prior to construction of the wall, by constructing a test pad section.

The test pad section shall be performed as follows:

- Minimum dimensions of the test pad shall be five feet wide, 15 feet long, and three feet final depth.
- Maximum lift thickness before compaction shall be eight inches.
- Minimum one density test per lift.

Only those methods used to establish compaction compliance in the test pad section shall be used for production work. Any change in the material as per Table 929-5 or the approved equipment shall require the contractor to conduct a new test pad section and obtain re-approval by the Engineer of the minimum number of passes and rolling pattern. No measurement or payment will be made for test pad sections.

(C) Moisture Control:

The moisture content of the backfill material prior to and during compaction shall be uniformly dispersed throughout each layer. Backfill materials shall have a placement moisture content three percent less than or equal to optimum moisture content, as determined in accordance with the requirements of Arizona Test Method 225 for the reinforced backfill, and AASHTO T 180 for the retained backfill. Backfill material with a placement moisture content in excess of optimum shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift.

(D) Protection of the Work:

The contractor shall not allow surface runoff from adjacent areas to enter the wall construction site at any time during construction operations. In addition, at the end of each day's operation, the contractor shall slope the last lift of backfill away from the wall facing so that runoff is directed away from the structure. If the subgrade is damaged due to water or otherwise, such that it does not meet the requirements of Subsection 929-4.02, then as directed by the Engineer, the contractor shall rework and repair the damaged subgrade at no additional expense to the Department. The criteria in Subsection 929-4.02 shall be used to judge the adequacy of the repair. Rework and repair shall extend to a depth where undamaged work is encountered.

929-5 Method of Measurement:

Mechanically Stabilized Earth (MSE) retaining walls will be measured by the square foot of completed wall, based on the vertical height and length of the retaining wall shown on the plans. The vertical height will be taken as the difference in elevation measured from the top of wall to the minimum embedment reference line as indicated on the plans.

The entire surface of retaining walls shown on the plans, including all wall terminations and cast-in-place coping, will be measured as MSE retaining wall.

929-6 Basis of Payment:

The accepted quantities of Mechanically Stabilized Earth (MSE) retaining walls, measured as provided above, will be paid for at the contract unit price per square foot of wall, complete in place. Such price shall include full compensation for furnishing all designs, design revisions, associated working drawings, engineering calculations, labor, materials, tools, equipment, and incidentals. Such price shall also include provision of manufacturer's field representative, and all work involved in constructing the retaining walls, including foundation preparation, proof-rolling, footings, drainage features, wall facing, slip joints, concrete or shotcrete caps and aprons, rustication, paint or stain, grout, tendons, cables, anchors, fabric, and all hardware and reinforcing steel, complete in place as shown on the plans and as specified herein.

No separate measurement or payment will be made for excavation, reinforced backfill, and retained backfill associated with retaining walls, the cost of such work being considered as included in the price paid for the MSE retaining wall.

No separate measurement or payment will be made for the design, construction, or removal of temporary excavation support systems (shoring), or associated geotechnical review, the cost of such work being considered as included in the price paid for the MSE retaining wall.

April 16, 2010
Project No. 602526001

Mr. Equbalali Charania, P.E.
City of Phoenix
1034 East Madison Street
Phoenix, Arizona 85034

Subject: Addendum No. 1 to Geotechnical Evaluation Dated December 29, 2009
Riverview Drive; 18th Street to 22nd Street
Phoenix, Arizona

Dear Mr. Charania:

In accordance with our proposal dated April 9, 2010, Ninyo & Moore is pleased to submit this addendum to our Geotechnical Evaluation dated December 29, 2009 for the proposed Riverview Drive project from 18th Street to 22nd Street in Phoenix, Arizona.

INTRODUCTION

We understand that the City of Phoenix has decided to use a box culvert placed near the invert of the existing drainage channel to support the new roadway for the proposed project. Furthermore, we understand the City wants AASHTO LRFD design procedures followed for the proposed box culvert and retaining wall structures. As such, this addendum presents our geotechnical recommendations for the box culvert and associated retaining walls in accordance with the guidelines presented in AASHTO LRFD Bridge Design Specifications (2007) design procedures for the project.

RECOMMENDATIONS

The following sections present our geotechnical recommendations for shallow foundations for the box culvert and retaining walls. Recommendations for lateral earth pressures and backfill parameters for the proposed project are also provided. The recommendations below are based on the materials observed in our exploration and the recommendations presented in our report. Ninyo & Moore should be contacted for additional recommendations if the actual design details change from those detailed or assumed in our report.

Shallow Foundations

As noted in our report, we recommend that the proposed culvert base slab and spread type foundations for the planned retaining walls be founded on a zone of moisture-conditioned and compacted engineered fill. This engineered fill zone should extend 5 or more feet below the proposed bottom-of-base-slab or footing elevation and be compacted to a relative compaction of 100 percent in accordance with ASTM D 698 at a moisture content generally near its laboratory optimum.

Following the overexcavation as described above, and prior to the placement of any new fill, the resulting exposed surface should be carefully evaluated by the geotechnical consultant. This evaluation could consist of proof-rolling, soil probing, visual assessment and/or additional laboratory testing. Based on this evaluation, additional remediation may be needed. This additional remediation, if needed, should be addressed by the geotechnical consultant during the earthwork operations.

Based on information from the project team, the concrete box culvert will have approximate base dimensions of 62 feet long by about 17 to 36 feet wide. The box culvert walls will be on the order of 15 feet in height. Retaining walls parallel to the planned roadway (perpendicular to the channel) will be stepped and will be on the order of about 15 feet in length and about 6 to 9 feet wide. Wall heights will be about 9 to 15 feet. For use in design, Factored Bearing Resistance Charts are presented for the proposed box culvert base slab in Figure 1 and for retaining wall footings in Figure 2 and Figure 3.

The factored net bearing resistance on the vertical axis corresponds to the equivalent "net" uniform (Meyerhoff) stress on an equivalent footing with a calculated "effective" footing width B' based on load eccentricity (AASHTO, 2007). The weight of any soil above the footings should be added to the weight of the structure when calculating the total factored equivalent uniform vertical bearing pressure, q_{tveu}. An estimated unit weight of 125 pcf may be assumed for compacted soil density above spread footings. For computing the "net" equivalent uniform vertical bearing pressures, q_{nveu}, the weight of concrete plus soil above base-of-footing level (to finished grade) times the appropriate load factor should be subtracted from q_{tveu}. As an approximation, the difference in unit weights of concrete and soil can be neglected, i.e. use the soil density for the weight of material (concrete plus soil) above base of footing level.

The estimated settlements presented on the Factored Bearing Resistance Charts were calculated as follows:

- A spreadsheet computer program was developed for calculating settlements for various combinations of footing geometry and loading. This spreadsheet is based on the Schmertmann method as presented in NHI-06-089 (FHWA, 2006).
- Values of soil modulus used in the analyses described above were estimated using published sampler blow count correlations presented in Table 5-16 of NHI-06-089 (FHWA, 2006). Field blow counts for both SPT and ring samplers were adjusted to $N1_{60}$ values.

The assumed footing depths and lengths presented on the Factored Bearing Resistance Charts were based on preliminary design information provided to us. A minor change in footing depth or length will not significantly alter the Service Limit Settlement Curves. However, a change in footing depth may have a significant effect on the Strength Limit Curve but it is unlikely the strength limit will govern design. We should be contacted in the event that recommendations are needed for different footing geometry or footing depths.

It should be noted that the settlements noted on the attached design curves represent immediate elastic settlements plus estimated creep for a period of 1 year, based on the existing soil moisture conditions. Long term ponding of water near footings may increase the post-construction settlement. It is our understanding that following excavation and construction of the footings, the area will be backfilled and graded such that water will not pond near newly constructed footings. Although not encountered in our borings, any zones of loose rubble or organic waste in the undocumented fills could result in higher settlements than calculated. Design and construction procedures to tolerate large differential settlements, such as additional reinforcing, more frequent joints, or other measures deemed appropriate by the structural engineer, should be considered.

In accordance with LRFD, culverts that are subject to lateral loadings may be designed using a coefficient of friction of 0.65 for cast-in-place and 0.52 for pre-cast structures (total frictional resistance equals the coefficient of friction multiplied by the dead load). A drained passive resistance value of 700 psf per foot, and an undrained (submerged) passive resistance value of 315 psf per foot of depth, below finished grade can be used to resist lateral loads, as described in the section below. Resistance factors, depicted in AASHTO Table 10.5.5.2.2-1, should be applied appropriately in accordance with the anticipated construction methods, to the parameters presented above for lateral resistance.

Lateral Earth Pressures

The retaining walls associated with this project should be designed in accordance with AASHTO (2007) using the appropriate Resistance Factors. Active earth pressure occurs when the wall moves away from the soil and the soil mass stretches horizontally, sufficient to mobilize its shear strength, and a condition of plastic equilibrium is reached. For a drained granular backfill, an equivalent fluid active earth pressure of 35 psf per foot (psf/ft) of wall height should be used for the design of cantilevered, yielding walls. Drainage measures were provided in our report. If drainage is not provided, an equivalent fluid active earth pressure of 85 psf/ft of wall height should be used for design of the walls. These earth pressures are based on the walls being flexible enough to allow mobilization of the active earth pressure condition. An outward lateral movement of about 0.001H (where H is the height of the wall) at the top of the wall is generally needed to mobilize the active earth pressure condition.

A soil mass that is neither stretched nor compressed is said to be in an at-rest state. If the wall is rigidly restrained, so that it does not rotate sufficiently to reach the active earth pressure condition, at-rest earth pressure conditions will exist. An equivalent fluid at-rest earth pressure of 50 psf/ft should be used for the drained condition, and 90 psf/ft should be used for the undrained condition below the groundwater table.

Passive earth pressure occurs when the wall or foundation moves into the soil and the soil mass is compressed horizontally, mobilizing its shear strength. For below-grade portions of the walls with granular backfill (derived from on-site soils) in front of the toe of the wall, an drained equivalent fluid passive earth pressure of 700 psf/ft of wall height, and an undrained (submerged) equivalent fluid passive earth pressure of 315 psf/ft, can be utilized (triangular pressure distribution). However, since significant movement of the wall will be needed to mobilize full passive earth pressure, passive pressures should be neglected in the design unless analysis indicates that the structure can tolerate this movement, and there is certainty that the soil providing the passive restraint will be present.

If the walls are partially restrained, the actual lateral earth pressure may be somewhere between the active and at-rest pressure conditions. The actual pressure distribution will depend on the stiffness of the wall. Also, any additional lateral wall loads resulting from surcharge loading, such as traffic loads, should be added to the above earth pressures. Precautions should be taken to avoid overstress-

ing of the below-grade walls during backfilling. Temporary bracing of the walls during backfilling may be needed to help avoid this problem.

Soil Backfill Parameters

Soil backfill behind and beneath structures should conform to the general requirements listed in our report for engineered fill. Suitable engineered fill should not include deleterious or organic material, clay lumps, construction debris, rock particles, and other non-soil fill materials larger than 6 inches in dimension. In addition, suitable fill material should exhibit low plasticity and very low to low expansive potential, as noted in our report. As such, many of the on-site soils may be suitable for re-use as engineered fill with appropriate screening or processing, as needed. It is assumed the backfill soils will exhibit a friction angle of 30 degrees or more and will have a total unit weight of 125 pcf or more when compacted in accordance with the project specifications.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE

Registered Professional Engineer (Civil) CERTIFICATE NO. 41716 KEVIN L. PORTER Date Signed 4-16-10 ARIZONA, U.S.A.

Kevin L. Porter, P.E.
Senior Engineer

Registered Professional Engineer (Civil) CERTIFICATE NO. 12875 STEVEN A. HAIRE Date Signed 4-16-10 ARIZONA, U.S.A.

Steven A. Haire, P.E.
Chief Geotechnical Engineer

KLP/SAH/SDN/hle EXPIRES 12/31/2010

EXPIRES 3/31/12

Attachments: Figures 1-3, Factored Bearing Resistance Charts

Distribution: (2) Addressee
(2) Mike Lopez/Stanley Consultants, Inc.

Figure 1
Factored Bearing Resistance Chart
Box Culvert

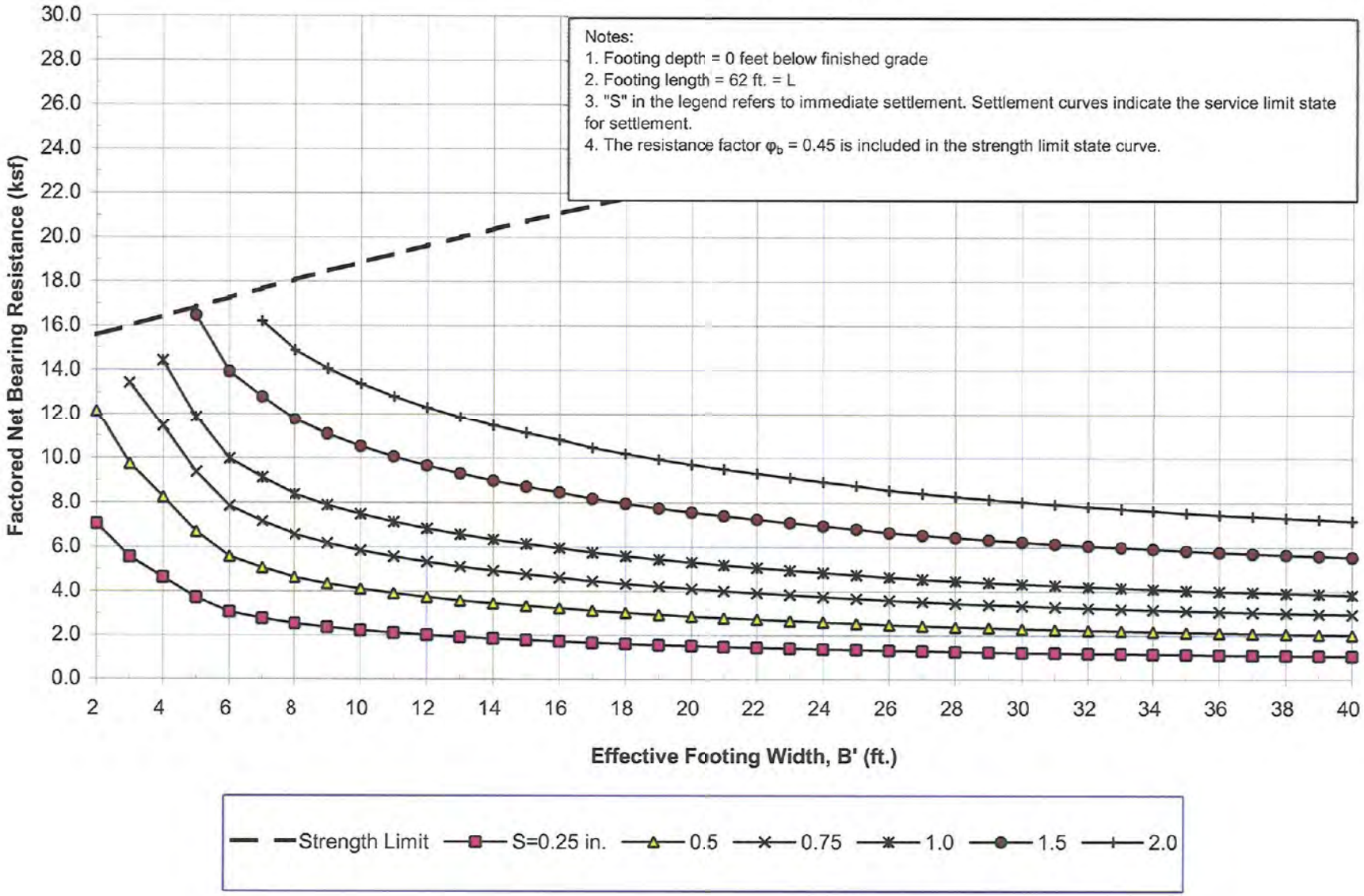


Figure 2
Factored Bearing Resistance Chart
Retaining Wall (H~15')

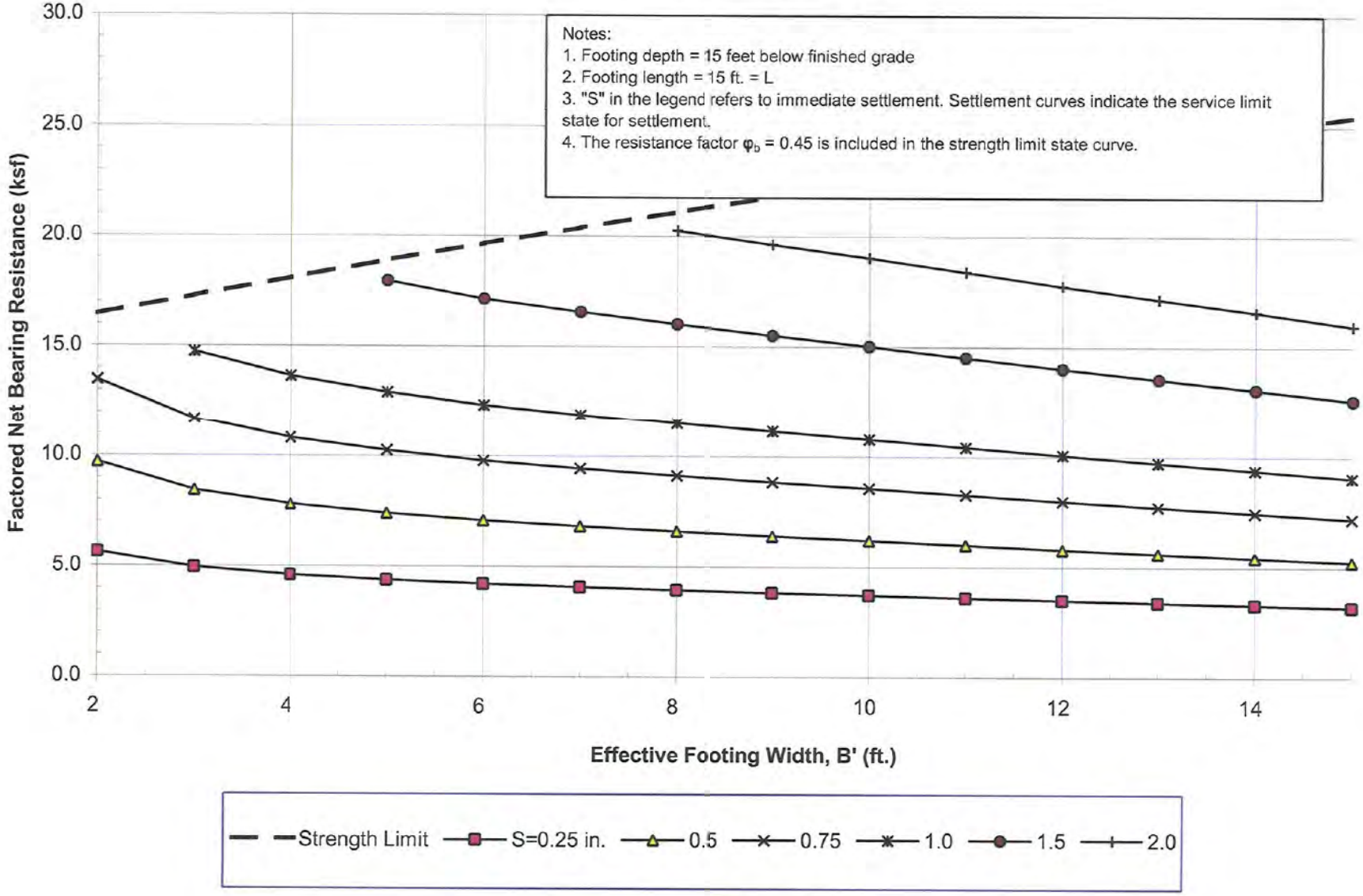
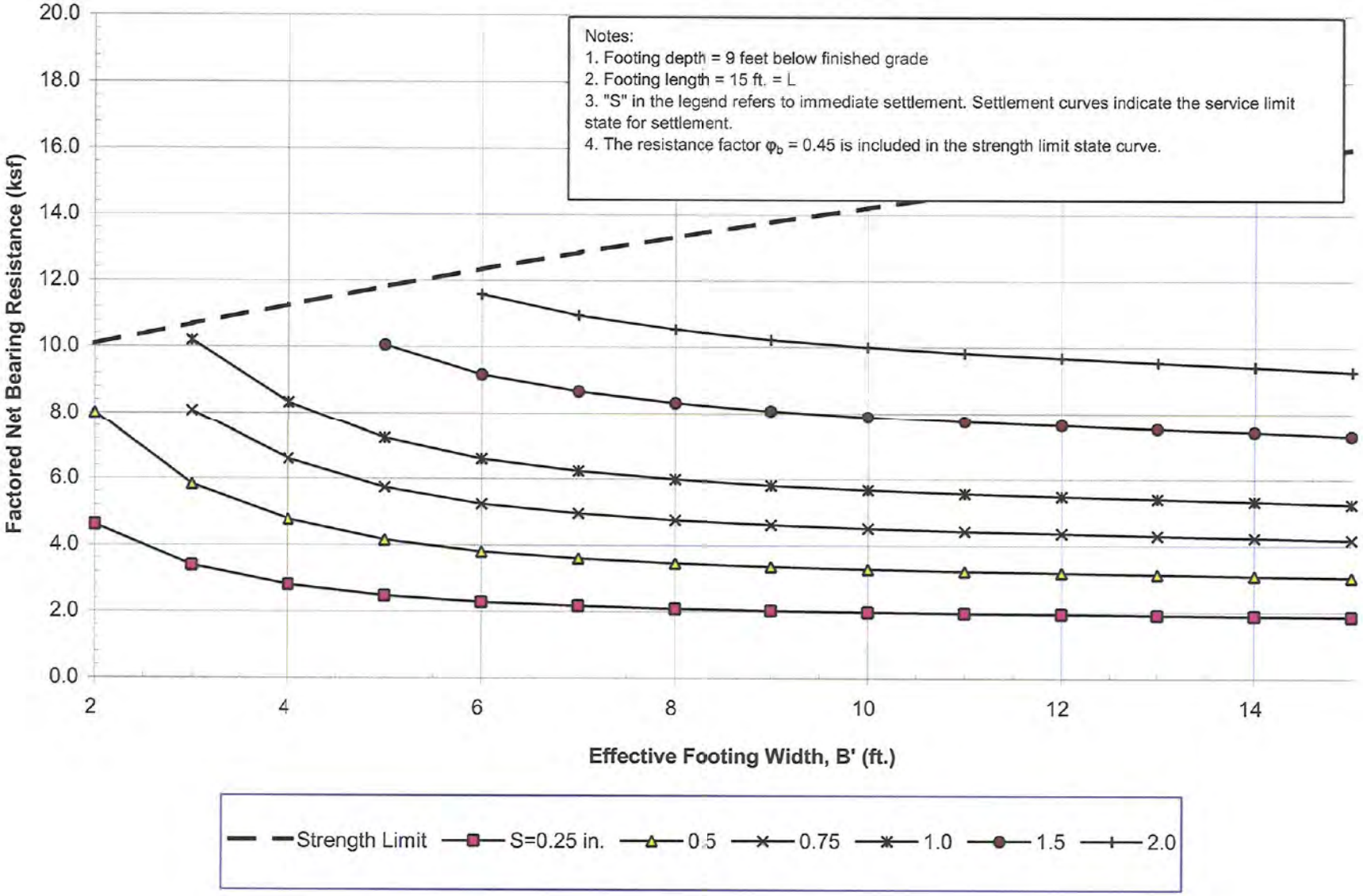


Figure 3
Factored Bearing Resistance Chart
Retaining Wall (H~9')



June 16, 2011
Project No. 602526001

Mr. Equbalali Charania, P.E.
City of Phoenix
1034 East Madison Street
Phoenix, Arizona 85034

Subject: Addendum No. 2 to Geotechnical Evaluation Dated December 29, 2009
Riverview Drive; 18th Street to 22nd Street
Phoenix, Arizona

Dear Mr. Charania:

Per your request, Ninyo & Moore is pleased to submit this Addendum No. 2 to provide additional clarification to our Geotechnical Evaluation dated December 29, 2009 for the proposed Riverview Drive project from 18th Street to 22nd Street in Phoenix, Arizona. This additional clarification address backfill compaction recommendations around or behind structures. Please refer to our original report for compaction recommendations for engineered fill beneath structures.

Soil Backfill

Soil backfill behind and around structures should conform to the general requirements listed in our report for engineered fill. Backfill should be placed in horizontal lifts no more than approximately 8 inches in loose thickness and compacted by appropriate mechanical methods to 95 percent relative compaction as evaluated by ASTM D698 and at a moisture content slightly above the laboratory optimum.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE

Registered Professional Engineer (Civil) CERTIFICATE NO. 41716 KEVIN L. PORTER Date Signed 6-16-11 ARIZONA U.S.A.

Kevin L. Porter, P.E.
Senior Engineer

EXPIRES 12/31/13

Registered Professional Engineer (Civil) CERTIFICATE NO. 12875 STEVEN A. HAIRE Date Signed 6-16-11 ARIZONA U.S.A.

Steven A. Haire, P.E.
Chief Geotechnical Engineer

EXPIRES 03/31/12

KLP/SAH/clj

Distribution: (1) Addressee

September 11, 2015
Project No. 602526001

Mr. Rost Sapon, PE
City of Phoenix
1034 East Madison Street
Phoenix, Arizona 85034

Subject: Addendum No. 3 to Geotechnical Evaluation dated December 29, 2009
Riverview Drive; 18th Street to 22nd Street
Phoenix, Arizona

Dear Mr. Sapon:

Ninyo and Moore (N&M) is pleased to submit this addendum to our Geotechnical Evaluation for the above-mentioned project dated December 29, 2009. Per request from the City of Phoenix (COP), this addendum is being issued to provide American Association of State Highway and Transportation (AASHTO) Load and Resistance Factor Design (LRFD) design parameters for the conventional retaining wall and concrete box culvert associated with the aforementioned project based on the results of our recent subsurface evaluation, laboratory testing, and engineering analysis associated with the adjacent project entitled, "*Geotechnical Evaluation, Arizona Department of Transportation (ADOT), 20th Street and Riverview Drive, Phoenix, Arizona,*" dated September 4, 2015. As such, this addendum presents our geotechnical recommendation for the conventional retaining wall and concrete box culvert in accordance with the guidelines presented in the *AASHTO LRFD Bridge Design Specifications, Customary U.S. Units, 7th Edition, with 2015 Interim Revisions* design procedures for this project.

The following AASHTO LRFD design parameters are recommended for the conventional retaining wall design associated with the "*Geotechnical Evaluation, Riverview Drive; 18th Street to 22nd Street, Phoenix, Arizona,*" dated December 29, 2009:

Design Parameter	Value
Nominal Bearing Resistance, q_{nn}	6,250 psf.
Resistance Factor, ϕ_b	0.45

For the concrete box culvert, we defer to the AASHTO LRFD design recommendations provided in the previously issued addendum associated with the aforementioned project entitled, "*Addendum No. 1 to Geotechnical Evaluation Dated December 29, 2009, Riverview Drive; 18th Street to 22nd Street, Phoenix, Arizona,*" dated April 16, 2010.

We appreciate the opportunity to be of service to you during this phase of both projects.

Sincerely,
NINYO & MOORE

Sabrina N. Perez, EIT
Project Manager

Steven D. Nowaczyk, PE
Managing Principal Engineer

Registered Professional Engineer (Civil)
CERTIFICATE NO. 34866
STEVEN D. NOWACZYK
Date Signed 9-11-15
ARIZONA U.S.A.
Expires 06-30-2016

SNP/JSR/SDN/tlp

Distribution: (1) Addressee (Electronic Copy)

NATIONWIDE PERMIT NUMBER 14

LINEAR TRANSPORTATION PROJECTS

US Army Corps of Engineers
Los Angeles District
Regulatory Division/Arizona Branch

A. General Information

This document is an aid to understanding the terms and conditions of your nationwide permit (NWP) by bringing together information issued separately in; (1) the Federal Register (82 FR 1860-2008)*, (2) the Special Public Notice for NWP "Reissuance of the Nationwide Permits and Issuance of Final Regional Conditions for the Los Angeles District"*, and (3) the Clean Water Act Section 401 water quality certification decisions (401 WQCs)* issued by the White Mountain Apache Tribe, Hopi Tribe, Hualapai Tribe, Navajo Nation, U.S. Environmental Protection Agency, and Arizona Department of Environmental Quality. Please note that website addresses enclosed herein may have been changed and updated since publication of the original document.

1) Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and/or Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401 et seq) the U.S. Army Corps of Engineers (Corps) published the "Issuance and Reissuance of Nationwide Permits" in the Federal Register (82 FR 1860-2008) on January 6, 2017. These NWPs are in effect from March 19, 2017 through March 18, 2022 unless modified, reissued, or revoked before that time. It is incumbent upon the permittee to remain informed of changes to the NWPs.
2) The Los Angeles District of the Corps issued a Special Public Notice (March 22, 2017) announcing final regional conditions for NWPs to ensure protection of high value waters within the State of Arizona.
3) The Los Angeles District of the Corps requested and obtained for the entire State of Arizona the 401 WQC decision for all NWPs on all tribal lands from the White Mountain Apache Tribe, Hopi Tribe, Hualapai Tribe, Navajo Nation, and U.S. Environmental Protection Agency and on all non-tribal lands from the Arizona Department of Environmental Quality.

A description of all NWPs and 401 WQCs can be found in the "Nationwide Permits for Arizona" Special Public Notice.*

***Note:** The Federal Register can be accessed at https://www.gpo.gov/fdsys/pkg/FR-2017-01-06/pdf/2016-31355.pdf

Key Sections:

B. Nationwide Permit Terms (page 1)
C. Nationwide Permit General Conditions (page 2)
D. District Engineer's Decision (page 7)
E. Nationwide Permit Regional Conditions (page 8)
F. 401 Water Quality Certifications (page 8)

B. Nationwide Permit Terms

14. Linear Transportation Projects. Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (*e.g.*, roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: **(1)** the loss of waters of the United States exceeds 1/10-acre; or **(2)** there is a discharge in a special aquatic site, including wetlands. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: For linear transportation projects crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require preconstruction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, ''District Engineer's Decision.'' The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

C. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for a NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. **(b)** Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. **(c)** The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects from Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (*e.g.*, stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. **(b)** If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status. **(c)** Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (*e.g.*, National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: *http://www.rivers.gov/*.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur. **(b)** Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA. **(c)** Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. **(d)** As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs. **(e)** Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. **(f)** If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required. **(g)** Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their World Wide Web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively. (Note: Arizona endangered species information is available at http://www.fws.gov/southwest/es/arizona/Threatened.htm#County List)

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. **(b)** Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106. **(c)** Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. **(d)** For non-

federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. **(e)** Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. . If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. **(a)** Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. **(b)** For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal: **(a)** The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). **(b)** Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal. **(c)** Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. **(d)** For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)). **(e)** Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. **(f)** Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation. (2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). (3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. (4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)). **(g)** Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used

to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs. **(h)** Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. **(i)** Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____

(Transferee)

_____

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: **(a)** A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions; **(b)** A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and **(c)** The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. <u>Activities Affecting Structures or Works Built by the United States</u>. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. <u>Pre-Construction Notification</u>. (a) <u>Timing</u>: Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to

request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2). **(b) <u>Contents of Pre-Construction Notification</u>:** The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed activity; (3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity; (4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act; (8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act; (9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and (10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project. **(c) <u>Form of Pre-Construction Notification</u>:** The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals. **(d) <u>Agency Coordination</u>:** (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district

engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. <u>District Engineer's Decision</u>

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: **(a)** that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; **(b)** that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or **(c)** that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

E. <u>Nationwide Permit Regional Conditions</u>

Of the ten regional conditions effective within the Los Angeles District of the Corps, six apply to projects within Arizona (1-4, 9 and 10). The remaining four regional conditions apply to specific geographic areas, resources, or species not located in Arizona.

The following regional conditions must be complied with for any authorization by a NWP to be valid in the State of Arizona:

Regional Condition 1. For all activities in waters of the U.S. that are suitable habitat for federally listed fish species, including designated critical habitat for such species, the permittee shall design all new or substantially reconstructed linear transportation crossings (e.g. roads, highways, railways, trails, bridges, culverts) to ensure that the passage and/or spawning of fish is not hindered. In these areas, the permittee shall employ bridge designs that span the stream or river, including pier- or pile-supported spans, or designs that use a bottomless arch culvert with a natural stream bed, unless determined to be impracticable by the Corps.

Regional Condition 2. Nationwide Permits (NWP) 3, 7, 12-15, 17-19, 21, 23, 25, 29, 35, 36, or 39-46, 48-54 cannot be used to authorize structures, work, and/or the discharge of dredged or fill material that would result in the "loss" of wetlands, mudflats, vegetated shallows or riffle and pool complexes as defined at 40 CFR Part 230.40-45. The definition of "loss" for this regional condition is the same as the definition of "loss of waters of the United States" used for the Nationwide Permit Program. Furthermore, this regional condition applies only within the State of Arizona and within the Mojave and Sonoran (Colorado) desert regions of California. The desert regions in California are limited to four USGS Hydrologic Unit Code (HUC) accounting units (Lower Colorado -150301, Northern Mojave-180902, Southern Mojave- 181001, and Salton Sea-181002).

Regional Condition 3. When a pre-construction notification (PCN) is required, the appropriate U.S. Army Corps of Engineers (Corps) District shall be notified in accordance with General Condition 32 using either the South Pacific Division PCN Checklist or a signed application form (ENG Form 4345) with an attachment providing information on compliance with all of the General and Regional Conditions. The PCN Checklist and application form are available at: http://www.spl.usace.army.mil/Missions/Regulatory/PermitProcess.aspx. In addition, unless specifically waived by the Los Angeles District, the PCN shall include: **a)** A written statement describing how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States; **b)** Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity as well as the location of delineated waters of the U.S. on the site. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and area (in acres) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the mean high water mark and high tide line, should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation. All drawings shall follow the Updated Map and Drawing Standards for the South Pacific Division Regulatory Program (Feb 2016), or most recent update (available at the South Pacific Division website at: http://www.spd.usace.army.mil/Missions/Regulatory/PublicNoticesandReferences.aspx); **c)** Numbered and dated pre-project color photographs showing a representative sample of waters proposed to be impacted on the project site, and all waters proposed to be avoided on and immediately adjacent to the project site. The compass angle and position of each photograph shall be documented on the plan-view drawing required in subpart b of this regional condition. **d)** Delineation of aquatic resources in accordance with the current Los Angeles District's Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (available at: http://www.spl.usace.army.mil/Missions/Regulatory/Jurisdictional-Determination/).

Regional Condition 4. Submission of a PCN pursuant to General Condition 32 and Regional Condition 3 shall be required for specific regulated activities in the following locations: **a)** All perennial waterbodies and special aquatic sites throughout the Los Angeles District as well as intermittent waters within the State of Arizona for any regulated activity that would result in a loss of waters of the United States. The definition of "loss of waters of the United States" for this regional condition is the same as the definition used for the Nationwide Permit Program. **b)** All areas designated as Essential Fish Habitat (EFH) by the Pacific Fishery Management Council, and that would result in an adverse effect to EFH, in which case the PCN shall include an EFH assessment and extent of proposed impacts to EFH. EFH Assessment Guidance and other supporting information can be found at: http://www.westcoast.fisheries.noaa.gov/habitat/fish_habitat/efh_consultations_go.html. **c)** All watersheds in the Santa Monica Mountains in Los Angeles and Ventura counties bounded by Calleguas Creek on the west, by Highway 101 on the north and east, and by Sunset Boulevard and Pacific Ocean on the south. **d)** The Santa Clara River watershed in Los Angeles and Ventura counties, including but not limited to Aliso Canyon, Agua Dulce Canyon, Sand Canyon, Bouquet Canyon, Mint Canyon, South Fork of the Santa Clara River, San Francisquito Canyon, Castaic Creek, Piru Creek, Sespe Creek and the main-stem of the Santa Clara River. **e)** The Murrieta and Temecula Creek watersheds in Riverside County, California for any regulated activity that would result in a loss of waters of the U.S. The definition of "loss of waters of the United States" for this regional condition is the same as the definition used for the Nationwide Permit Program. **f)** All waterbodies designated by the Arizona Department of Environmental Quality as Outstanding Arizona Waters (OAWs), within 1600 meters (or 1 mile) upstream and/or 800 meters (1/2 mile) downstream of a designated OAW, and on tributaries to OAWs within 1600 meters of the OAW (see http://www.azdeq.gov/index.html). **g)** All waterbodies designated by the Arizona Department of Environmental Quality as 303(d)-impaired surface waters, within 1600 meters (or 1 mile) upstream and/or 800 meters (1/2 mile) downstream of a designated impaired surface water, and on tributaries to impaired waters within 1600 meters of the impaired water (see http://www.azdeq.gov/index.html).

Regional Condition 9. Any requests to waive the applicable linear foot limitations for NWPs 13, 21, 29, 39, 40 and 42, 43, 44, 51, 52, and 54, must include the following: **a)** A narrative description of the affected aquatic resource. This should include known information on: volume and duration of flow; the approximate length, width, and depth of the waterbody and characters observed associated with an Ordinary High Water Mark (e.g. bed and bank, wrack line, or scour marks) or Mean High Water Line; a description of the adjacent vegetation community and a statement regarding the wetland status of the associated vegetation community (i.e. wetland, non- wetland); surrounding land use; water quality; issues related to cumulative impacts in the watershed, and; any other relevant information. **b)** An analysis of the proposed impacts to the waterbody in accordance with General Condition 32 and Regional Condition 3; **c)** Measures taken to avoid and minimize losses, including other methods of constructing the proposed project; and **d)** A compensatory mitigation plan describing how the unavoidable losses are proposed to be compensated, in accordance with 33 CFR Part 332.

Regional Condition 10. The permittee shall complete the construction of any compensatory mitigation required by special condition(s) of the NWP verification before or concurrent with commencement of construction of the authorized activity, except when specifically determined to be impracticable by the Corps. When mitigation involves use of a mitigation bank or in-lieu fee program, the permittee shall submit proof of payment to the Corps prior to commencement of construction of the authorized activity.

F. 401 Water Quality Certification (401 WQC)

A 401 WQC is mandatory for any activity that requires a Clean Water Act Section 404 permit. A 401 WQC is required prior to discharging any dredged or fill material into a water of the United States. Only one of the following 401 WQCs listed below will apply to your project. The geographical location of your project will determine which 401 WQC is applicable. The 401 WQCs issued for this NWP will remain in effect through March 18, 2022.

On all "Non-Tribal Lands", lands that are not part of federally recognized Indian Reservation, the Arizona Department of Environmental Quality (ADEQ) is the agency responsible for issuing the 401 WQC.

On all "Tribal Lands", lands that are part of a federally recognized Indian Reservation, the U.S. Environmental Protection Agency (EPA) is responsible for issuing the 401 WQC except where EPA has delegated the 401 WQC authority to the White Mountain Apache Tribe (Fort Apache Indian Reservation), Hopi Tribe (Hopi Indian Reservation), Hualapai Tribe (Hualapai Indian Reservation), or Navajo Nation (Navajo Indian Reservation).

If "Individual Certification" is required you must apply for, receive, and comply with the 401 WQC issued by ADEQ, EPA, or the appropriate Tribe.

Non-tribal Lands - 401 ADEQ WQCs*

ADEQ 401 WQC definitions:

Not Attaining Waters are surface waters that are identified pursuant to CWA Section 305(b) as not attaining (e.g. not meeting surface water quality standards) and as a result, merit special consideration. The current list of Not Attaining Waters (Category 4A, 4B and 4C) is available on the ADEQ website at www.azdeq.gov.

Native Fill means soil, sand, gravel and other natural materials that are similar in physical, chemical and biological composition to existing natural materials in the project area; and which are free from pollutants in quantities and concentrations that can cause or contribute to an exceedance of applicable Surface Water Quality Standards (SWQS).

ADEQ requires that an applicant submit an application to ADEQ for a Water Quality Certification if the proposed activity will occur within the ordinary high water mark of any of the following: An Outstanding Arizona Water; an impaired water; a water that is listed as not attaining; or a lake.

The following 401 water quality conditions apply to regulated discharges of dredged or fill material occurring within the ordinary high water mark (OHWM) of Waters of the US (WUS) under all applicable NWPs (hereinafter referred to as "certified activities"):

1. Submission of a PCN pursuant to General Condition 32 and Regional Condition 3 shall be required for all waterbodies designated by ADEQ as Not Attaining, within 1600 meters (or 1 mile) upstream and/or 800 meters (or 1/2 mile) downstream of a not attaining water.
2. Any discharge occurring as a result of certified activities of the project shall not cause an exceedance of any Surface Water Quality Standard (SWQS). Applicability of this condition is as defined in A.A.C. R18-11-102.
3. This certification does not authorize the discharge of wastewater, process residues or other waste to any WUS.
4. Runoff of water used for irrigation or dust control for certified activities within WUS shall be limited to the extent practicable and shall not cause downstream erosion, flooding or an exceedance of applicable surface water quality standards (SWQS) in any WUS.
5. Clearing, grubbing, scraping or otherwise exposing erodible surfaces in WUS shall be minimized to the extent necessary for each construction phase or location.
6. Dredged or fill material in WUS shall be placed so that it is stable, meaning after placement, the material does not show signs of excessive erosion, such as gullying, head cutting, caving, block slippage, material sloughing, etc. Dredged or fill material placed in WUS shall not discharge (e.g., via leaching, runoff) pollutants into streams or wetlands at levels exceeding any applicable SWQS.
7. The effectiveness of all pollution control measures, including sediment and erosion control measures, shall be inspected, maintained and modified (as necessary) to reduce pollutants and ensure compliance with SWQS in any WUS.
8. Except where certified activities are intended to permanently alter any WUS, all disturbed areas within WUS shall be restored and (re)vegetated or stabilized. Vegetation shall be maintained on unarmored banks and slopes to stabilize soil and prevent erosion.
9. Silt laden or turbid water resulting from certified activities shall managed in a manner to reduce sediment load prior to discharging so as not to exceed SWQS in any WUS.
10. Any washing or dewatering of fill material must occur outside of any WUS prior to placement.
11. Acceptable fill material that can be placed in any WUS includes: untreated logs and lumber; natural stone (crushed or not), crushed clean concrete (recycled concrete); native fill; precast, sprayed or cast-in-place concrete (including soil cement and unmodified grouts); steel (including galvanized); plastic; aluminum; and other material that is free from pollutants in quantities or combinations that can cause an exceedance of applicable SWQS. Other fill materials may be placed in WUS with prior written approval from ADEQ.
12. Upon completion of the certified activities, areas within any WUS shall be promptly cleared of all forms, pilings, construction residues, equipment, debris and other obstructions, including temporary structures.
13. If fully, partially or occasionally submerged structures in WUS are constructed of cast-in- place concrete instead of pre-cast concrete, applicant will take steps; e.g., sheet piling or temporary dams, to prevent contact between water (instream and runoff) and the concrete until it cures and until any curing agents have evaporated or otherwise cease to be available; i.e., are no longer a pollutant source.
14. Any permanent WUS crossings other than fords, shall be equipped with conveyances that direct untreated runoff away from WUS.
15. Permanent and temporary pipes and culvert crossings in WUS shall be adequately sized to handle expected flow and properly set with end section, splash pads, headwalls or other structures that dissipate water energy to control erosion.
16. Debris will be cleared as needed from culverts, ditches, dips and other drainage structures in any WUS to prevent clogging or conditions that may lead to washout.
17. All temporary structures in WUS constructed of imported materials and all permanent structures, including but not limited to, access roadways; culvert crossings; staging areas; material stockpiles; berms, dikes and pads, shall be constructed so as to accommodate overtopping and resist washout by streamflow.
18. Any temporary WUS crossing, other than fords on native material, shall be constructed in such a manner so as to provide armoring of the stream channel. Materials used to provide this armoring shall not include anything easily transportable by flow.

Tribal Lands - 401 WQCs

Fort Apache Indian Reservation (White Mountain Apache Tribe):	Individual Certification required for all projects.*
Hopi Indian Reservation (Hopi Tribe):	Individual Certification required for all projects.*
Hualapai Indian Reservation (Hualapai Tribe):	Individual Certification required for all projects.*
Navajo Indian Reservation (Navajo Nation):	Individual Certification required for all projects.*

All other Indian Reservations (EPA): 401 WQCs issued by EPA: Contact PM

401 WQC Contact Information

Elizabeth Goldmann
Region IX
U.S. Environmental Protection Agency
75 Hawthorne Street (WTR-8)
San Francisco, California 94105
Telephone: 415- 972-3398
Fax: 415-747-3537
E-mail: Goldmann.Elizabeth@epa.gov

Lionel Puhuyesva
Hopi Water Resources Program
Hopi Tribe
P.O. Box 123
Kykotsmovi, Arizona 86309
Telephone: 928-734-3711
Fax: 928-734-3609
E-mail: lpuhuyesva@hopi.nsn.us

Daniel Pusher
Water Resources
White Mountain Apache Tribe
P.O. Box 816
Ft. Apache, Arizona 85926
Telephone: 928-338-2472
Fax: 928-338-3933
E-mail: DanielPusher@wmat.us

Lee Anna Silversmith
Water Quality Program
Navajo Nation Environmental Protection Agency
P.O. Box 339
Window Rock, Arizona, 86515
Telephone: 928-871-7700
Fax: 928-871-7996
E-mail: leeanna.martinez09@yahoo.com

Alex Cabillo
Water Resource Program Manager
Hualapai Dept. of Natural Resources
P.O. Box 300
Peach Springs, Arizona 86434
Telephone: 928-769-2254
Fax: 928-769-2309
E-mail: acabillo@hotmail.com

Laurie (Rosi) Sherrill
Water Quality Division
Arizona Department of Environmental Quality
110 West Washington Street
Phoenix, Arizona 85007
Telephone: 602-771-4409
Fax: Not available
E-mail: Sherrill.Laurie@azdeq.gov

City of Phoenix
STREET TRANSPORTATION DEPARTMENT

Western Burrowing Owl

(Athene cunicularia)

The purpose of this flyer is to provide City of Phoenix employees and contractors working on City projects with basic knowledge to reduce the risk of impacting western burrowing owls.

Legal Status:
The western burrowing owl is protected under the Migratory Bird Treaty Act of 1918, as amended. All migratory birds and their parts (including eggs, feathers, and nests) are fully protected. They are also protected under Arizona State Law, Title 17-101, Title 17-235, and Title 17-236.

Species Description:

- Small, ground-dwelling owl (mass of approx. 5 oz.)
- Length: 7.6-9.9 inches, with long legs
- Wingspan: approx. 23 inches
- Round head, lacks ear tufts
- Distinct oval facial ruff, framed by a broad, puffy white eyebrow
- Bright yellow iris

Where are they found?

- Dry, open, short grass, treeless plains
- Human dominated landscapes such as:
  - Golf courses, airports
  - Agricultural fields, vacant lots
- Depends on other animals to construct burrows

Identifying an active burrow

- Western burrowing owls use burrows constructed by ground squirrels, badgers, coyotes, tortoises, etc, or may use pipes, culverts, and ditches.
- They may "decorate" the entrance to a burrow with cow, horse, or dog manure, feathers, vegetation, and trash items
- An active burrow may (not always) have owl excrement ("whitewash") and/or pellets near the entrance

How to avoid impacting western burrowing owls:

- Scan ahead as you work
- ***If western burrowing owls or potentially active burrows observed, STOP WORK and MOVE at least 100 feet away from the owl or occupied burrow before resuming work***
  - Do not harass or "shoo" the owl away
- If the project cannot avoid or stay outside 100 feet of the owl or active burrow, call contact listed below

Questions? Need to work within 100 feet of a western burrowing owl or active burrow? Contact a City of Phoenix Street Transportation Department Environmental Quality Specialist:

Ed Checkley (602) 534-3366, (602) 377-8943 (cell), ed.checkley@phoenix.gov
Greta Halle (602) 534-6030, (602) 628-7607 (cell), greta.halle@phoenix.gov

Sources: Arizona Department of Transportation Environmental Planning Group Western Burrowing Owl Awareness Flyer
Arizona Game and Fish Department Animal Abstract: Western Burrowing Owl. Heritage Data Management System

Updated March 2, 2016

Credit: DesertUSA.com/animals/cliff-swallow.html

City of Phoenix
STREET TRANSPORTATION DEPARTMENT

Migratory Bird Treaty Act

(Applies to many birds in Phoenix)

The purpose of this flyer is to provide City of Phoenix employees and contractors with basic knowledge to reduce the risk of impacting species protected by the Migratory Bird Treaty Act.

Migratory Bird Treaty Act (MBTA)

Under the Migratory Bird Treaty Act of 1918, as amended, listed birds and their parts (including eggs, feathers, and nests) are fully protected. They are also protected under Arizona State Law, Title 17-101, Title 17-235, and Title 17-236. The MBTA states that it is illegal to:

- Pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird.
  - 'Take' is defined as to "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."

More information regarding the MBTA can be found at:

- http://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php
- https://www.fws.gov/laws/lawsdigest/migtrea.html

Where/When are they active?

- The nests of birds protected by the MBTA can be found in many places, including trees, shrubs, cacti, cattails, on the ground, in holes in the ground and on man-made structures including culverts, bridges, buildings, etc.
- The breeding cycle of most birds in Phoenix occurs between February 1 and August 31, although there are a few species that may nest outside that period. Some birds may be present year-round and others migrate, often during the late summer/early autumn period.

How to avoid impacting birds protected by the MBTA:

- If your project might impact active bird nests/burrows, work with one of the contacts below during the design process to make appropriate arrangements before the project activity begins. Necessary actions may include active nest surveys, seasonal restrictions, or obtaining a project-specific relocation permit from the U.S. Fish and Wildlife Service.
- When actively working, be aware of your surroundings. If you see a nest that appears active (chirping, aggressive or distracting adult bird behavior, eggs present, etc.) **STOP WORK** within 30 feet of the area and call one of the contacts below.

Questions? Work may impact birds protected by the MBTA? Contact a City of Phoenix Street Transportation Department Environmental Quality Specialist:

Ed Checkley – desk: 602-534-3366 – cell: 602-377-8943 – ed.checkley@phoenix.gov
Greta Halle – desk: 602-534-6030 – cell: 602-628-7607 – greta.halle@phoenix.gov

Updated November 2, 2016

BID PROPOSAL
CITY OF PHOENIX, ARIZONA
OFFICE OF THE CITY ENGINEER
PROJECT TITLE: RIVERVIEW DRIVE 18th PLACE TO 22nd STREET ROADWAY IMPROVEMENTS
PROJECT NO.: ST85110072 - 2
BOND ISSUE OR BUDGET PROJECT

PROPOSAL to the City Engineer of the City of Phoenix.

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

_____
(Print or Type Contractor Name)

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

Understands that construction of this project will be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Uniform Standard Details, latest revision and the City of Phoenix Supplements, latest revision to the MAG Uniform Standard Specifications and Details, except as otherwise required by the project plans and specifications.

No proposal may be withdrawn for a period of 50 days after opening without consent of the Contracting Agency through the body or agent duly authorized to accept or reject the proposal except in the case of federally-assisted projects.

Understands that his proposal will be submitted with a proposal guarantee of cash, certified check, cashier's check or surety bond for an amount not less than ten (10) percent of the amount bid, as referenced in the Call for Bids.

Agrees that upon receipt of Notice of Award, from the City of Phoenix, he will execute the contract documents within 10 calendar days.

Work will be completed within 180 calendar days, beginning with the day following the starting date specified in the Notice to Proceed. The time allowed for completion of the work includes lead time for obtaining the necessary materials and/or equipment and approvals.

The bidder will acknowledge all addenda in writing. By writing the addendum number(s) below, the bidder agrees that this proposal is computed with consideration of the specification book(s) plus any addenda.

ADDENDUM NO.	DATE	ADDENDUM NO.	DATE
_____	_____	_____	_____
_____	_____	_____	_____

City of Phoenix

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
	Project No.: ST85110072-2 Riverview Dr:18th St-22nd St-2				
1 C3080001	Furnish and Install Additional Grounding Rod, Wire, Clamp, Welds and Test, Contingent Item	Each	12.00		
2 C3453001	Adjust Existing Type "A" Water Valve Box & Cover, Contingent Item	Each	4.00		
3 C3456000	Adjusting Frames, Covers, Valve Boxes On Existing Non-City Utilities, Contingent Item	Each	4.00		
4 E6992000	"Allowance For Stormwater Pollution Prevention Best Management Practices (BMP'S)"	Job	1.00	$85,000.00	$85,000.00
5 M1042005	Allowance for Extra Work	Job	1.00	$250,500.00	$250,500.00
6 M2050001	Roadway Excavation, Including Haul	Cu. Yd.	275.00		
7 M2204001	Rock Riprap,	Sq. Ft.	798.00		
8 M2205055	Architectural Gabions	Sq. Yd.	18.00		
9 M3010001	Subgrade Preparation	Sq. Yd.	4,399.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
10 M3100000	Aggregate Base Course	Ton	124.00		
11 M3210101	Asphalt Concrete Surface Course, Type C-3/4"For Driveway, Sidewalk and Parking Lot Connections	Ton	72.00		
12 M3210120	Asphalt Concrete Surface Course, Type D 1/2, 2" Thick	Ton	429.00		
13 M3210130	Asphalt Concrete Surface Course, Type D 1/2, 3" Thick	Ton	112.00		
14 M3210340	Asphalt Concrete Base Course, Type A 1-1/2, 4" Thick	Ton	858.00		
15 M3290100	Emulsified Asphalt For Tack Coat, Type SS-1h	Ton	1.50		
16 M3304100	Power Broom	Hour	20.00		
17 M3400400	Concrete Sidewalk, Std. Detail P-1230	Sq. Ft.	9,222.00		
18 M3400415	Truncated Domes for Sidewalk Ramps	Sq. Ft.	66.00		
19 M3400553	Concrete Driveway Entrance, Std. Detail P-1244	Sq. Ft.	678.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
20 M3400664	Concrete Driveway Entrance, Standard Detail P1255-1 (9" Thick)	Sq. Ft.	482.00		
21 M3402201	Combined Concrete Curb and Gutter, Std. Detail 220, Type "A", H=6"	Lin. Ft.	1,906.00		
22 M3402222	Concrete Single Curb, Std. Detail 222, Type "B"	Lin. Ft.	89.00		
23 M3440001	Salvaged Concrete Header	Lin. Ft.	197.00		
24 M3453001	Adjust Existing Type "A" Water Valve, Standard Detail P-1391 and P-1391-1	Each	4.00		
25 M3500010	Remove Portland Cement Concrete Single Curb; Curb and Gutter; Header Curb or Embankment Curb	Lin. Ft.	356.00		
26 M3500020	Remove Portland Cement Concrete Sidewalk, Driveway, Valley Gutter & Slab	Sq. Ft.	2,153.00		
27 M3500030	Remove Structures, Backfill & Compact	Job	1.00		
28 M3500060	Remove Asphalt Concrete Pavement	Sq. Yd.	1,660.00		
29 M3500110	Remove Existing Fence	Lin. Ft.	270.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
30 M3500300	Miscellaneous Removal and Other Work	Job	1.00		
31 M3500310	Remove Existing Rip-Rap	Sq. Ft.	185.00		
32 M3500315	Remove Gabions	Cu. Yd.	880.00		
33 M3500501	Remove Existing Canal Lining Per Plan	Sq. Yd.	1,554.00		
34 M3515042	Furnish and Install Street Light Per C.O.P. Street Lighting Procedures, Standards and Specifications Manual, latest edition. (Single Arm)	Each	10.00		
35 M4005145	Decorative Steel Fence, Height = 3'- 2"	Lin. Ft.	38.00		
36 M4005156	Decorative Steel Fence, Height = 6'- 0"	Lin. Ft.	114.00		
37 M4012000	Traffic Control Devices	Job	1.00		
38 M4051202	Survey Marker, MAG Standard Det. 120-1, Type "B"	Each	4.00		
39 M4154001	Safety Post / Bollard	Each	1.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
40 M4200014	Gates for Maintenance Road	Each	1.00		
41 M4200075	Chain Link Fence, ADOT Detail C-12.20, Type 2, H=6'	Lin. Ft.	157.00		
42 M4303000	Plant Establishment Guarantee and Maintenance (including water and power if required)	Month	6.00		
43 M4304011	Decomposed Granite, Stabilized for MultiPurpose Trail, 1/4" Minus, 3" Thick	Sq. Ft.	481.00		
44 M4304109	Decomposed Granite For General Landscape, Per Plans and Specifications	Cu. Yd.	42.00		
45 M4305001	1 Gallon Shrub	Each	8.00		
46 M4305005	5 Gallon Shrub	Each	14.00		
47 M4305015	15 Gallon Tree	Each	31.00		
48 M4305024	24" Box, Trees	Each	8.00		
49 M4305915	15 Gallon Cactus	Each	2.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
50 M4307006	Hydroseed, Native Mix	Sq. Ft.	26,109.00		
51 M4400001	Landscape Irrigation System	Job	1.00		
52 M5050017	Concrete Retaining Wall, Per Plans	Sq. Ft.	3,413.00		
53 M5050020	Concrete Wall per Detail on Plans	Lin. Ft.	78.00		
54 M5050041	Reinforced Conrete Parapet Wall, Per Detail on Plans	Cu. Yd.	162.00		
55 M5051535	Concrete Catch Basin, Type "M-1, L=6-Ft" Phx. Supp. Detail P-1569-1	Each	2.00		
56 M5051594	Concrete Catch Basin, Type "R-2,L=3-Ft" Special Detail	Each	2.00		
57 M5052062	Concrete Scupper, MAG Standard Detail 206	Each	1.00		
58 M5052074	Concrete Channel Lining Per Plans	Sq. Yd.	605.00		
59 M5055012	Headwall For 24" Pipe, MAG Standard Details 501-1 And 501-2	Each	1.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
60 M5057093	Inlet Structure per Special Detail	Each	1.00		
61 M5057098	Outlet Structure per Special Detail	Each	1.00		
62 M5057202	2-Barrel Reinforced Concrete Box Culvert per Special Detail	Lin. Ft.	62.00		
63 M5155049	Trash Rack MAG Standard Detail 502-2	Each	1.00		
64 M5200110	Handrail, Phoenix Supp. Detail P-1173 (Mod)	Lin. Ft.	479.00		
65 M6014900	Trenching For Street Light Circuit	Lin. Ft.	1,140.00		
66 M6101850	Allowance for Excess Ductile Iron Fittings, Furnish and Install	Job	1.00	$7,500.00	$7,500.00
67 M6104006	6" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install, With Polywrap	L. F.	19.00		
68 M6104008	8" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install	L. F.	17.00		
69 M6104012	12" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install	L. F.	746.00		

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
70 M6108005	Fire Hydrant Collar	Each	1.00		
71 M6108007	Fire Hydrant, Salvage & Deliver to the City of Phoenix	Each	1.00		
72 M6108010	Relocate Fire Hydrant	Each	1.00		
73 M6153000	Construct Water or Sanitary Sewer Encasement, MAG. St'd. Detail-404	Lin. Ft.	56.00		
74 M6180024	24" Storm Sewer Pipe	Lin. Ft.	328.00		
75 M6180506	Concrete Pipe Collar For 24" Pipe and Larger, COP Standard Detail P-1505	Each	1.00		
76 M6181018	18" Catch Basin Connector Pipe	Lin. Ft.	84.00		
77 M6250020	Storm Sewer Manhole per Detail "A"	Each	1.00		
78 M6255002	Storm Sewer Manhole, per Special Detail "B"	Each	3.00		
79 M6303108	8" Valve, Flg. X MJ, Box and Cover, Furnish & Install	Each	1.00		

City of Phoenix

BID PROPOSAL

Riverview Drive 18th Place to 22nd Street Roadway Improvements

Project No: ST85110072-2

Item No.	Description	Unit	Quantity	Unit Price	Total
80 M6303112	12" Valve, Flg. X MJ, Box and Cover, Furnish & Install	Each	2.00		
81 M6307111	12" X 12" X 8" TEE WITH FLANGED SIDE, FURNISH AND INSTALL	Each	1.00		
82 M6307206	6" 90 Degree Flanged Elbow, Furnish and Install	Each	1.00		
83 M6307207	8" 11 1/4 Degree Flanged Elbow, Furnish and Install	Each	1.00		
84 M6307209	8" 22 1/2 Degree Flanged Elbow, Furnish and Install	Each	1.00		
85 M6307210	12" 11 1/4 Degree Flanged Elbow, Furnish and Install	Each	1.00		
86 M6307212	12" 45 DEGREE FLANGED ELBOW, FURNISH AND INSTALL	Each	6.00		
87 M6307216	16" X 12' FLANGED REDUCER, FURNISH AND INSTALL	Each	1.00		

Project No: ST85110072-2 Riverview Drive18th Place to 22nd Street Roadway Improvements
(Items 1 thru 87)

Total Amount of Construction Bid $ _____

_____ & _____ /100 Dollars

Written Words

PROPOSAL SUBMITTAL

PROJECT TITLE: RIVERVIEW DRIVE 18th
PLACE TO 22nd STREET ROADWAY
IMPROVEMENTS
PROJECT NO.: ST85110072-2

THIS PROPOSAL IS SUBMITTED BY _____

a corporation organized under the laws of the State of _____

a partnership consisting of _____

_____

a joint venture consisting of _____

_____

or individual trading as _____

_____

_____

of the City of _____

FIRM _____

ADDRESS _____

CITY _____ STATE ___ ZIP CODE _____

PHONE _____ VENDOR NO. _____

BY _____
Officer and Title (signature)

_____
Officer and Title (print or type)

_____
Date

_____
WITNESS: If Contractor is an individual
(signature)

_____
ATTEST: If Contractor is Corporation or Partnership
(signature and title)

S U R E T Y B O N D

Project No.: ST85110072 - 2

That we, _____, as Principal, (hereinafter called the Principal) and the _____, a corporation duly organized under the laws of the State of _____, as Surety, (hereinafter called the Surety) are held and firmly bound unto the City of Phoenix as Obligee, in the sum of ten (10) percent of the total amount of the bid of Principal, submitted by him to the City of Phoenix for the work described below, for the payment of which sum, well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents and in conformance with A.R.S. #34-201.

WHEREAS, the said Principal is herewith submitting its proposal for RIVERVIEW DRIVE 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS

NOW, THEREFORE, if the City of Phoenix will accept the proposal of the Principal and the Principal will enter into a contract with the City of Phoenix in accordance with the terms of such proposal and give such Bonds and Certificates of Insurance as specified in the Standard Specifications with good and sufficient Surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter into such contract and give such Bonds and Certificates of Insurance, if the Principal will pay to the City of Phoenix the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal, then this obligation will be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____ A.D., 2018

_____
Principal

_____
Title

_____

_____
Surety

_____
WITNESS:

_____

A.M. BEST RATING:

City of Phoenix

Small Business Enterprise Program

SBE – DESIGN BID BUILD (DBB) CONTRACT CLAUSE

PROJECT #: ST855110072-2 **CONTRACT #: TBD**

PROJECT NAME: Riverview Drive 18th Place to 22nd Street Roadway Improvements

The City of Phoenix Small Business Enterprise Program (SBE) is managed and administered by the Equal Opportunity Department, Contract Compliance Division. Phoenix is one of the fastest growing, multicultural cities in the country and has shown a historical commitment to business diversity. The City strives to advance the economic growth of businesses through its Small Business Enterprise (SBE) Program.

Through a coordinated effort among several city departments, the SBE Program provides SBE certification, procurement opportunities, construction subcontracting utilization, small business management and technical assistance and educational services and networking opportunities.

The Small Business Enterprise (SBE) participation goal for this project is as follows:

SBE Required Goal = 12%

An annual SBE subcontracting participation goal has been established under this Contract. The Prime Contractor is required to demonstrate good faith efforts to utilize certified SBE firms to achieve this goal during the life of this contract.

For purposes of determining the Contractor's actual SBE utilization during and at the end of the project, the Contractor shall meet or exceed their **Proposed SBE Goal Percentage (as indicated on the Submitter's received SBE Utilization Form with their bid submittal)** for the contract, for ***ALL*** work performed on the project, including any amount paid for contingencies and allowances, and selected alternates. **The Proposed Goal shall meet/or exceed the Required Goal.**

For purposes of calculating the Contractor's "Proposed SBE Goal Percentage" on the Contractor's Statement of Proposed SBE Utilization form, bidders must not propose SBE subcontractors from areas identified on the bid form as contingencies and allowances or proposed alternates. Any SBE participation proposed from these areas will be not counted towards meeting the SBE goal requirement necessary for contract award.

The "Total Bid" shall be defined as the total of all the unit prices, or the lump sum total, including alternates and contingencies and allowances. The "Base Bid" shall be defined as the "Total Bid" minus "all proposed alternates" as determined by the project manager. Any additional dollars paid under this contract, including any selected alternate(s), shall be subject to the **Proposed SBE Goal Percentage** listed on the Contractor's Statement of Proposed SBE Utilization form.

SBE PROGRAM DEFINITIONS

Broker, Packager, Manufacturers' Representative, or Jobber means a firm that is not a manufacturer or regular dealer as defined herein.

Commercially Useful Function (CUF) means that a SBE firm is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. A SBE must perform at least 75% of the total cost of its contract with its own work force in order to be determined to be performing a CUF on the contract.

Contract is a written agreement obligating the seller or business enterprise to furnish goods or services as submitted and the Purchaser or Buyer to pay for such goods or services.

Contractor is an individual, partnership, joint venture, corporation or firm that executes a contract with the City to perform services requested by a solicitation or procurement. The Contractor may be direct or through an authorized representative.

Joint Venture (JV) is an association between two or more persons, partnerships, corporations, or any combination thereof, formed to carry on a single business activity. The JV is limited in scope and duration to this contract. The resources, assets and labor of the participants must be combined in an effort to accrue profit.

Manufacturer means a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract.

Purchaser for purposes of this contract means the City.

Regular Dealer or Supplier means a business that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. The firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.

Small Business Enterprise (SBE) means a small business that has been determined to meet the requirements for SBE certification with the City of Phoenix and whose certification is in force at the time of the award of business by the City. A directory of currently certified SBE firm is located at https://phoenix.diversitycompliance.com.

Subcontract a contract at any tier below the prime contract, including purchase orders.

Subcontractor is an individual, partnership, joint venture, corporation or firm that holds a contract at any tier below the prime contract, including purchase orders.

Successful Submitter is a Submitter who has been selected to perform services requested by a solicitation or procurement.

SECTION I. SBE CERTIFIED FIRMS

Only firms certified by the City of Phoenix under Chapter 18, Article VIII of the Phoenix city code are eligible to fulfill the participation goal stated above. A firm's ***certification must be in the trade areas listed on the proposed utilization form and current and in force at the date and time of the bid opening deadline***.

The most current electronic directory of all certified **SBE** firms can be accessed at:

https://phoenix.diversitycompliance.com

If you need to verify certification status, please contact the Equal Opportunity Department at (602) 262-6790 and identify yourself as a prime contractor bidding on this project. Prime contractors should verify that the certifications of the SBE firms are current prior to bid opening. ***If a firm's certification expires and is not renewed prior to the bid-opening deadline, that firm will be ineligible to satisfy the goal.***

SECTION II. SBE BID PROCEDURES

The bid envelope shall contain all information and documents related to the SBE requirements of this section. ***Failure to properly complete the "Contractor's Statement of Proposed SBE Utilization" and "Letter of Intent to Perform as a Subcontractor/Supplier" forms, or submit a fully documented waiver request as described below, will result in bid rejection.*** The required documentation includes:

1. **A Contractor's Statement of Proposed SBE Utilization** - The form shall document the name of each SBE firm that will be awarded a subcontract; services to be performed by each subcontractor; dollar amount to be paid for those services; and the total dollar amount that is being proposed in SBE participation.

2. **A Letter of Intent to Perform as a SBE Subcontractor/Supplier** (required for each SBE subcontractor/supplier proposed) The form shall be completed by the SBE firm that will be awarded the subcontract. The form documents services to be performed by the subcontractor/suppler and the total dollar amount of the subcontract that will be awarded to the SBE. Only the services performed in the area(s) described by the SBE's certification description can be counted towards the SBE goal requirement.

The bidder's proposed utilization of SBE firms to fulfill the participation goal must be submitted on the "Contractor's Statement of Proposed SBE Utilization" form included in the specification packet. Additionally, each of the **SBE** subcontractors/suppliers the bidder is proposing to use to meet the goal requirement on this contract must complete the "Letter of Intent to Perform as an SBE Subcontractor/Supplier" (LOI) form. Both forms must be completed and submitted as part of the bid packet by the bid-opening deadline.

Failure to submit a completed "Contractor's Statement of Proposed SBE Utilization" and signed "Letter of Intent to Perform as an SBE Subcontractor/Supplier" form for each of the proposed SBE firms will result in a bidder being declared non-responsive to the requirements of these specifications and the bid will not be considered. The forms must contain the following:

1. The Certified SBE firm name and the certified trade or services to be performed.
2. The dollar amount of the proposed subcontract to be awarded to each SBE firm.
3. The total dollar amount of all SBE proposed subcontracts.

In instances where an exact dollar amount to be subcontracted with a SBE firm cannot be determined, the bidder shall indicate on Columns 3 and 4 of Part B Section 1 of the "Letter of Intent To Perform as a SBE Subcontractor/Supplier" form the minimum guaranteed hours/units and dollar amount that will be paid to the SBE firm. This situation applies only when a Contractor proposes to utilize a SBE firm that engages in work related to a broker, supplier or; a bid that is based on a per hour charge as in hauling/trucking or construction site security. Please note that this exception does not permit the Prime contractor to complete or modify any other part of the LOI document. Both, the SBE and the bidder must sign the LOI document prior to bid submittal. By signing the document, the bidder affirms that it has not altered or modified the document in any way other than, if applicable, entering the Unit/Hours and Total Quote Amount in Part B SECTION 1.

If a bidder proposes to utilize a firm not certified by the City of Phoenix and/or not certified in the proposed scope of work at the time of bid, the proposed utilization amount for that firm will be deducted from the total proposed SBE utilization amount used for determining if the bidder is responsive to the requirements of this section. Bidder shall not include any amount the SBE firm has indicated in the LOI document as work it will sublet or is not covered in their certification description in the Contractor's Statement of Proposed SBE Utilization form. Only amounts associated with the work to be performed by the SBE, and indicated in the SBE's certification description, may be counted towards the SBE participation goal requirement of this section.

If the reduced proposed SBE utilization is insufficient to meet the established participation goal required for this contract, and no waiver documentation has been submitted, the bidder shall be determined to be **non-responsive** to the requirements of this section and the bid will not be considered.

A certified SBE firm bidding as a Prime Contractor cannot count the work it will self-perform towards meeting the required SBE subcontracting goal.

A "Letter of Intent to Perform as a Subcontractor/Supplier" will be used in determining compliance with the requirements of this section. **The proposed subcontract dollar amount listed for each SBE firm on the "Contractor's Statement of Proposed SBE Utilization" must match the SBE dollar amount indicated in the boxed areas in Parts C, D or E of the signed "Letter of Intent to Perform as a Subcontractor/Supplier."** Failure to submit a completed LOI document with the SBE's and bidder's signatures shall be determined to be **non-responsive** to the requirements of this section and the bid will not be considered.

SECTION III. IF THE BIDDER IS UNABLE TO MEET THE GOAL

A fully documented waiver request detailing why the bidder has been unable to meet the SBE utilization goal in whole, or in part, and the "good faith" effort of the bidder to obtain SBE participation. In order to be viewed as good faith efforts, a bidder's activities must be consistent with all activities that could reasonably be expected from a bidder who was actively and aggressively seeking to meet the SBE goal. To show proof of having exercised good faith efforts in trying to obtain bids from SBE firms to meet the utilization goals. The following factors are illustrative of those matters that shall be considered when judging whether the bidder made "good faith efforts".

1. A cover letter addressed to the Street Transportation Procurement Section clearly indicating whether a full or partial waiver is being requested, the percentage to be waived, and the reasons the waiver is being sought.
2. If a partial waiver is being requested, a Bidder's Statement of Proposed Utilization listing firms that will satisfy the portion of the goal that will be met must be included with the bid proposal. Additionally, a Letter of Intent to Perform as a Subcontractor/Supplier from each SBE firm that is proposed to be utilized must be included with the bid proposal.
3. Proof of contact with SBE firms, including but not limited to, fax logs, telephone logs, mail receipts, etc, including documentation of the number of times that firms were contacted, the dates of contact, and the name, phone number, fax number, and address of the contact person associated with each SBE firm. Solicitation of SBE subcontractors must be consistent with the solicitation of all subcontractors and must clearly demonstrate that SBE firms had sufficient time to submit an effective response.
4. Copies of the documents submitted to all subcontractors requesting their bid. This should include the scope of work to be bid and performed on the project.
5. Copies of bid responses/quotes from all subcontractors who bid to perform work on the project in the areas that SBE firms were also bidding on, including information as to why SBE bids were not considered.
6. Documentation that shows efforts made to provide assistance to SBE firms in the areas of bonding, insurance, or other contracting requirements.
7. Documentation of attendance at the pre-bid conference held for the project.
8. Documentation of contact made with City personnel seeking assistance in identifying eligible SBE firms for contracting opportunities on the project.

SECTION IV. SBE WAIVER PROCEDURES

Requests for a partial or full waiver of the SBE goal for the project including all Good Faith Documentation shall be submitted as part of the bid packet. The request will be reviewed to ensure compliance with the requirements of this section. If the request is determined to meet the requirements, a waiver hearing will be scheduled and the bidder notified of the date, time, and place of the hearing. All waiver hearings are open to the public. However, only the designated representative for the contractor and City staff may participate in the proceedings.

The contractor requesting the waiver may appear at the hearing to present their request and answer questions from the Waiver Review Committee regarding their submittal. The Committee will consider the information and documentation that was submitted at the time of bid. The bidder may not present additional or new information at the hearing. At the conclusion of the hearing process the Committee will make independent recommendations on the request for waiver. The presiding officer, on behalf of the Committee, will provide a written summary of the Committee's recommendations to the City Manager's designee, the City Engineer. The City Engineer will make the final decision to grant or deny the waiver request. The City Engineer's decisions shall be final. The City will notify the contractor regarding the final decision of the City Engineer.

If a partial or full waiver of the SBE goal is granted to a bidder, the bidder shall be considered to have met the project goals and their bid will be considered responsive to the requirements of this section. If a waiver is denied, the bidder is deemed non-compliant and non-responsive to the requirements of this section and their bid will not be considered.

Failure to submit the Contractor's Statement of Proposed SBE Utilization form and a LOI from each SBE firm proposed OR a fully documented waiver request at the time of bid will be cause to determine the bidder non-responsive to the requirements of this section.

SECTION V. LIMITATION OF THE USE OF SUPPLIERS AND BROKERS TO FULFILL THE SBE GOAL

Proposed expenditures to brokers and suppliers can be used to meet the utilization goal, provided that the combined applicable expenditures do not exceed 25 percent (25%) of the total SBE goal requirement. Contractors may count one hundred percent (100%) of the dollars proposed to be paid to a SBE supplier, and all costs associated with fees and commission to be paid to a SBE broker, up to the 25% limitation.

Supplier (or Wholesaler) is defined as firm that does not directly manufacture the product being supplied and has an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A supplier is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

EXAMPLE: *An SBE goal of 5% has been established on a project where the contractor has submitted a base bid of $1,000,000. This results in a dollar goal of $50,000 to be subcontracted to SBE's. The contractor proposes to contract with a SBE supplier for $100,000. Only $12,500, or 25 percent (25%), may be counted towards achievement of the SBE goal for this project. The remaining $37,500 must be achieved through the use of firms that are not suppliers or brokers.*

Broker is defined as firm that arranges or expedites services or transactions through the use of individuals not directly employed by the company. Brokers are not regular suppliers. Only costs associated with the fees and commission paid to the certified firm for providing such services may be applied towards the SBE contract goal.

The following defines the expenditures to SBE firms that are NOT subject to the 25% limitation. The following expenditures may be counted in their entirety towards fulfilling 100% of the utilization goal:

1. Expenditures to certified SBE firms that operate and maintain an establishment or factory to produce, on the premises, the materials or supplies purchased for the contract.
2. Expenditures to a certified SBE fabricator that operates and maintains a factory to substantially alter materials or supplies before resale.
3. Expenditures, including fees and commissions, charged to provide bona fide technical and professional personnel recruitment for the contract. The total cost paid that shall be comparable to the industry standards customarily charged for the same or similar services.
4. Expenditures, including fees and commissions, charged for providing bonds and insurance specifically required for the performance of the contract. The total cost shall be comparable to the industry standards charged for the same or similar services.

All SBE firms proposed to participate on this contract opportunity must be SBE certified by the City of Phoenix prior to the date and time of the bid.

Participation on the contract will be calculated based on that portion (dollar value) of the contract that the SBE actually performs with its own forces. This includes the cost of supplies and materials obtained by the SBE for the work on the contract, ***except*** in cases when; it has been determined by the City *not* to be part of the firm's certification description; the SBE is certified as a "placer", "finisher", or "installer" of those materials only, or when the supplies and/or equipment it uses to perform its work is purchased or leased from the Contractor or its affiliate.

Special emphasis and care should be taken to ensure that the following types of participation are handled properly when preparing your bid packet, as failure to correctly calculate the allowable SBE participation in the following areas shall result in your bid being declared non-responsive if the SBE goal requirement is not met:

Fees & Commissions*:* SBE firms that supply a bona fide service for a fee or commission may be counted only to the extent of the fees or commissions charged by the SBE. This includes, but is not limited to, providing professional, technical, consultant, or managerial services, and bonds or insurance specifically required for the performance of a contract. Fees must be reasonable, not excessive, compared to fees customary for similar services.

EXAMPLE: *A* SBE *firm that supplies uniformed officers for security or traffic control may count only the amounts charged as a commission. The hourly amount paid to the officers may not be counted. If the "per hour" bid amount to the prime contractor is $35, and $25 per hour will be paid to the officers, only $10 per hour can be counted towards achieving the* SBE *goal. If the firm or bidder estimates that there will be 200 hours of work bid at a rate of $35 per hour, only $2,000 of the total $7,000 bid could be counted.*

Trucking & Hauling: The amount of a trucking/hauling subcontract that may be counted towards the utilization requirements may be limited. An SBE must itself own and operate at least one fully licensed, insured, and operational truck that will be used on the contract. In addition, trucks the SBE leases without drivers under a long-term leasing agreement may be considered part of the trucking firm's workforce and counted in full, provided the leasing agreement(s) is/are for a period of not less than 6 months and; **the leased vehicles have been recorded with the City's Equal Opportunity Department's Certification Office prior to the submittal of the LOI document.**

EXAMPLE: *A* SBE *trucking firm uses seven trucks on a job; two are owned by the* SBE *and five are leased from other firms. If two of the five trucks are leased without drivers and the remaining three are leased with drivers from another firm, then the amount paid to the* SBE *for the services provided by the trucks it owns and the two it leases without drivers and operates with its own employees can be counted in full towards meeting the* SBE *requirements. The Contractor may not count any portion of the amount the SBE receives for the two trucks it leases with drivers towards the* SBE *utilization goal.*

SECTION VI. POST AWARD SBE COMPLIANCE INFORMATION - DBB

Submittal of a bid to the City of Phoenix shall constitute an agreement by the bidder to comply with the SBE utilization requirements of this section should the bidder be awarded a contract. This includes, but is not limited to, the following compliance activities:

1. The contractor shall contract, or attempt to contract, in good faith with all SBE firms listed on the Bidder's Statement of Proposed SBE Utilization form submitted with their bid. The subcontract shall be for an amount that is equal to, or greater than, the total proposed dollar amount listed on the form, with the exception of instances where the City changes a scope of work in the contract that would reduce the available work in the subcontractor's area of performance.
2. The contractor shall not reduce any of the proposed SBE scopes of work or amounts indicated on the Bidder's Statement of Proposed SBE Utilization form without first submitting a Request for Exemption and receiving approval in writing from the City's Equal Opportunity Department (EOD), Contract Compliance Division.
3. The contractor shall notify the City of Phoenix Equal Opportunity Department immediately if any firm listed on the Bidder's Statement of Proposed SBE Utilization form refuses to enter into a subcontract or fails to perform according to the requirements of the subcontract.
4. Any reduction of retention by the City to the contractor shall result in a corresponding reduction to subcontractors or suppliers who have performed satisfactory work. The contractor has 14 days from the date their retention reduction takes affect to reduce retention to the subcontractors.
5. The contractor shall return all retention monies to subcontractors at such time as the work originally proposed by the subcontractor, and expressed in the original subcontract agreement, is complete and the purchaser (City) has accepted the work and paid the prime for the work performed by the subcontractor. Retention shall be paid no later than 30 days after such payment is made by the City.
6. The contractor shall act in good faith to meet the contract SBE utilization goal and provide all necessary documentation to show proof of those efforts as requested by the City.

If for any reason the SBE firm is decertified prior to the execution of a subcontract agreement, the bidder shall find additional SBE participation in the amount equivalent to or greater than that which was originally proposed for the SBE firm. Bidder shall make every good faith effort possible in finding a SBE replacement in the proposed trade area first, before considering SBE participation in other trade areas.

SECTION VII. Subcontract Assurances

Each contract signed by the Agency and the Successful Bidder and each subcontract signed by the Successful Bidder with a Subcontractor, including Subcontractors with lower tier Subcontractors must include the following assurances verbatim:

Prompt Payment of Subcontractors *The Contractor and Subcontractor shall promptly pay its lower tier subcontractors, sub consultants, or suppliers upon receipt of payment from the City of Phoenix (Agency).*

Progress Payments: In accordance with the Arizona Revised Statues (ARS), Section 34-221(G), the Contractor(s) shall promptly pay its subcontractors, sub consultants, or suppliers within seven (7) calendar days of receipt of each progress payment from the Agency. Any diversion by the Contractor(s) of payments received for work performed on the contract, or failure to reasonably account for the application or use of such payments, constitutes grounds for a declaration of breach of the contract with the Agency.

Retention Payments: If the Agency reduces the Contractor's retention, the Contractor shall correspondingly, within 14 days, reduce the retentions held against the Subcontractors and suppliers that have performed satisfactory work.

Release of Retention: The Contractor(s) shall ensure prompt and full payment of retentions to Subcontractors and suppliers when their work is complete, the Agency has accepted the work, and the Agency has paid the Contractor for the work. The Contractor shall pay each Subcontractor's and supplier's retention no later than 30 days after the Agency pays Contractor for the completed scope of work.

Changes to Subcontracts and Values *The City of Phoenix prohibits Contractor(s) from altering the Contractor's Statement of Proposed SBE Utilization form without receiving prior, written consent from the City. The Equal Opportunity Department must be informed, in writing, and in advance of the following:*

- *Reduction to the scope of work performed by subcontractors working on the contract*
- *Changes in any of the subcontract values resulting in a reduced dollar amount*
- *Replacement and/or release of any subcontractor after contract award*

Contractor(s) and Subcontractor(s) are required to complete a Request for Exemption Form and have the written approval of the Contract Compliance Office prior to taking action on any of the above listed matters related to SBE subcontractors.

In the event that any provision of this subcontract varies from the provisions of the contract or subcontract, the provisions for SBE contract compliance as contained in Administrative Regulation 1.89, Section IX, shall provide definitive guidance.

Disclaimer: *Nothing in this section prevents the Contractor or Subcontractor from enforcing its subcontract with a lower tier Subcontractor or supplier for defective work, late performance, and other claims arising under the Subcontract.*

SECTION VIII. RECORDS and REPORTING REQUIREMENTS

1. **Records**

During performance of the Contract, the Successful Submitter shall keep all records necessary to document DBE and Small Business participation. The Successful Submitter shall provide the records to the Agency within 72 hours of the Agency's request and at final completion of the Contract. The Agency will prescribe the form, manner, and content of reports. The required records may include but not limited to:

a) A complete listing of all Subcontractors and suppliers on the project;
b) Each Subcontractor's and supplier's scope performed;
c) The dollar value of all subcontracting work, services, and procurement;
d) Copies of all executed Subcontracts, purchase orders, and invoices: and
e) Copies of all payment documentation.

2. **Reports**

a. The contractor shall participate in all compliance reviews determined necessary by the City. This includes, but is not limited to participating in on-site reviews, providing monthly utilization reports of SBE activity, providing signed copies of subcontracts and/or purchase orders with each SBE listed on the Bidder's Statement of Proposed SBE Utilization form, and complying with any and all requests for information the City deems appropriate for effectively monitoring this contract for compliance with the SBE Program requirements.

b. The contractor shall provide regular, monthly report/audit information that will assist us in effectively monitoring your compliance with the SBE Program requirements. This shall include listing all subcontractors working on the contract and reporting payments into the Certification and Compliance System https://phoenix.diversitycompliance.com. Reporting audits shall include all payments received from the City and payments you have issued to all subcontractors and suppliers. **Copies of the first 2 pages of the Pay Request submittal are required with each report. All Monthly audit reports are to be completed online by the 15th of every month.** (https://phoenix.diversitycompliance.com).

i. The total of all payments received from the City during the previous month.
ii. The first two pages of each payment application submitted for those payments.
iii. All payments made to Subcontractors during the previous month.

Before the Agency processes the Successful Submitter's final payment and/or outstanding retention held against the Successful Submitter, the Successful Submitter shall submit to the Agency a final certification of full and final payment to each Subcontractor in the form prescribed by the Agency. The form must be completed and certified by the Successful Submitter's and each Subcontractor's duly authorized agents.

SECTION IX. PERFORMANCE OF A COMMERCIALLY USEFUL FUNCTION

The prime contractor may count only expenditures to SBE subcontractors that perform a commercially useful function in the work of the contract, as defined in Chapter 18 Article VI of the City Code. A "commercially useful function" constitutes performing real and actual services related to the contract.

SBE subcontractors may enter into second-tier subcontracts consistent with normal industry practices. If an SBE subcontracts greater than twenty-five **(25)** percent of the work of their contract, the SBE subcontractor shall be presumed not to be performing a commercially useful function. In this event, the prime contractor will not be allowed to claim any expenditure to the SBE subcontractor.

SECTION X. FAILURE TO COMPLY WITH THE SBE PROGRAM REQUIREMENTS

If the Equal Opportunity Department determines that the contractor will fail, or has failed, to meet the SBE subcontracting goals, and/or has failed to act in good faith to ensure compliance with the SBE conditions of its contract; it shall deem the contractor "noncompliant" and not in good standing. A noncompliant status shall result in the rejection of all future contract bids or offers for all projects or other procurements with the City until such time that the contractor has cured its breaches and demonstrates that it has faithfully performed its approved SBE utilization plan and all other provisions of this article required to be deemed in good standing. In addition to this action, the City may also exercise its option to impose any or all of the following remedies:

1. Withholding from the contractor ten percent (10%) of all future payments on the involved eligible project until it is determined that the contractor is in compliance;

2. Withholding from the contractor all future payments on the involved project until it is determined that the contractor is in compliance

Failure to cure a non-compliance status within the time frame provided by the City may result in further action, including but not limited to imposing any or all of the following sanctions:

1. Rejection of all future bids or offers from the contractor for any eligible project with the City or any of its departments or divisions for a period of (1) year after substantial completion of the contract.

2. Cancellation of the contract.

City of Phoenix

Small Business Enterprise Program

CONTRACTOR'S STATEMENT OF PROPOSED SBE UTILIZATION (DBB)

PROJECT NUMBER/NAME: ST85511072-2 Riverview Drive 18th Place to 22nd Street Roadway Improvements

Required SBE Goal: 12%

	COMPANY NAME	SERVICES TO BE PROVIDED	SUPPLIER-YES/NO May not satisfy more than 25% of the Goal	SBE $$$ AMOUNT from LOI Tables - Sections C, D, or E
SBE FIRMS				

($_____) - ($_____) = ($_____)

Total Bid - Alternates = Base Bid

($_____) ÷ ($_____) X 100 = _____%

Total Proposed SBE Dollars ÷ Base Bid X 100 = Total Proposed SBE Participation %

Total Proposed SBE Dollars

$

Proposed SBE Percentage must equal to or exceed the Required SBE Required Goal Percentage.

All additional contract dollars, including selected alternates, will be subject to the Proposed SBE Goal %. NO rounding allowed.

Do not alter or adjust any dollar amount or percentage on this form; it may have a negative impact on your bid.

I hereby certify by signing below the foregoing SBE firms shall be contracted to work on the trades identified above and/or supply material/equipment for this project.

The information shown above is a **true reflection of the proposed subcontracts**.

COMPANY NAME: _____ EMAIL: _____ PHONE: _____

NAME & TITLE: _____

SIGNATURE: _____ DATE: _____

City of Phoenix

Small Business Enterprise Program

Letter of Intent (LOI) To Perform as an SBE Subcontractor

(THIS FORM ***MUST*** BE COMPLETED BY THE SBE SUBCONTRACTOR – BOTH SBE SUBCONTRACTOR & PRIME SIGNATURE ARE REQUIRED)

Project Number: ST85110072-2 **Contract #:**	**Project Description: Riverview Drive 18th Place to 22nd Street Roadway Improvements**

TO: _____ (Insert Name of Prime Contractor)

FROM: _____ (Insert Name of SBE Firm)

A. The undersigned declares that the firm bidding to perform the work described herein, has been granted certification by the City of Phoenix (COP) as a Small Business Enterprise (SBE) in the area(s) of:

(COP) Certification Description:

B. The undersigned is bidding to perform the following scope(s) of work on the above referenced project:

SECTION 1 - COMPLETE THIS PORTION IF THE SCOPE OF WORK IS BEING BID BY UNIT PRICE OR HOURLY RATE SUPPLIER, BROKER, TRUCKING, HAULING, UNIFORMED OFFICERS MUST USE THIS SECTION			
Scope of Work	**Unit/Hourly Rate**	**# of Units/Hours**	**Total Quote Amount**
			$

SECTION 2 - GENERAL OR SPECIALTY CONSTRUCTION TRADE AREAS MUST USE THIS SECTION	
Scope of Work	**Total Quote Amount**
	$

C. Of the Total Quote Amount reflected in Part B-SECTION 2, the following scope(s) of work with the given amount **will not** be performed by the SBE or **is/are not** covered under the SBE's certification description:

Scope(s) of Work _____ **Amount $**_____

Subtract Amount in Part C above from the Total Quote Amount in Part B-Section 2 =* *$*_____

* ***Only this amount shall be reflected on the Bidder's Statement of Proposed Utilization.***

D. If trucking services are included in Part B - SECTION 1 above, SBE **MUST** complete the following:

Of the Total Quote Amount noted in part B-Section 1, the SBE affirms that the amount of * $_____ shall be performed by drivers the firm employs, and trucks the SBE owns and leases without drivers.

(*The amount referenced above is transferred from Step 9 of the Worksheet (L.O.I.W.-1). *Only this amount shall be on the Statement of Proposed Utilization)*

E. All subcontractors providing Broker or Traffic Control/Security Services indicated in Part B-SECTION 1 above

MUST Complete the Following:

Rate of the SBE's fees/commissions _____%; for a Total Amount in fees/commissions of: $_____

The Percentage and Total Amount referenced above is transferred from Steps 2 and 3 of the Worksheet (page L.O.I. W.-1).
Only the Total Amt in fee/commissions shall be reflected on the Bidders Statement of Proposed Utilization.

Should the prime contractor receiving this form be selected for award of the contract, the undersigned affirms that he/she will enter into an agreement to perform the work bid herein.

_____ _____

(SBE Subcontractor Authorized Signature) (Date)

_____ _____

(Print Name and Title) (Phone Number)

By signing this LOI document, the Prime Contractor affirms that it has not altered or modified this document in any way other than, if applicable, entering the Unit/Hours and Total Quote Amount in Part B SECTION 1.

_____ _____

(Prime Contractor Authorized Signature) (Date)

_____ _____

(Print Name and Title) (Phone Number)

City of Phoenix
Small Business Enterprise Program

LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR/SUPPLIER INSTRUCTIONS AND WORKSHEET - *L.O.I. W.-1*

A Letter of Intent to Perform as a SBE Subcontractor/Supplier (required for each SBE subcontractor/supplier proposed). The form documents services to be performed by the subcontractor/suppler and the total dollar amount of the subcontract that will be awarded to the SBE. Only the services performed in the area(s) described by the SBE's certification description can be counted towards the SBE goal requirement.

Part I. Trucking and Hauling: SBEs should indicate on Part B-Section 1 and Part D, of the LOI form, the information regarding trucks to be used in executing the contract. The City allows the counting of all payments for services provided by trucks which the SBE owns. Trucks which the SBE leases on a long-term basis and are operated with drivers the SBE employs may also be counted in full. The payments for short-term leased trucks, with or without SBE employed drivers cannot be counted.

Only trucks for which leasing agreements have been submitted and approved by EOD as part of the SBE firm's current certification file shall be considered eligible for counting towards the goal.

STEP ONE	STEP TWO	STEP THREE
Value of work expected to be performed by trucks owned by the SBE (2 Trucks)	Value of work expected to be performed by trucks leased (**with drivers**) by the SBE on a long-term basis (2 Trucks)	Combined value of work expected to be performed by other trucking firms and/or trucks leased (**without drivers**) by the SBE (3 Trucks)
$20,000	**$20,000**	**$33,000**

STEP FOUR	STEP FIVE	STEP SIX
Estimated value for services provided by all trucks the SBE will use on the contract**.** **(Add Steps One, Two, and Three)**	Expected value of work performed by trucks not eligible for counting as SBE participation **(Value in Step Three)**	Total estimated value that can be counted for SBE participation **(Subtract Step Five from Step Four)** **$73,000 - $33,000**
$73,000	**$33,000**	**=$40,000**

Part II. Fees and Commissions: Insert the information from below under Step Three-Commission/Fees Percentage and the Countable Amount for SBE Participation into Part E of the LOI form. This part is applicable for the use of uniformed officers to provide traffic control and security and other services provided at an hourly rate by non-employees of the SBE contractor.

(The following information is provided as a sample only)

STEP ONE		
Total Number of Hours	Per Hour Bid Amount	Calculation Formula: Total Gross Bid Amount
200	**$35**	**200 × $35 = $7,000**

STEP TWO			
Per Hour Bid Amount	Officers Hourly Rate	SBE Firm Commission/Fee	Calculation Formula: Fees/Commissions Percentage
$35	**$25**	**$10**	**(10 / 35) * 100 = 28.57%**

STEP THREE		
Gross Bid Amount (from Step One)	Commission/Fee % (from Step Two)	Calculation Formula: Amount Countable for SBE Participation
$7,000	**28.57%**	**$7,000 × .2857 = $2,000**

Part III. Construction Trade Areas: SBE must indicate in the Scope of Work of Part B-Section 2 of the LOI form, ***all*** scope(s) of work associated with the Total Quote Amount. The SBE must complete Part C of the LOI form by entering the Scope of Work and amount not expected to be performed by the SBE or which is not covered under the SBE's certification description. Subtracting this amount from the Total Quote Amount in Part B-Sect. 2 will result in the portion of work that can be counted as SBE participation.

CITY OF PHOENIX
LIST OF MAJOR SUBCONTRACTORS AND SUPPLIERS

PROJECT NO.: ST85110072-2 PROJECT TITLE: RIVERVIEW DRIVE 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS

DESCRIPTION OF WORK OR MATERIALS (CONTRACTOR TO ENTER TRADE/SUPPLIER AREAS)	SELF-PERFORMED BY PRIME CONTRACTOR	SUBCONTRACTOR/SUPPLIER COMPANY NAME (IF NOT SELF-PERFORMED)	CONTACT PERSON	PHONE NUMBER
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			

I hereby certify by signing below that the above listed companies will be utilized to perform work on this project for an amount **equal to or greater than 5% of the base bid**. These companies will not be removed or replaced without prior written approval by the City of Phoenix Project Manager. The City requires, as in Paragraph D – List of Major Subcontractors and Suppliers in the Information for Bidders that ALL vendors are listed or you will be disqualified. If you are self-performing the work, you must still list any suppliers for materials, or list any contractors that will assist you in any form.

COMPANY NAME _____ SIGNATURE _____

NAME & TITLE _____ PHONE NUMBER _____ DATE _____

EMAIL ADDRESS _____

CITY OF PHOENIX
LIST OF ALL SUBCONTRACTORS AND SUPPLIERS

PROJECT NO.: ST85110072-2 PROJECT TITLE: RIVERVIEW DRIVE: 18TH PLACE TO 22ND STREET ROADWAY IMPROVEMENTS

DESCRIPTION OF WORK OR MATERIALS (CONTRACTOR TO ENTER TRADE/SUPPLIER AREAS)	SELF-PERFORMED BY PRIME CONTRACTOR	SUBCONTRACTOR/SUPPLIER COMPANY NAME (IF NOT SELF-PERFORMED)	CONTACT PERSON	PHONE NUMBER
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			
	☐YES ☐ NO			

I hereby certify by signing below that the above listed companies will be utilized to perform work on this project. These companies will not be removed or replaced on the project without prior written approval by the City of Phoenix Project Manager. The City requires, as in Paragraph D - List of All Subcontractors and Suppliers in the Information for Bidders that ALL vendors are listed or you will be disqualified. If you are self-performing the work, you must still list any suppliers for materials, or list any contractor's that will assist you in any form.

COMPANY NAME _____ SIGNATURE _____

NAME & TITLE _____ PHONE NUMBER _____ DATE _____

EMAIL ADDRESS _____

Authorized Contact for this Disclosure Statement

Name:_____

Title:_____

E-mail:_____

Phone number:_____

FAX number:_____

List any other DBA, trade name, other identity, or EIN used in the last five (5) years, the state or country where filed, and the status (active or inactive): (if applicable):_____

_____

_____

Business Characteristics

Business entity type – Please check appropriate box and provide additional information:

☐ Corporation Date of incorporation:_____
☐Limited Liability Company Date organized:_____
☐Limited Liability Partnership Date of registration:_____
☐Limited Partnership Date established:_____
☐General Partnership Date established:_____
☐Sole Proprietor How many years in business?:_____
☐Other (explain) Date Established:_____

Was the business entity formed in the State of Arizona? Yes_____ No_____
If no, indicate jurisdiction where Business Entity was formed:_____

Is the Business Entity currently registered to do business in Arizona with the Arizona Corporation Commission? Yes_____ No_____ Not required _____ (if sole proprietor or general partnership)

Does the Business Entity have a City of Phoenix business privilege license? Yes_____ No_____ If “no” explain and provide detail such as “not required” or “application in progress” or other reason.

Is the Business Entity publicly traded? Yes_____ No_____

Is the responding Business Entity a Joint Venture? Note: If the Submitting Business entity is a Joint Venture, also submit a questionnaire for each Business Entity

comprising the Joint Venture. Yes_____ No_____

Is the Business Entity's Principal Place of Business/Executive office in Phoenix? If "no" does the Business Entity maintain an office in Phoenix? Yes_____ No_____

Provide the address and phone number for the Phoenix office. _____

Is the business certified by Phoenix as a Small Business Enterprise? Yes_____ No_____

Identify Business Entity Officials and principal Owners:

Name(s) _____Title_____Percentage ownership ___%(Enter 0% if not applicable).

Name(s) _____Title_____Percentage ownership ___%(Enter 0% if not applicable).

Name(s) _____Title_____Percentage ownership ___%(Enter 0% if not applicable).

Name(s) _____Title_____Percentage ownership ___%(Enter 0% if not applicable).

Affiliates and Joint Venture Relationships

Does the Business entity have any Affiliates? Yes_____ No_____ Attach additional pages if necessary.

Affiliate name: _____

Affiliate EIN (if available):_____.

Affiliate's primary Business Activity:_____

Explain relationship with Affiliate and indicate percent ownership, if applicable. _____

Are there any Business Entity Officials or Principal Owners that the Business Entity has in common with this Affiliate?_____
Individual's name:_____

Position/Title with Affiliate:_____

Has the Business Entity participated in any joint Ventures within the past three years? Yes_____ No_____
(Attach additional pages if necessary)

Joint Venture Name:_____
Joint venture EIN (if applicable):_____

Identify parties to the Joint Venture:_____

Contract History

Has the Business Entity held any contracts with the city of Phoenix in the last three (3) years? Yes_____ No_____ If “yes” attach a list.

Integrity – Contract Bidding

Within the past three (3) years, has the Business Entity or any Affiliate been suspended or debarred from any government contracting process or been disqualified on any government procurement? Yes_____ No_____

Been subject to a denial or revocation of a government prequalification? Yes_____ No_____

Been denied a contract award or had a bid rejected based upon a finding of a non-responsibility by a government entity? Yes_____ No_____

Agreed to a voluntary exclusion from bidding/contracting with a government entity? Yes_____ No_____

Initiated a request to withdraw a bid submitted to a government entity or made any claim of an error on a bid submitted to a government entity? Yes_____ No_____

Initiated a request to withdraw a bid submitted to a government entity or made any claim of an error on a bid submitted to a government entity? Yes_____ No_____

For each “Yes” answer above, provide an explanation of the issues.

Integrity – Contract Award

Within the past three (3) years has the Business Entity or any Affiliate been suspended, cancelled, or terminated for cause on any government contract? Yes_____ No_____

Been subject to an administrative proceeding or civil action seeking specific performance or restitution in connection with any government contract? Yes_____ No_____

For each “yes” answer, provide an explanation. (Attach explanation on a separate sheet of paper).

Certifications/Licenses

Within the past three (3) years, has the Business Entity or Affiliate had a revocation, suspension, or disbarment of any business or professional permit and/or license? Yes_____ No_____

If “yes” provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, relevant dates, the government entity involved, and any remedial or corrective action(s) taken and the current status of the issues.

Legal Proceedings

Within the past three (3) years, has the Business Entity of any Affiliate:

Been the subject of an investigation, whether open or closed, by any government entity for a civil or criminal violation? Yes_____ No_____

Been the subject of an indictment, grant of immunity, judgment or conviction, (including entering into a plea bargain for conduct constituting a crime)? Yes_____ No_____

Received any OSHA citation and Notification of Penalty containing a violation classified as serious or willful? Yes_____ No_____

Had a government entity find a willful prevailing wage or supplemental payment violation? Yes_____ No_____

Been involved in litigation as either a plaintiff or a defendant involving a copyright or patent infringement violation or an anti-trust violation? Yes_____ No_____

Other than previously disclosed, for the past three (3) years:

(i) Been subject to the imposition of a fine or penalty in excess of $1000 imposed by any government as a result of the issuance of citation, summons or notice of violation, or pursuant to any administrative, regulatory, or judicial determination? Yes_____ No_____

(ii) Been charged or convicted of a criminal offense pursuant to any administrative and/or regulatory action taken by any government entity? Yes_____ No_____

If "yes" provide an explanation of the issue(s), the Business Entity involved, the relationship to the submitting Business Entity, relevant dates, the government entity involved, and any remedial or corrective action(s) taken and the current status of the issues.

Leadership Integrity

If the Business Entity is a joint Venture Entity, answer "N/A – Not Applicable" to questions below:

Within the past three (3) years has any individual previously identified, or any other Business Entity Leader not previously identified, or any individual having the authority to sign, execute, or approve bids, proposals, contracts or supporting documentation with the city of Phoenix been subject to:

A sanction imposed relative to any business or professional permit and/or license? Yes_____ No_____

An investigation, whether open or closed, by any government entity for a civil or criminal violation for any business related conduct? Yes_____ No_____

DLB/dlb/828671V3

City of Phoenix

AFFIDAVIT OF IDENTITY

Your completion of this form is required by Arizona state law. A.R.S. §§ 1-501 and -50 only if you are a sole proprietor.

I, _____(print full name exactly as on document), hereby affirm, upon penalty of perjury, that I presented the document marked below to the City of Phoenix, that I am lawfully present in the United States, and that I am the person stated on the document. (*select one category only*)

☐Arizona driver license issued after 1996.
Print first four numbers/letters from license: ☐☐☐☐

☐Arizona non-operating identification license.
Print first four numbers/letters: ☐☐☐☐

☐ Birth certificate or delayed birth certificate issued in any state, territory or possession of the U.S.
Year of birth: _____; Place of birth: _____

☐ United States Certificate of Birth Abroad.
Year of birth: _____; Place of birth: _____

☐United States Passport.
Print first four numbers/letters on Passport: ☐☐☐☐

☐Foreign Passport with United States Visa.
Print first four numbers/letters on Passport: ☐☐☐☐
Print first four numbers/letters on Visa: ☐☐☐☐

☐I-94 Form with a photograph.
Print first four numbers on I-94: ☐☐☐☐

☐USCIS Employment Authorization Document (EAD). ☐☐☐☐
Print first four numbers/letters on EAD:
***or* Perm. Resident Card (acceptable alternative):** ☐☐☐☐

☐Refugee Travel Document.
Date of issuance: _____; Refugee country: _____

☐U.S. Certificate of Naturalization.
Print first four digits of CIS Reg. No.: ☐☐☐☐

☐ U.S. Certificate of Citizenship.
Date of issuance:_____; Place of issuance: _____

☐Tribal Certificate of Indian Blood.
Date of issuance: _____; Name of tribe: _____

☐Tribal or Bureau of Indian Affairs Affidavit of Birth.
Year of birth: _____; Place of birth: _____

Signed: _____ Dated: _____