

CITY OF PHOENIX, ARIZONA
OFFICE OF THE CITY ENGINEER
DESIGN AND CONSTRUCTION PROCUREMENT



PROJECT SPECIFICATIONS AND CONTRACT DOCUMENTS

ARPA LOCAL DRAINAGE MITIGATION PACKAGE 2
DESIGN-BID-BUILD

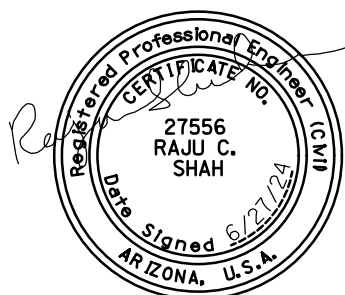
PROJECT NO. ST83140111 16TH STREET TO 18TH STREET
PROJECT NO. ST831401 13 18TH STREET & JACKSON
PROJECT NO. ST83140115 INDIAN SCHOOL & N 28TH STREET
PROJECT NO. ST83140116 33RD AVENUE & TAYLOR STREET
PROJECT NO. ST83140120 32ND STREET & MONTEROSA STREET

PROCUREPHX PRODUCT CATEGORY CODE 91200000
RFx 6000001629

AGREEMENT _____



FOR PROJECT NO. ST83140120



EXPIRES 12/31/2026

TABLE OF CONTENTS

CITY OF PHOENIX PROJECT TITLE: ARPA LOCAL DRAINAGE MITIGATION PACKAGE 2 DBB
CITY OF PHOENIX PROJECT NOS.: ST83140111, ST83140113, ST83140115, ST83140116, ST83140120

SECTION I – Informative

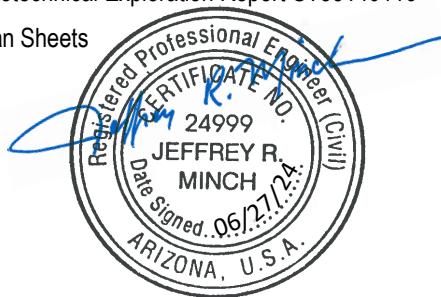
	<u>Page</u>
(1) Call for Bids	C.F.B. - 1 to 3
(2) Information for Bidders	I.F.B. - 1 to 15
(3) Supplementary Conditions	S.C. - 1 to 25
(4) Special Provisions	S.P. - 1 to 31
(5) Project Environmental Requirements Memorandum	P.E.R.M. - 1 to 9
(6) Migratory Birds / Desert Tortoise	2 Pages
(7) Disadvantage Business Enterprise (DBE) Clause	D.B.E.C. - 1 to 11
(8) Equal Employment Opportunity Compliance Report	E.O.C. - 1
(9) Certification with Regard to Equal Opportunity Clause	E.E.O.C. - 1 to 4
(10) American Rescue Plan Act (ARPA) Language	ARPA - 1 to 4
(11) Storm Water Pollution Prevention Plan	S.W.P.P.P - 1 to 12
(12) APS Street Light Pole J-Box Detail	A.P.S. - 1

SECTION II - Submittals

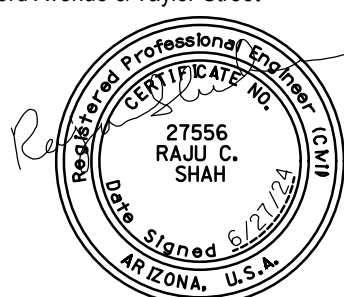
(1) Bid Proposal	P. - 1 to 7
(2) Proposal Submittal	P.S. - 1
(3) Surety Bond	S.B. - 1
(4) DBE Reporting Forms EO2 and EO3	D.B.E.F. - 1 to 2
(5) Certification with Regard to Equal Opportunity Clause	E.E.O.C. - 1
(6) List of Major Subcontractors and Suppliers	L.O.S. - 1
(7) List of All Subcontractors and Suppliers	L.O.S. - 2
(8) Bidder's Disclosure Statement	B.D.S. - 1 to 4
(9) Affidavit of Identity	A.O.I. - 1
(10) Buy America Certificate	B.A.C. - 1
(11) Non-Collusion Affidavit	N.C.A. - 1
(12) Certification of Non-Segregated Facilities	N.S.F. - 1 to 2

SECTION III – Technical Specifications and Drawings

	<u>Pages/Sheets</u>
(1) Geotechnical Exploration Report: ST83140111 – 16th Street to 18th Street	87 Pages
(2) Geotechnical Exploration Report ST83140116 – 33rd Avenue & Taylor Street	89 Pages
(3) Plan Sheets	43 Pages



FOR PROJECT NO. ST83140120



EXPIRES 12/31/2026

CALL FOR BIDS

**CITY OF PHOENIX
ARPA LOCAL DRAINAGE MITIGATION PACKAGE 2
DESIGN-BID-BUILD**

**PROJECT NO. ST83140111 16TH STREET TO 18TH STREET
PROJECT NO. ST83140113 18TH STREET & JACKSON STREET
PROJECT NO. ST83140115 INDIAN SCHOOL ROAD & N 28TH STREET
PROJECT NO. ST83140116 33RD AVENUE & TAYLOR STREET
PROJECT NO. ST83140120 32ND STREET & MONTEROSA STREET**

**PROCUREPHX PRODUCT CATEGORY CODE 912000000
RFx 6000001629**

**BIDS WILL BE DUE: TUESDAY, JULY 30, 2024 AT 2:00 P.M.
SUBMITTED INTO THE DESIGN AND CONSTRUCTION PROCUREMENT BID BOX
LOCATED ON THE 1ST FLOOR LOBBY OF THE PHOENIX CITY HALL BUILDING,
200 W. WASHINGTON STREET, PHOENIX, ARIZONA, 85003**

**BIDS WILL BE READ: TUESDAY, JULY 30, 2024 AT 2:00 P.M.
ON 5TH FLOOR, ROOM 5 WEST
PHOENIX CITY HALL
200 W. WASHINGTON STREET
PHOENIX, AZ 85003-1611
*All times are local Phoenix time**

SCOPE OF WORK

The City of Phoenix is seeking a qualified contractor to provide construction services for the four ARPA Local Drainage Mitigation projects listed below. These projects are being combined into one package to deliver efficiencies and obtain economies of scale.

This project will utilize federal funds and is subject to the requirements of Federal Regulations under the American Rescue Plan Act (ARPA) program. Participation in the Disadvantaged Business Enterprise Program is highly encouraged.

No DBE goal has been established for this project.

The City of Phoenix, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252.42 U.S.C. §§ 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

PROJECT NO. ST83140111 16TH STREET TO 18TH STREET

The project is located along Madison Street – South 16th Street to S 16th Place North to Madison Street. The work will include the installation of 15", 18", 24", 30", 36", and 42" storm drain pipes, catch basins, manholes, and/or inlet structures. The project will also include installation, removal and replacement of asphalt-concrete pavement, microseal, valley gutters, sidewalk, curb and gutter. Removal of existing pumps and disconnected of related electrical lines.

PROJECT NO. ST83140113 18TH STREET & JACKSON STREET

The project is located at East Jackson Street and South 18th Street. The work will include the installation of 18" storm drain pipes, catch basins, manholes, and/or inlet structures. The project will include a vertical waterline realignment and connection. The project will also include installation, removal and replacement of asphalt-concrete pavement, microseal, and removal and replacement of an existing street sign.

PROJECT NO. ST83140115 INDIAN SCHOOL ROAD & N 28TH STREET

The project is located just west of the adjacent intersection of East Indian School Road and North 28th Street. The work will include the installation of 18" storm drain pipes, catch basins, manholes, a tee, and/or inlet structures. The project will also include installation, removal and replacement of asphalt-concrete pavement, microseal, sidewalk, curb and gutter.

PROJECT NO. ST83140116 33RD AVENUE & TAYLOR STREET

The project begins at West Polk Street at North 35th Avenue and progresses east to North 33rd Avenue where it turns north on North 33rd Avenue and terminates at West Taylor Street. The work will include the installation of 15", 18", 24", and 30" storm drain pipes, catch basins, manholes, and/or inlet structures. The project will also include installation, removal and replacement of asphalt-concrete pavement, microseal, valley gutters, sidewalk, valley gutters, curb and gutter. The project will include the installation of a restrained joint, vertical waterline realignment, installation of a dip tee and valve, and a fire hydrant reconnection. Removal of ACP waterlines and a service valve. Removal and resetting of a survey monument. Removal and replacement of an existing traffic sign.

PROJECT NO. ST83140120 32ND STREET & MONTEROSA STREET

The project is located at West Monterosa Street and North 32nd Street. The work will include the installation of 12" and 15" storm drain pipes, catch basins, manholes, and/or inlet structures. Installation of check valves. The project will also include installation, removal and replacement of asphalt-concrete pavement, microseal, slurry seal, valley gutters, sidewalk, valley gutters, curb and gutter.

PRE-BID MEETING

A pre-bid meeting for this project will be held on Tuesday, July 9, 2024, at 11:30 a.m., at 200 W. Washington Street, City Hall, 5th Floor, 5 West Conference Room. 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.

This pre-bid meeting will also include the pre-bid for the ARPA Local Drainage Mitigation Package 1 Design-Bid-Build REBID.

REQUEST FOR BID PACKET

On June 27, 2024, the bid packet may be downloaded from the City of Phoenix's eProcurement site at:

<https://eprocurement.phoenix.gov/irj/portal>

(OR)

the City of Phoenix's "Solicitations" web page as. The web address is:

<https://solicitations.phoenix.gov>

Firms receiving a copy of the bid packet through any other means are strongly encouraged to download the bid packet from the City webpage.

Firms must be registered in eProcurement <https://www.phoenix.gov/finance/vendorsreg> as a vendor.

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 Annette Perez at (602) 273-3488 or calling TTY 711. 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 Annette Perez at (602) 273-3488 or annette.perez@phoenix.gov.

Jeffrey Barton
City Manager

Eric J. Froberg, PE
City Engineer

Published: Arizona Business Gazette
Date: June 27, 2024
Date: July 4, 2024
Districts: 3, 4, & 6

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 shall 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://solicitations.phoenix.gov>

OR

<https://eprocurement.phoenix.gov/irj/portal>

For additional information prior to submitting your bid, contact:

Plans, Technical/Special Provisions, Proposal or Specifications:

NAME: Annette Perez, Design and Construction Procurement

ADDRESS: 200 W. Washington Street, 5th Floor, Phoenix, AZ 85003-1611

PHONE: (602) 273-3488 E-MAIL: annette.perez@phoenix.gov

DBE Utilization contact:

Equal Opportunity Department: (602) 262-6790

All questions regarding the plans and specifications must be received (in writing) at a minimum seven 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 calendar days prior to the established bid date. Notification of acceptable substitutions will be made by addendum issued no fewer than seven calendar days prior to the established bid date. (A.R.S. 34-104)
2. The prime bidder, at his own expense, shall 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 Annette Perez, 5th floor, Phoenix City Hall, 200 W. Washington Street, Phoenix, Arizona 85003-1611 or via email to annette.perez@phoenix.gov.

C. **BID BOND**

Bidders must submit a properly completed proposal guarantee in the form of certified check, cashier's check, or surety bond on the form provided, for an amount not less than ten 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 shall 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 shall 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 shall not be executed by an individual surety or sureties even if the requirements of Section 7-101 are satisfied. The certified check, cashier's check, or surety bond will be returned 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 L.O.S.-1 "List of Major Subcontractors and Suppliers" form.

To assist in eliminating the practice of bid shopping on City construction projects, the Bidder shall list all Major Subcontractors and Suppliers 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 L.O.S.-1 "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 or City-affiliated construction projects for a period of one year.

The list of All Subcontractors and Suppliers shall be provided on the L.O.S.-2 "List of All Subcontractors and Suppliers" form. This form is due three calendar days after bid opening by 5:00 p.m. All bidders will be required to submit the L.O.S.-1 form. The three lowest bidders will be required to submit the L.O.S.-2 form. If the L.O.S.-2 form is not submitted by the post-bid deadline, the Bidder will still be required to submit the document prior to award. If the Bidder fails to submit the required L.O.S.-2 form by the post-bid deadline, the Bidder's bid bond may be placed in jeopardy because the City may make a claim against the Bidder's bid bond for the cost difference between the lowest responsive and responsible Bidder's bid and the next lowest bid (and any additional costs involved in awarding the contract to the next lowest responsive and responsible bidder).

E. **BID SUBMITTAL**

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

Bid of (Firm's Name, Address and Phone Number)

For: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build

City of Phoenix Project Numbers: ST83140111, ST83140113, 83140115, ST83140116 and ST83140120

Sealed bids will be submitted to the bid box located on the first 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 hereby 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 shall 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. Any changes to the plans, drawings and specifications will be in the form of an addendum.

It shall 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 Design and Construction Procurement. All addenda issued shall 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://eprocurement.phoenix.gov/irj/portal>

(OR)

the City of Phoenix’s “Solicitations” web page. The web address is:

<https://solicitations.phoenix.gov>

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 Design and Construction Procurement website to ascertain if any addenda have been issued for the project.

H. **BID SUBMITTAL CHECKLIST**

All firms must be registered in the City’s Vendor Management System prior to submitting a bid. 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 bid proposal package/envelope. Information on how to register with the City is available at:

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

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.

- Acknowledge all addenda? (Page P.-1)
- Completed all of the Bid Proposal forms? (Pages P-2 to P-7 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 Certification with Regard to Equal Opportunity Clause for Contractor and Subcontractors (E.E.O.C.-1)
- Completed Documentation of DBE Small Business Outreach Efforts Form EO2, Columns A through D; Instructions are found in Section IV on pages DBEC-4 to 6 (Form EO2)
- Completed List of Major Subcontractors and Suppliers form? (Page L.O.S.-1)
- Buy American Certificate (Page B.A.C.-1)
- Non-Collusion Affidavit (Page N.C.A.-1)
- Certification of Non-Segregated Facilities (Page N.S.F.-1)

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

POST-BID SUBMITTAL CHECKLIST

The three lowest bidders must submit completed contracts documents listed below, no later than three calendar days after bid opening by 4:00 p.m. The documents must be submitted to Design and Construction Procurement, 5th Floor, or can be sent by email to annette.perez@phoenix.gov.

- Completed List of All Subcontractors and Suppliers form (L.O.S.-2)
- Completed Documentation of DBE Small Business Outreach Efforts with supporting documentation, Columns E and F (Form EO2); Instructions and supporting documentation are found in Section IV on pages DBEC-4 to 6 (Form EO2)
- Completed Small Business Utilization Commitment (Form EO3)
- Bidders Disclosure Statement (Pages B.D.S.-1 to 4)
- Submit Affidavit of Identity (if you are a sole proprietor) (Page A.O.I.-1)

PRIOR TO CONTRACT EXECUTION

- Contractor must provide proof of license required to perform the work.
- Verification of Experience Modification Rate (EMR) – the awarded company will be required to provide an EMR verification letter from the insurance company prior to contract execution.

***ALL DOCUMENTS NOTED AS REQUIRED IN SUBCONTRACTS MUST BE INCLUDED IN EVERY SUBCONTRACT THAT IS UPLOADED INTO THE B2G SYSTEM.**

I. **PERMITS**

CITY RESPONSIBILITY – The City will be responsible for City of Phoenix review and permit(s) fees for building and demolition permits. The City will also pay review fees for grading and drainage, water, sewer, and landscaping. The City will also pay for utility design fees for permanent services.

CONTRACTOR RESPONSIBILITY – The Contractor will be responsible for all other permits and review fees not specifically listed above. The Contractor is responsible for the cost of water meters, water and sewer taps, fire lines and taps, and all water bills on the project meters until the project is accepted. Arrangements for construction water are the Contractor's responsibility.

The Contractor may elect to use a City fire hydrant for its source of construction water only if an existing water service connection is unavailable or inadequate. The Contractor will be required to comply with Phoenix City Code Section 37-13A.

The Contractor is specifically reminded of the need to obtain the necessary environmental permits or file the necessary environmental notices. Copies of these permits and notices must be provided to the City's Project Manager prior to starting the permitted activity. In the case of Fire Department permits, a copy of the application for permit will also be provided to the Project Manager. This provision does not constitute an assumption by the City of an obligation of any kind for violation of said permit or notice requirements.

J. **WORKFORCE REPORTING REQUIREMENTS**

The contractor shall submit payrolls electronically through the internet to the City of Phoenix web-based certified payroll tracking system. The City of Phoenix uses the "LCP Tracker" website to track the certified payroll information. Additional information regarding the use of this system is available at <https://lcptracker.net>. This requirement shall also apply to every lower-tier subcontractor that is required to provide weekly certified payroll reports.

K. **PAYMENT WITHHOLDING**

Payrolls, including subcontractor's payrolls, must be submitted weekly no later than seven days after each pay period ending date. Payments may be withheld in part or in full until payrolls are received and reviewed to assure compliance with the Federal Labor Standards.

Failure to clarify, when requested, discrepancies between hourly wages paid individual workers and the minimum hourly wages required by the Federal Wage Decisions contained in the contract documents may affect the complete or timely release of payments.

L. **BUSINESS AND OPERATION LICENSES, PERMITS AND CERTIFICATIONS REQUIRED**

It is the responsibility of the bidder to determine whether it has the appropriate contracting licenses to perform the work. The City will make the award, if any, to the lowest responsive, responsible bidder who has the proper licenses. For all projects except Federal-aid funded projects, the bidder must have the proper licenses at the time the bid is submitted to the City. On Federal-aid funded projects, the bidder is not required to have the licenses at the time of bidding, but it must procure the licenses before award can be made, and no later than 60 days after the date bids are opened. Licensing information is available from the Arizona Registrar of Contractors.

Prior to award of the contract, the successful bidder must provide Design and Construction Procurement its Contractor's License Classification and number, its City of Phoenix Privilege License number and Federal Tax Identification number.

Bidder shall submit the Bidder's Disclosure Statement as set forth in Pages B.D.S. - 1 to B.D.S.

- 4 within three calendar days of bid opening by 5:00 p.m. Bidder will be deemed non-responsive and the bid rejected if Bidder fails to submit a substantially completed Bidder's Disclosure Statement as specified above.

M. TAX LIABILITIES; DISCLOSURE OF CONVICTIONS AND BREACH(ES) OF CONTRACT

On or before the award of the contract for this project, the successful bidder shall: (i) file all applicable tax returns and shall 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 shall be deemed non-responsive 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 review the price or offer submitted and will not deduct, add or alter pricing based on taxes.

If you have questions regarding tax liability, seek advice from a tax professional prior to submitting bid. 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.

For purposes of A.R.S. 42-5075(P), this contract is subject to A.R.S. Title 34.

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.

N. STANDARD SPECIFICATIONS AND DETAILS

Except as otherwise required in these specifications, bid preparation and construction of this project shall be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Uniform Standard Details, latest edition, the City of Phoenix Supplements to the MAG Uniform Standard Specifications and Details, latest edition, and the Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction, latest edition.

O. 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 edition
6. MAG Standard Specifications and Details, latest edition
7. ADOT Standard Specifications for Roads and Bridges Construction, latest edition

The precedence of any Addenda falls within the category of which it represents. The bid items and special provisions shall take precedence over the quantities shown on the plans. Items shown on the plans but not shown in the bid items shall be considered informational and cost shall be incidental and included in the bid items.

P. 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."

Q. 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 shall be kept on the basis of generally accepted accounting principles and must be made available to the City and its auditors for up to five 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 shall 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 shall be liable for reimbursement of the reasonable, actual cost of the audit.

R. **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.

S. **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 shall 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.

T. **CONTRACTOR AND SUBCONTRACTOR WORKER BACKGROUND SCREENING**

Contractor agrees that all Contractor's and subcontractors' workers (collectively "Contract Worker(s)") pursuant to this Agreement will be subject to background and security checks and screening (collectively "Background Screening") at Contractor's sole cost and expense, unless otherwise provided for in the scope of work. Contractor's background screening will comply with all applicable laws, rules and regulations. Contractor further agrees that the background

screening is necessary to preserve and protect the public health, safety and welfare. The City requires a completed Contract Worker Badge/Key/Intrusion Detection Responsibilities Agreement for each Contract Worker who requires a badge or key.

Background Screening Risk Level: The City has established two levels of risk: Standard and Maximum risk. The current risk level and background screening required is **N/A**. If the scope of work changes, the City may amend the level of risk, which could require the Contractor to incur additional contract costs to obtain background screens or badges.

Terms of This Section Applicable to all Contractor's Contracts and Subcontracts: Contractor will include Contract Worker background screening in all contracts and subcontracts for services furnished under this agreement.

Materiality of Background Screening Requirements; Indemnity: The background screening requirements are material to City's entry into this agreement and any breach of these provisions will be deemed a material breach of this contract. In addition to the indemnity provisions set forth in this agreement, Contractor will defend, indemnify and hold harmless the City for all claims arising out of this background screening section including, but not limited to, the disqualifications of a Contract Worker by Contractor. The background screening requirements are the minimum requirements for the Agreement. The City in no way warrants that these minimum requirements are sufficient to protect Contractor from any liabilities that may arise out of the Contractor's services under this Agreement or Contractor's failure to comply with this section. Therefore, Contractor and its Contract Workers will take any reasonable, prudent and necessary measures to preserve and protect public health, safety and welfare when providing services under this Agreement.

Continuing Duty; Audit: Contractor's obligations and requirements will continue throughout the entire term of this Agreement. Contractor will maintain all records and documents related to all background screenings and the City reserves the right to audit Contractor's records.

CONFIDENTIALITY AND DATA SECURITY: All data, regardless of form, including originals, images and reproductions, prepared by, obtained by, or transmitted to Contractor in connection with this Agreement is confidential, proprietary information owned by the City. Except as specifically provided in this Agreement, the Contractor shall not disclose data generated in the performance of the service to any third person without the prior written consent of the City Manager or his/her designee.

Contractor agrees to abide by all current applicable legal and industry data security and privacy requirements and to notify the City immediately if the scope of work changes or personal identifying information or information subject to the Payment Card Industry Standards becomes part of the Agreement.

Contractor agrees to comply with all City information security and technology policies, standards, and procedures when accessing City networks and computerized systems whether onsite or remotely.

A violation of this Section may result in immediate termination of this Agreement without notice. The Obligations of Contractor under this Section shall survive the termination of this Agreement.

SECURITY INQUIRIES: Contractor acknowledges that all of the employees that it provides pursuant to this Contract shall, at Contractor's expense, be subject to background and security checks and screening at the request of the City. Contractor shall perform all such security inquiries and shall make the results available to the City for all employees considered for performing work (including supervision and oversight) under this Contract. City may make further security inquiries. Whether or not further

security inquiries are made by the City, City may, at its sole, absolute and unfettered discretion, accept or reject any or all the employees proposed by the Contractor for performing work under this Contract. Employees rejected by the City for performing services under this Contract may still be engaged by Contractor for other work not involving the City. An employee rejected for work under this Contract shall not be proposed to perform work under other City contracts or engagements without the City's prior approval.

The City, in its sole discretion, reserves the right, but not the obligation to:

- require an employee/prospective employee of the Contractor to provide fingerprints and execute such other documentation as may be necessary to obtain criminal justice information pursuant to A.R.S. 41-1750 (G) (4);
- act on newly acquired information whether or not such information should have been previously discovered;
- unilaterally change its standards and criteria relative to the acceptability of Contractor's employees and/or prospective employees; and
- object, at any time and for any reason, to an employee of Contractor performing work (including supervision and oversight) under this Agreement. Contractor will bear the costs of all inquiries requested by the City.

U. 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.

V. LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

If practical, the contractor shall 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.

W. 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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.

X. **PROTEST PROCEDURES**

Any bidder who has any objections to the awarding of a contract to any bidder by the City of Phoenix, pursuant to competitive bidding procedures, shall comply with Phoenix City Code Chapter 2, Section 188.”

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

1. 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;
2. 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
3. Data which is required to be disclosed by virtue of law, regulation, or court order, to which the Contractor or its subcontractors 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 shall first notify the City as set forth in this section of the request or demand for the data. The Contractor or its subcontractors shall 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 shall promptly deliver, as set forth in this section, a copy of all data to the City. All data shall 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 shall be deemed to cause irreparable harm that justifies injunctive relief in court. Contractor agrees that the requirements of this Section shall 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 shall 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 shall be incorporated into all subcontracts entered into by Contractor. It is further agreed that a violation of this Section shall 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 shall survive the termination of this Contract.

Z. PROJECT MANAGEMENT INFORMATION SYSTEM (UNIFIER)

The Street Transportation Department's Design and Construction Management (DCM) Project Manager may determine that use of UNIFIER will be required during this contract. The following information provides a guideline for utilization. Any questions related to the requirements of UNIFIER 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 shall 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 shall provide a computerized networked office platform with broadband internet connectivity. Wired or wireless is acceptable. This platform shall function well in a web-based environment utilizing an internet browser compatible with the City UNIFIER ASP system.

UNIFIER 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.

AA. CONTRACTOR AND SUBCONTRACTOR RECORDS

The contractor, subcontractors and all suppliers shall keep and maintain all books, papers, records, files, accounts, reports, bid documents with backup data, including electronic data, and all other material relating to the contract and project for five years following completion and acceptance of the work.

All the above material shall be made available to the City for auditing, inspection and copying and shall be produced, upon request.

The contractor shall insert the above requirement in each subcontract, purchase order and lease agreement and shall also include in all subcontracts a clause requiring subcontractors to include the above requirement in any lower-tier subcontract, purchase order or lease agreement.

BB. FEDERAL IMMIGRATION AND NATIONALITY ACT

The contractor, including all subcontractors, shall comply with all federal, state and local immigration laws and regulations, as set forth in Arizona Executive Order 2005-30, relating to the immigration status of their employees who perform services on the contract during the duration of the contract. The Agency shall retain the right to perform random audits of contractor and subcontractor records or to inspect papers of any employee thereof to ensure compliance.

By submission of a bid, the contractor warrants that the contractor and all proposed subcontractors are and shall remain in compliance with all federal, state and local immigration laws and regulations relating to the immigration status of their employees who perform services on the contract. The Agency may, at its sole discretion, require evidence of compliance from the contractor or subcontractor. Should the Agency request evidence of compliance, the contractor or subcontractor shall have ten working days from receipt of the request to supply adequate information. The City will accept, as evidence of compliance, a showing by the contractor or subcontractor that it has followed the employment verification provisions of the Federal Immigration and Nationality Act as set forth in Sections 274A and 274B of that Act, including implementation of regulations and agreements between the Department of Homeland Security and the Social Security Administration's verification service. The contractor shall include the

requirements of the provisions of ADOT Standard Specifications Subsection 107.19 In all its subcontracts.

Failure to comply with the immigration laws or to submit proof of compliance constitutes a material breach of contract. The City will reduce the contractor's compensation by \$10,000 for the initial Instance of non-compliance by the contractor or a subcontractor. Should the same contractor or subcontractor commit subsequent violations within a two-year time-period from the initial violation, the contractor's compensation will be reduced by \$50,000 for each violation. The third instance by the same contractor or subcontractor within a two-year period may result, in addition to the \$50,000 reduction in compensation, in removal of the offending contractor or subcontractor, suspension of work in whole or in part or, in the case of a third violation by the contractor, termination of the contract for default. In addition, the City may debar a contractor or subcontractor who has committed three violations within a two-year period for up to one year. For purposes of this paragraph, a violation by a subcontractor does not count as a violation by the contractor.

Any delay resulting from a sanction under this subsection is a non-excusable delay. The contractor is not entitled to any compensation or extension of time for any delays or additional costs resulting from a sanction under this subsection.

CC. **PROJECT STAFFING**

Key Personnel: Before starting work, Contractor must submit detailed résumés of key personnel involved in that work for City's approval (which City will not unreasonably withhold). If Contractor later desires to change key personnel involved in that work, Contractor must submit detailed résumés of the new personnel for City's approval (which City will not unreasonably withhold).

Qualified Staff: Contractor must maintain an adequate and competent staff of qualified persons—as City may determine in its sole discretion—during performance of this Master Agreement. If City in its sole discretion determines that any of Contractor's staff is objectionable, Contractor must take prompt corrective action or replace that staff with new personnel, subject to City's approval.

Third-Party Employment Brokers: Contractor and Subcontractors will not utilize a third-party labor broker for any construction worker under this Agreement. The Contractor and Subcontractors must be the employers of record for its construction staff under this Agreement.

DD. **NO ISRAEL BOYCOTT**

If this Contract is valued at \$100,000 or more and requires Contractor (a company engaging in for-profit activity and having ten or more full-time employees) to acquire or dispose of services, supplies, information technology, or construction, then Contractor must certify and agree that it does not and will not boycott goods or services from Israel, pursuant to Title 35, Chapter 2, Article 9 of the Arizona Revised Statutes. Provided that these statutory requirements are applicable, Contractor by entering this Contract now certifies that it is not currently engaged in, and agrees for the duration of the Contract to not engage in, a boycott of goods or services from Israel.

EE. **NO FORCED LABOR OF ETHNIC UYGHURS**

If this Contract requires Contractor (a company engaging in for-profit activity and having ten or more full-time employees) to acquire or dispose of services, supplies, information technology, goods, or construction, then pursuant to Title 35, Chapter 2, Article 10 of the Arizona Revised Statutes Contractor must certify and agree that it and any contractors, subcontractors, or

suppliers it utilizes do not and will not use the forced labor of ethnic Uyghurs in the People's Republic of China or any goods or services produced by such forced labor. Provided these statutory requirements are applicable, Contractor, by entering this Contract, now certifies it is not currently engaged in, and agrees for the duration of the Contract to not engage in, (a) the use of forced labor of ethnic Uyghurs in the People's Republic of China; (b) the use of any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China; or (c) the use of any contractors, subcontractors, or suppliers that use the forced labor or any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China.

FF. COMPLIANCE WITH LAWS

Contractor must comply with all existing and subsequently enacted federal, state and local laws, ordinances and codes, all applicable ADA requirements, regulations that are, or become applicable to this Agreement, and be in general conformance with PROWAG guidance. If a subsequently enacted law imposes substantial additional costs on Contractor, a request for an amendment may be submitted pursuant to this Agreement. Contractor is also required to certify its compliance with all applicable laws and Contractor must pass along these requirements to its Subcontractors. If any of Contractor's certifications is found to be false, the City may terminate this Agreement or impose other remedies due to the false certification.

GG. HEAT MITIGATION

Per Phoenix City Code G-7241, effective April 25, 2024, any Contractor whose employees and contract workers perform work in an outdoor environment under this contract must keep on file a written heat safety plan. The City may request a copy of this plan and documentation of all heat safety and mitigation efforts currently implemented to prevent heat-related illnesses and injuries in the workplace. The plan must also be posted where it is accessible to employees. At a minimum, the heat safety and mitigation plan and documentation required under this provision shall include each of the following as it relates to heat safety and mitigation:

- 1.1 Availability of sanitized cool drink water free of charge at locations that are accessible to all employees and contract workers.
 - 1.2 Ability to take regular and necessary breaks as needed and additional breaks for hydration.
 - 1.3 Access to shaded areas and/or air conditioning.
 - 1.4 Access to air conditioning in vehicles with enclosed cabs. All such vehicles must contain functioning air conditioning by no later than May 1, 2025.
 - 1.5 Effective acclimatization practices to promote the physiological adaptations of employees or contract workers newly assigned or reassigned to work in an outside environment.
 - 1.6 Conduct training and make it available and understandable to all employees and contract workers on heat illness and injury that focuses on the environmental and personal risk factors, prevention, how to recognize and report signs and symptoms of heat illness and injury, how to administer appropriate first aid measures and how to report heat illness and injury to emergency medical personnel.
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- 2.1 The Contractor further agrees that this clause will be incorporated in all subcontracts with subconsultants, sublicensees or sublessees who may perform labor or services in connection with this contract. Additionally, the Contractor agrees to require all subcontractors, sublicensees or sublessees to include this clause in all contracts with any third party who is contracted to perform labor or services in connection with this contract. It is the obligation of the Contractor to ensure compliance by its subcontractors.

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 DBE 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**:

1. 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 shall 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 shall accompany the bonds. The Certificate shall have been issued or updated within two years prior to the execution of the Contract. The bonds shall be made payable and acceptable to the City of Phoenix. The bonds shall 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 shall have attached thereto a certified copy of Power of Attorney of the signing official. If one Power of Attorney is submitted, it shall be for twice the total contract amount. If two Powers of Attorney are submitted, each shall 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.

2. BONDING COMPANIES

All bonds submitted for this project shall 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 their obligations have been discharged, including any warranty periods under this Contract.

The City in no way warrants that the 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 and Contractor may purchase additional insurance as they determine necessary.

1. 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 liability limits provided that (1) the coverage is written on a "following form" basis, and (2) all terms under each line of coverage below are met:

1. **Commercial General Liability – Occurrence Form**

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

a. The policy must name the City of Phoenix as an additional insured with respect to liability for bodily injury, property damage and personal and advertising injury with respect to premises, ongoing operations, products and completed operations, and liability assumed under an insured contract arising out of the activities performed by, or on behalf of the Contractor, related to this Contract.

b. Coverage must include XCU coverage.

c. There shall be no endorsement or modification which limits the scope of coverage or the policy limits available to the City of Phoenix as an additional insured.

d. City of Phoenix is an additional insured to the full limits of liability purchased by the Contractor.

e. The Contractor's insurance coverage must be primary and non-contributory with respect to any insurance or self-insurance carried by the City.

f. Contractor's policies must be endorsed to provide an extension of the completed operations coverage for a period of nine years.

2. **Automobile Liability**

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

Combined Single Limit (CSL)	\$1,000,000
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a. 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 Contractor, related to this contract.

b. City of Phoenix is an additional insured to the full limits of liability purchased by the Contractor.

c. The Contractor's insurance coverage must be primary and non-contributory with respect to any insurance or self-insurance carried by the City.

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 executed the appropriate sole proprietor waiver form.

4. **No Builders' Risk Insurance required.**

2. NOTICE OF CANCELTION

For each insurance policy required by the insurance provisions of this Contract, the Contractor must provide to the City, within five business days of receipt, a notice if a policy is suspended, voided or cancelled for any reason. Such notice must be mailed, emailed or hand delivered to Design and Construction Procurement, 200 W. Washington Street, 5th Floor, by certified mail, return receipt requested.

3. 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 required minimum insurer rating is sufficient to protect the Contractor from potential insurer insolvency.

4. 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.

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 Design and Construction Procurement via email at **str.title34.procure@phoenix.gov**. **The City project number, contract number and project description must be noted on the certificate of insurance.** The City reserves the right to require complete 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.**

5. SUBCONTRACTORS

Contractor's certificates shall include all subcontractors as additional insureds under its policies **OR** Contractor shall be responsible for ensuring and verifying that all subcontractors have valid and collectable insurance. At any time throughout the life of the contract, the City of Phoenix

reserves the right to require proof from the Contractor that its subcontractors have insurance coverage. All subcontractors providing services included under this Contract's Scope of Services are subject to the insurance coverages identified above and must include the City of Phoenix as an additional insured. In certain circumstances, the Contractor may, on behalf of its subcontractors, waive a specific type of coverage or limit of liability where appropriate to the type of work being performed under the subcontract. Contractor assumes liability for all subcontractors with respect to this Contract.

6. APPROVAL

Any modification or variation from the insurance coverages and conditions in this Contract must be documented by an executed contract amendment.

103.6.2 Defense and Indemnification

To the maximum extent allowed by law, including Title 34 A.R.S., Contractor ("Indemnitor") agrees to defend, indemnify, and hold harmless the City of Phoenix and its officers, officials (elected or appointed), 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 any and all claims, actions, liabilities, damages, losses or expenses, (including but not limited to court costs, attorney fees, expert fees, and costs of claim processing, investigation and litigation) of any nature or kind whatsoever ("Losses") caused or alleged to be caused, in whole or in part, by the wrongful, negligent or willful acts, or errors or omissions of Indemnitor or any of its owners, officers, directors, members, managers, agents, employees, or subcontractors (Indemnitor's Agents") arising out of or in connection with this Contract. This defense and indemnity obligation includes holding Indemnitee harmless for any Losses or other amount arising out of or recovered under any state's workers' compensation law or arising out of the failure of Indemnitor or Indemnitor's Agents to conform to any federal, state or local law, statute, ordinance, rule, regulation, or court decree. Indemnitor's duty to defend Indemnitee accrues immediately at the time a claim is threatened or a claim is made against Indemnitee, whichever is first. Indemnitor's duty to defend exists regardless of whether Indemnitor is ultimately found liable. Indemnitor must indemnify Indemnitee from and against any and all Losses, except where it is proven that those Losses are solely as a result of Indemnitee's own negligent or willful acts or omissions. Indemnitor is responsible for primary loss investigation, defense and judgment costs where this indemnification applies. In consideration of the City's award of this Contract, Indemnitor agrees to waive all rights of subrogation against Indemnitee for losses arising from or related to any work performed by Indemnitor or Indemnitor's Agents for the City of Phoenix under this Contract. The obligations of Indemnitor under this provision survive the termination or expiration of this Contract.

4. **104 SCOPE OF WORK**, Add the following to **Section 104.1 WORK TO BE DONE**:

The following environmental commitment measures are required to be followed. Refer to Environmental Clearance Letter section for additional information and guidance.

The project mitigation measures are not subject to change without written approval from City of Phoenix Office of the City Engineer. The Contractor shall follow all the requirements of the permits specified herein and comply with the project special provisions, as well as the MAG Uniform Standard Specifications for Public Works, as well as all applicable local environmental requirements.

PROJECT NO. ST83140111 Drainage Improvement: 16th Street to 18th Street:

Asbestos & Lead Paint Testing (City HBM Policy)

- Per the City of Phoenix Hazardous Building Materials (HBM) Policy as well as Environmental Protection Agency (EPA) and Occupational Safety & Health Association (OSHA) requirements, asbestos and lead paint testing of materials planned for disturbance must be conducted prior to start of construction.
- Compliance with the City of Phoenix HBM Policy for this project may be achieved either through utilizing a certified asbestos and lead inspector through your contract or utilizing the Office of the City Engineer's Environmental Section which oversee on-call contracts for these inspection services. Please contact Tariq Abdellatif at 602-534-5628 or tariq.abdellatif@phoenix.gov for additional information.

Clean Water Act Section 402 / Phoenix Code 32C Note

- Less than 1 acre of ground disturbance will occur during project work. The contractor must comply with Phoenix City Code 32C.

Natural Resources

- Due to proximity to landscape vegetation, the contractor shall review the attached Migratory Bird Treaty Act (MBTA) construction flyer and Sonoran Desert Tortoise (SDT) construction flyer. The area is suitable for protected active nests (both vegetation and ground nesting species). If work will occur between February and August of any calendar year, a survey for active nests protected under the Migratory Bird Treaty Act (MBTA) is required no more than 10 days prior to the start of clearing/grubbing or other initial construction activity. **Please contact Office of the City Engineer, Environmental Quality Specialist, Andrea Love (andrea.love@phoenix.gov) at least two weeks before construction to arrange for an active nest survey.**
- Rocky slopes and ephemeral washes provide suitable habitat for Sonoran Desert tortoise (SDT). A survey for this species and its burrows is required prior to the start of work. **Please contact Office of the City Engineer, Environmental Quality Specialist, Andrea Love (andrea.love@phoenix.gov) at least two weeks before construction to arrange for a SDT survey.**

Clean Water Act Section 404/401

- No potential Waters of the U.S. are present in the affected project area. No Clean Water Act Section 404 permitting is required.

Archaeology

- Based upon the results of the archaeological survey (Stillman 2023), the City of Phoenix Archaeology Office does not recommend further archaeological work for this project area.
- No archaeological work is necessary for this project. However, if any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the City of Phoenix Archaeology Office must be notified immediately and allowed time to properly assess the materials.

Historic Preservation

- No historic neighborhoods or structures will be adversely affected by this project.

PROJECT NO. ST83140113 18th Street & Jackson Street:

Asbestos & Lead Paint Testing (City HBM Policy)

- Per the City of Phoenix Hazardous Building Materials (HBM) Policy as well as Environmental Protection Agency (EPA) and Occupational Safety & Health Association (OSHA) requirements, asbestos and lead paint testing of materials planned for disturbance must be conducted prior to start of construction.
- Compliance with the City of Phoenix HBM Policy for this project may be achieved either through utilizing a certified asbestos and lead inspector through your contract or utilizing the Office of the City Engineer's Environmental Section which oversee on-call contracts for these inspection services. Please contact Tariq Abdellatif at 602-534-5628 or tariq.abdellatif@phoenix.gov for additional information.

Clean Water Act Section 402 / Phoenix Code 32C Note

- Less than 1 acre of ground disturbance will occur during project work. The contractor must comply with Phoenix City Code 32C.

Natural Resources

- Impacts to vegetation are not expected. Due to proximity to landscape vegetation, the contractor shall review the attached Migratory Bird Treaty Act (MBTA) construction flyer.

Clean Water Act Section 404/401

- No potential Waters of the U.S. are present in the affected project area. No Clean Water Act Section 404 permitting is required.

Archaeology

- No know archaeological sites are located within the project area.
- No archaeological work is necessary for this project. However, if any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the City of Phoenix Archaeology Office must be notified immediately and allowed time to properly assess the materials.

Historic Preservation

- No historic neighborhoods or structures will be adversely affected by this project.

PROJECT NO. ST83140115 Indian School Road & N 28th Street:

Asbestos & Lead Paint Testing (City HBM Policy)

- Per the City of Phoenix Hazardous Building Materials (HBM) Policy as well as Environmental Protection Agency (EPA) and Occupational Safety & Health Association (OSHA) requirements,

asbestos and lead paint testing of materials planned for disturbance must be conducted prior to start of construction.

- Compliance with the City of Phoenix HBM Policy for this project may be achieved either through utilizing a certified asbestos and lead inspector through your contract or utilizing the Office of the City Engineer's Environmental Section which oversee on-call contracts for these inspection services. Please contact Tariq Abdellatif at 602-534-5628 or tariq.abdellatif@phoenix.gov for additional information.

Clean Water Act Section 402 / Phoenix Code 32C Note

- Less than 1 acre of ground disturbance will occur during project work. The contractor must comply with Phoenix City Code 32C.

Natural Resources

- Impacts to vegetation are not expected. Due to proximity to landscape vegetation, the contractor shall review the attached Migratory Bird Treaty Act (MBTA) construction flyer.

Clean Water Act Section 404/401

- No potential Waters of the U.S. are present in the affected project area. No Clean Water Act Section 404 permitting is required.

Archaeology

- No know archaeological sites are located within the project area.
- No archaeological work is necessary for this project. However, if any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the City of Phoenix Archaeology Office must be notified immediately and allowed time to properly assess the materials.

Historic Preservation

- No historic neighborhoods or structures will be adversely affected by this project.

PROJECT NO. ST83140116 33rd Avenue & Taylor Street:

Asbestos & Lead Paint Testing (City HBM Policy)

- Per the City of Phoenix Hazardous Building Materials (HBM) Policy as well as Environmental Protection Agency (EPA) and Occupational Safety & Health Association (OSHA) requirements, asbestos and lead paint testing of materials planned for disturbance must be conducted prior to start of construction.
- Compliance with the City of Phoenix HBM Policy for this project may be achieved either through utilizing a certified asbestos and lead inspector through your contract or utilizing the Office of the City Engineer's Environmental Section which oversee on-call contracts for these inspection

services. Please contact Tariq Abdellatif at 602-534-5628 or tariq.abdellatif@phoenix.gov for additional information.

Clean Water Act Section 402 / Phoenix Code 32C Note

- Less than 1 acre of ground disturbance will occur during project work. The contractor must comply with Phoenix City Code 32C.

Natural Resources

- Impacts to vegetation are not expected. Due to proximity to landscape vegetation, the contractor shall review the attached Migratory Bird Treaty Act (MBTA) construction flyer.

Clean Water Act Section 404/401

- No potential Waters of the U.S. are present in the affected project area. No Clean Water Act Section 404 permitting is required.

Archaeology

- No known archaeological sites are located within the project area.
- No archaeological work is necessary for this project. However, if any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the City of Phoenix Archaeology Office must be notified immediately and allowed time to properly assess the materials.

Historic Preservation

- No historic neighborhoods or structures will be adversely affected by this project.

PROJECT NO. ST83140120 32nd Avenue & Monterosa Street:

Asbestos & Lead Paint Testing (City HBM Policy)

- Per the City of Phoenix Hazardous Building Materials (HBM) Policy as well as Environmental Protection Agency (EPA) and Occupational Safety & Health Association (OSHA) requirements, asbestos and lead paint testing of materials planned for disturbance must be conducted prior to start of construction.
- Compliance with the City of Phoenix HBM Policy for this project may be achieved either through utilizing a certified asbestos and lead inspector through your contract or utilizing the Office of the City Engineer's Environmental Section which oversees on-call contracts for these inspection services. Please contact Tariq Abdellatif at 602-534-5628 or tariq.abdellatif@phoenix.gov for additional information.

Clean Water Act Section 402 / Phoenix Code 32 C Note

- Less than 1 acre of ground disturbance will occur during project work. The contractor must comply with Phoenix City Code 32C.

Natural Resources

- Impacts to vegetation are not expected. Due to proximity to landscape vegetation, the contractor shall review the attached Migratory Bird Treaty Act (MBTA) construction flyer.

Clean Water Act Section 404/401

- No potential Waters of the U.S. are present in the affected project area. No Clean Water Act Section 404 permitting is required.

Archaeology

- No know archaeological sites are located within the project area.
- No archaeological work is necessary for this project. However, if any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the City of Phoenix Archaeology Office must be notified immediately and allowed time to properly assess the materials.

Historic Preservation

- No historic neighborhoods or structures will be adversely affected by this project.

The following civil engineering tasks are required on each of the projects:

PROJECT NO. ST83140111 Drainage Improvement: Madison Street to 16th Street to 18th Street:

The scope of work for this project includes construction of storm drain system along:

- Jackson Street: 16th St to 16th Pl
- 16th Pl: Jackson St to Madison St
- Madison St: 16th Pl to 18th St

The work involves construction of storm drain system with pipe size ranging from 18" diameter to 42" diameter, curb opening catch basins, grated catch basins, connector pipes, storm sewer manholes, and pavement re-construction.

PROJECT NO. ST83140113 Drainage Improvements: Jackson Street and 18th Street

The scope of work for this project includes construction of storm drain lateral system along:

- Jackson Street and 18th Street intersection

The work involves construction of 18" storm drain lateral system with two catch basins and a new manhole tied into an existing 24" storm drain system flowing north.

PROJECT NO. ST83140115 Drainage Improvements: Indian School Road and 28th Street

The scope of work for this project includes construction of storm drain lateral system along:

- Indian School Road and 28th Street

The work involves construction of 18" storm drain lateral system with two catch basins and a new manhole tied into an existing 30" storm drain system flowing west within Indian School Road.

PROJECT NO. ST83140116 Drainage Improvements: Taylor Street and 33rd Avenue

The scope of work for this project includes construction of storm drain lateral system along:

- Polk St from 35th Ave to 33rd Ave
- 33rd Ave from Polk St to Taylor St, and
- Taylor Street and 33rd Ave approximately 100' east.

The work involves construction of storm drain system with pipe size ranging from 18" to 30", several catch basins, multiple manholes and a connection to an existing 54" storm drain.

PROJECT NO. ST83140120 Drainage Improvements: 32nd Street & Monterosa Street

The scope of work for this project includes construction of storm drain lateral system along:

- Monterosa Street west of 32nd Street
- 32nd St north of Monterosa Street

The work involves construction of 15" storm drain lateral system and catch basin in 32nd Street and a new manhole and 12" check valve in an existing 12" storm drain flowing east within Monterosa Street.

5. **104 SCOPE OF WORK**, Add the following to **Subsection 104.1.2 MAINTENANCE OF TRAFFIC:**

ADA AND ANSI ACCESS OF PREMISES DURING CONSTRUCTION

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

6. **104 SCOPE OF WORK**, Add the following to **Subsection 104.1.4 CLEANUP AND DUST CONTROL:**

The Contractor shall 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.

7. **105 CONTROL OF WORK**, Add the following to **Subsection 105.1, AUTHORITY OF THE ENGINEER:**

1. CONTRACT ADMINISTRATION

The definition of "Engineer" shall read as follows:

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

2. 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 602-4952050), 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 and Construction Management (DCM) Division.

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 shall also provide copies of all purchase orders and/or contracts with DBE subcontractors and suppliers used to meet the subcontract goal programmed for this project.

Minimum attendance by the Contractor shall 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.

3. 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 shall discontinue advancing the work specified under this Agreement.

Such suspension shall 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.

8. **105 CONTROL OF WORK,** Add the following to **Subsection 105.2 PLANS AND SHOP DRAWINGS:**

The Contractor shall 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 shall be submitted sufficiently in advance to allow adequate time for City review(s) and approval. The Contractor shall 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 shall 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 shall submit six (6) hard copies of each shop drawing for review. **Email or FAX submittals will not be accepted.**

The Contractor shall 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.

9. **105 CONTROL OF WORK**, Add the following to **Subsection 105.7 COOPERATION BETWEEN CONTRACTORS**

Other Contractors are expected to be working in or near the area of this contract. The Contractor shall conduct his work as specified in MAG Section 105.7.

10. **105 CONTROL OF WORK**, Delete **Subsection 105.8 CONSTRUCTION STAKES, LINES AND GRADES** and substitute the following

Description

The work under this section shall consist of furnishing all materials, personnel and equipment necessary to perform all surveying, staking and verification of the accuracy of all points which have been provided by the Engineer in the project plans.

Included in this work shall be all calculations required for the satisfactory completion of the project in conformance with the plans and specifications. The work shall be done under the direction of a registered professional surveyor employed by the Contractor.

Measurements of all removals and pay quantity items will be the responsibility of the Engineer.

When utility adjustments are a part of the contract, the Contractor shall perform and be responsible for locating, tying and untying all manholes and valves that are discovered during the course of the contract. The Contractor shall set all survey points, stakes and references necessary for carrying out all such adjustments.

During installation and/or relocation of new water lines, valves, water meters and service connections, fire hydrants, sewer lines, sewer taps, clean outs, manholes, and other similar assets, the contractor will record the final as-built location and provide additional information related to cost, manufacturer and model numbers in a form provided by the Engineer.

The Contractor shall furnish all traffic control, including flagging for survey and staking operations. Traffic control shall be in accordance with the requirements of the City of Phoenix Barricade Manual.

The Contractor will keep field notes in bound field books. These books will be available for inspection by City personnel at all times and shall become the property of the City of Phoenix upon completion of the project.

Construction Staking Requirements

Staking will be performed in accordance with the City of Phoenix's Survey Section Standard Requirements for Staking, As-Builts and Quantity Calculations, plus any special addenda provided by the Engineer. The Contractor will provide to the Engineer in writing, for the Engineer's approval, any special procedures that will be used for construction survey staking completion.

The project plans will include all the required benchmark and horizontal information to establish survey control on the project site and to complete the proper layout of the work. The project will identify two City of Phoenix Benchmarks, and where applicable, identify additional temporary benchmarks at other convenient locations. After the Contractor has verified the accuracy of the control points established by the City, the Contractor shall set all stakes necessary for construction in accordance with the City of Phoenix Survey Section Standard Requirements.

If errors are discovered during the verification process and control points do not agree with the information shown in the plans, the Contractor shall promptly notify the Engineer in writing, and explain the problem in detail. The Engineer will advise the Contractor of any corrective actions which may be necessary.

If errors are discovered during the verification process and control points do not agree with the geometrics shown in the plans, the Contractor shall promptly notify the Engineer in writing, and explain the problem in detail. The Engineer will advise the Contractor of any corrective actions which may be necessary.

The Contractor shall exercise care in the preservation of stakes, references, benchmarks and shall reset them when they are damaged, lost, displaced or removed.

Any discrepancies in grade, alignment, locations or dimensions detected by the Contractor shall be brought to the attention of the Engineer by letter. No changes in the project plans will be allowed without the approval of the Engineer.

The Engineer reserves the right to make inspections and random checks of any portion of the staking and layout procedure. If, in the Engineer's opinion, the work is not being performed in the manner that will assure proper control and accuracy, the Engineer will order any or all of the staking and layout work redone at no additional cost.

If any portion of the Contractor's staking and layout work is ordered redone, resulting in additional rechecking by the Engineer, the City shall be reimbursed for all costs for such additional checking. The amount of such costs will be deducted from the Contractor's progress payment.

Inspection of the Contractor's layout by the Engineer and the acceptance of all or any part of it shall not relieve the Contractor of their responsibility to secure the proper dimensions, grades and elevations for the work.

Record Drawings

The Contractor shall maintain a record drawing (redlines) at the job site. These shall be kept legible and current and shall show all changes or work added in a contrasting, reproducible color. Two weeks prior to issuance of substantial completion, the Contractor shall submit, prior to final inspection, corrected drawings showing the location of all utility services, controller, pipe, valves and wiring. The Engineer shall 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.

Prior to final acceptance, the Contractor will provide a complete as-built set, sealed by a Registered Professional, showing all field modifications and final elevation, stations and offset of the completed improvements. For construction related to sewer, and water facilities, and other utilities, as-built information may be requested at the Engineer prior to completion of as-builts at no additional cost. The as-built shall be prepared in accordance with the requirements of this section and other applicable special provisions for this project. Additional As-built requirement can be found on the Streets Transportation Department Website, under the Community Reference Materials.

Measurement

Construction surveying and layout will be measured as a single complete unit of work.

A contingency item, Two-person survey party will be measured by the hour to the nearest half (1/2) hour. This item will only be measured for payment when the Engineer requires extra work. The Engineer will require field notes and/or invoice to validate the additional time.

Payment

Payment for construction surveying and layout will be by the lump sum. No additional payment will be made for maintaining record drawings, preparation of final as-builts, and other work identified under this section.

The item of two-person survey party is a contingent item and is established for the purpose of compensating the Contractor for additional staking and layout required as a result of extra work ordered by the Engineer. Payment will be made at the predetermined unit price shown on the bidding schedule for the survey party or parties used. The Engineer will be the sole judge as to whether the additional work shall be performed by the Contractor or by City forces. The amount per hour for a two-person survey party includes the cost of all work necessary to complete the extra work.

No payment will be made for the resetting of stakes, references, benchmarks and other survey control.

11. **105 CONTROL OF WORK**, Add the following to **Subsection 105.15 ACCEPTANCE, paragraph (B) Final Acceptance**:

1. **SUBSTANTIAL COMPLETION**

The work may be judged substantially complete when all construction, including all applicable ADA requirements, 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 shall have thirty (30) days thereafter to complete punch list work, unless additional time is granted--in writing--by the Engineer. In no case shall 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.

2. **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 shall 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 shall 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 shall be deducted from the Contractor's final payment and the remaining funds, if any, including the contract retention, shall be released in accordance with the conditions set forth in contract retention.

3. **CONTRACT RETENTION**

This project shall not be considered complete until all work has been completed, including punch list work. Under no circumstances shall 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 shall 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.

12. **106 CONTROL OF MATERIALS**: Add the following new paragraphs:

106.17 Construction Materials:

A construction material, when used on a federal-aid construction project shall comply with the requirements of Build America, Buy America (BABA) Act specified in Title IX, Subtitle A, Part 1, Sections 70901 and 70911-70918 (Pub. L. No. 117-58 §§ 70901; §§ 70911-70918) of the Infrastructure Investment and Job Act (IIJA).

A “construction material” that is permanently incorporated on the project shall include an article, material, or supply that is or consists primarily of the following:

1. Non-ferrous metals;
2. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
3. Glass (including optic glass);
4. Lumber; or
5. Drywall.

Items manufactured through a combination of either two or more materials listed above, or at least one of the materials listed above and a material not listed shall be considered as a manufactured product, rather than as a construction material.

Build America, Buy America provisions specified for manufactured products in Section 70912(6)(B) of the IIJA, do not apply to federal-aid construction projects per FHWA’s existing statutory requirement applicable to manufactured products. A “manufactured product” is considered to be an item that undergoes one or more manufacturing processes before the item can be used on a federal-aid construction project.

Construction materials shall not include cement and cementitious materials; bituminous materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives.

All construction materials shall be produced in the United States. This means, all manufacturing processes to produce the construction materials shall occur in the United States. All manufacturing processes for construction materials shall mean the final manufacturing process and the immediately preceding manufacturing stage for the construction material.

The contractor shall furnish the Engineer with Certificates of Compliance, conforming to the requirements of Subsection 106.05 of the specifications, which shall state that the construction

materials incorporated in the project meet the requirements specified herein. Certificates of Compliance shall also certify that all manufacturing processes to produce construction materials occurred in the United States.

Convict-produced materials are prohibited in accordance with the requirements of 23 CFR 635.417.

13. **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 shall 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 shall not be considered for payment by the City.

14. **107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC**, Add the following new paragraphs to **Subsection 107.1, LAWS TO BE OBSERVED**:

(A) FAIR TREATMENT OF WORKERS

The Contractor shall 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 shall 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 shall 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.

(B) 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.

(C) 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 shall 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.

15. **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/airquality/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 shall 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 shall 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 shall 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 shall 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 shall 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 shall likewise be transmitted to the Engineer within twenty-four (24) hours.

The Contractor shall prevent any dust nuisance due to construction operations in accordance with MAG Specifications, Section 104.1.3, Cleanup and Dust Control. The Contractor shall 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 shall 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 shall 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 shall obtain this permit in accordance with the

City of Phoenix Traffic Barricade Manual, latest edition. The Contractor shall follow all requirements of the TRACS permit during construction. The Contractor shall 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 shall 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 shall 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. OTHER PERMITS

The Contractor may be required to obtain other permits from other agencies, such as the Arizona Department of Transportation (ADOT) or the Flood Control District of Maricopa County (FCDMC) before beginning work or restricting traffic in their right-of-way. The Contractor will be required to obtain these permits and comply with their requirements.

- 16. 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:**

Archaeological monitoring may be required within the limits of the project during construction. The Contractor must coordinate all ground disturbing work with the archaeologist(s) and provide a current work schedule to facilitate the archaeologist’s investigation and monitoring of all ground disturbing work within the area(s) of interest. When archaeological materials are discovered, the Contractor must stop work immediately within a 10-meter zone of the discovery, secure the area, and immediately notify the on-site archaeologist(s) who must then contact the City Archaeology Office (602-495-0901) or the Street Transportation Environmental Section at 602-534-3747, who will coordinate with the City Archaeology Office. The Contractor must not recommence work in the area of discovery until directed in writing by the City Archaeology Office.

If suspected archaeological materials are discovered during construction without an archaeologist present, the Contractor must stop work immediately within a 10-meter zone of the discovery, secure the area, and immediately notify the City Archaeology Office (602-495-0901). The Contractor must not recommence work in the area of discovery until directed in writing by the City Archaeology Office.

In 1990, the Arizona legislature amended two state laws (Arizona Antiquities Act & State Historic Preservation Act) that protect human burials and associated artifacts on both private and state land. As specified in these laws and rephrased below:

1) A person shall not knowingly excavate in or upon any historic or prehistoric archaeological site, except when acting as a duly authorized agent of an institution or corporation organized for scientific, research or land use planning purposes. [Arizona Revised Statute §41-841(A) - Archaeological Discoveries] Any person, institution or corporation violating any provision of this article is guilty of a class 2 misdemeanor. [A.R.S. §41-846 - Violation]

2) A person who knowingly excavates in violation of A.R.S. §41-841 is guilty of a class 5 felony pursuant to Arizona Criminal Code- Title 13. A second or subsequent violation under this subsection is a class 3 felony. [A.R.S. 17 .OJ - Excavating Certain Sites].

A class 5 felony carries potential penalties of up to two years in prison. If a City of Phoenix (City) project may impact historic or pre-historic archaeological resources, the guidelines described above must be adhered to. Therefore, no subsurface disturbance activities related to this without having an archaeological consultant on-site prior to and during this project's ground disturbance activities.

The City of Phoenix Office of the City Engineer is requesting that the Project Archaeological Requirements Acknowledgment Form is completed for all City sponsored or managed projects involving ground subsurface disturbance activities in areas that may include archaeological resources, as determined by the City of Phoenix Archaeology Office (CAO). If archaeological monitoring is required on a project, a City Archaeological Monitoring Acknowledgment form will be provided for your review and signature. The guidelines and the provisions in the Terms and Conditions of the Archaeological Monitoring Form must be followed as prescribed on the form and referenced above in this section. Penalties for non-compliance are detailed on the Archaeological Monitoring Form. Failure to comply with the requirements of this acknowledgment form and the City contract may constitute a breach of contract

17. **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".

18. **107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Add the following to Subsection 107.8, USE OF EXPLOSIVES:**

NO BLASTING will be allowed on this project.

19. **107 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC, Add the following to Subsection 107.11, CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES:**

1. **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. 40360.21 through 40360.32, "Underground Facilities"), shall 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 shall 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 shall 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

2. **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 shall immediately notify, in writing, the Project Engineer of any potential utility-related delay claim.

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

The Contractor shall 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 shall determine to document requirements of the affected utility for their acceptance of responsibility for the claims. The Contractor shall 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 shall obtain written confirmation from the utility company involved of their documentation requirements.

20. 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 shall pay its subcontractors or suppliers within seven (7) calendar days of receipt of each progress payment from the City. The Contractor shall 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 shall result in a corresponding reduction to subcontractors or suppliers who have performed satisfactory work. Contractor shall 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 shall comply with A.R.S. 35-214 and the City shall 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 shall 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 shall 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.

21. **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 shall 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 shall 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 shall submit updated CPM charts as required by the Engineer. This shall 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 shall accept liability or responsibility for the reasonable or workable nature of the CPM schedules prepared and submitted by the Contractor—that responsibility shall remain with the Contractor.

22. **108 COMMENCEMENT, PROSECUTION AND PROGRESS**, Replace the first paragraph of **Subsection 108.5, LIMITATION OF OPERATIONS**:

The Contractor shall conduct the work at all times in such a manner and sequence that will assure the least interference with traffic and inconvenience to the public. The Engineer may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience.

Contractor shall submit their preferred sequence and complete one location prior to starting another location. If sequencing need to be modified for some reason, Contractor shall inform the Engineer and obtain prior approval before changing sequencing.

23. **108 COMMENCEMENT, PROSECUTION AND PROGRESS**, Add the following to **Subsection 108.5, LIMITATION OF OPERATIONS**:

1. **WORK HOURS**

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

The Contractor shall 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 shall be defined as unscheduled overtime. All costs (including appropriate overhead) shall 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.

2. **NIGHT WORK**

Any proposed night work will be done in accordance with all City of Phoenix Ordinances. Night work will only be allowed upon submittal and approval of After-Hours Work in the Right-of-Way application. The Contractor will submit a comprehensive plan at the Preconstruction Conference that details the steps and methods of noise reduction during night working hours. This plan will address, but not be limited to the following: backup alarms, equipment noise, scheduling of excessively noisy construction phases, and material delivery times. Spotters, in lieu of backup alarms, may be required at night.

There will be no separate measurement or payment for work related to this item, the cost being considered incidental to the cost of contract items.

24. **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 Convenience

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, shall 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 shall not be entitled to receive any further payments under the Contract Documents until the Work shall 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 shall be obligated to pay the difference to City. Such costs and expense shall 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.

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

25. 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 shall be effective at the time and in the manner specified in the notification to the Contractor of the termination. Such termination shall be without prejudice to any claims which the Owner may have against the Contractor. In the event of a termination for convenience, the Contractor shall be paid only the direct value of its completed work and materials supplied as of the date of termination, and Contractor shall 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 shall 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 38511, Arizona Revised Statutes.

26. **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 shall incorporate the amount pre-entered in the bid proposal and shall 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, shall 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 shall be understood that this allowance item is an estimate only and is based on change order history of similar projects. It shall 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.

27. **109 MEASUREMENTS AND PAYMENTS**, Add the following to **Subsection 109.4 COMPENSATION FOR ALTERATION OF WORK**:

109.4.7 CHANGE 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 shall follow the procedure provided in the Federal Acquisition Regulation (FAR) clause 52.214-27, found in 48 CFR Part 52.

28. **109 MEASUREMENTS AND PAYMENTS Subsection 109.7, PAYMENT FOR BOND ISSUE AND BUDGET PROJECTS**, Delete the first three paragraphs in their entirety and replace with the following **Subsection 109.7, PAYMENT FOR BOND ISSUE AND BUDGET PROJECTS**:

1. 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 shall review payment requests and make recommendation of approval or denial within seven (7) calendar days.

2. PAYMENT RETENTION

At the start of construction, ten percent of all pay requests shall 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 money market accounts, demand deposit accounts, or 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. These securities are referred to as “Qualified Securities.”

Qualified 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 and/or deposit agreement

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

29. 109 MEASUREMENTS AND PAYMENTS, Delete Table 109-1 in Subsection 109.9, DOLLAR VALUE OF MAJOR ITEM, and substitute the following:

<u>CONTRACT AMOUNT</u>	<u>MAJOR ITEM IS DEFINED AS ANY ITEM EQUAL TO OR GREATER THAN THE FOLLOWING</u>
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 shall 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.

**30. 110 NOTIFICATION OF CHANGED CONDITIONS AND DISPUTE RESOLUTION, Add the following to Subsection 110.1 GENERAL:
SOILS INFORMATION**

The material boring logs and seismic refraction survey data 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. 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 shall be undertaken by the Contractor on a multi-tiered, most cost-effective approach. The Contractor shall 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 shall 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 shall 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 shall 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 shall 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 shall be in accordance with that manual.

There shall 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 shall 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 shall incorporate the amount pre-entered in the bid proposal and shall reflect the same in the total amount bid for this project.

Payment for various types of necessary BMP's shall 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.

2. **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.

3. **301 SUBGRADE PREPARATION,** Delete **Subsections 301.7, MEASUREMENT, and 301.8, PAYMENT,** and substitute the following:

301.7 MEASUREMENT:

There will be no separate measurement for subgrade preparation. Measurements shown on the plans are for informational purposes.

301.8 PAYMENT

The will be no separate payment for subgrade preparation. The cost of all subgrade preparation shall be included with the cost of the removal and replacement of asphalt, curb, gutter, valley gutter, sidewalk, or other bid item.

4. **331 PLACEMENT AND CONSTRUCTION OF ASPHALT EMULSION MICRO-SURFACING TREATMENTS**, Add the following to **Subsection 331.1 GENERAL**:

Pursuant to City of Phoenix Street Pavement Cut Policy, a micro seal pavement treatment must be applied to the half width of an arterial or collector street or the full width of a local street. The treatment must extend a minimum of 25 feet in both directions from the pavement cut(s).

Delete **Subsections 331.8, MEASUREMENT, and 331.9, PAYMENT**, and substitute the following:

331.8 MEASUREMENT:

Measurement for micro seal pavement treatment will be by the square yard, complete in place, including crack sealing per MAG 337.

331.9 PAYMENT

Payment for micro seal pavement treatment will be made under the bid item "MICROSEAL COAT & CRACK SEALING"

5. **332 PLACEMENT AND CONSTRUCTION OF ASPHALT EMULSION SLURRY SEAL TREATMENTS**, Add the following to **Subsection 332.1 GENERAL**:

Pursuant to City of Phoenix Street Pavement Cut Policy, a slurry seal pavement treatment must be applied to the half width of an arterial or collector street or the full width of a local street. The treatment must extend a minimum of 25 feet in both directions from the pavement cut(s). Type IV slurry seal shall be used on an arterial and collector streets and Type III slurry seal shall be used on a local street. For all pavement cut repair areas, crack fill and seal must be applied between existing and new pavement areas prior to any pavement treatment.

Project ST83140119 excludes portions of Pavement Restoration along Quarter Section 18-29 as these streets will be part of a future pavement rehabilitation project.

Delete **Subsections 332.8, MEASUREMENT, and 332.9, PAYMENT**, and substitute the following:

332.8 MEASUREMENT:

Measurement for slurry seal pavement treatment will be by the square yard, complete in place, including crack sealing per MAG 337.

332.9 PAYMENT

Payment for slurry seal pavement treatment will be made under the bid item "SLURRY SEAL COAT & CRACK SEALING"

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

PERMANENT PAVEMENT REPLACEMENT (ASPHALT CONCRETE)

Description

This special provision shall override the construction notes for pavement section shown on the plans. The pavement replacement sections shall be as follows:

Residential Street: 5 inches Type C-3/4 (two lifts) on 100% compacted native subgrade; or 2 inches Type D-1/2 on 3 inches Type C-3/4 on 100% compacted native subgrade; whichever best fits specific project needs.

Collector Street: 2 inches Type D-1/2 on 6 inches Type C-3/4 (two lifts) on 100% compacted native subgrade.

Major Arterial Street: 2 inches Type D-1/2 on 7 inches Type C-3/4 (two lifts) on 100% compacted subgrade.

The following pavement replacement sections shall apply to project ST83140120 shall override the construction notes on the plans:

Monterosa Street: 3 inches Type C-3/4 on 6-inches of Aggregate Base Course

32nd Street: 6 inches Type C-3/4 (two lifts) on 8-inches of Aggregate Base Course

The following pavement replacement sections shall apply to project ST83140116 – 33rd Ave & Taylor St Drainage Improvements and shall override the construction notes on the plans:

Polk St: 7 inches Type C-3/4 (two lifts) on 12-in of Aggregate Base Course

33rd Ave: 4 inches Type C-3/4 (two lifts) on 8-in of Aggregate Base Course

The other street pavement sections will remain as per plans for this project.

The following pavement replacement sections shall apply to project ST83140111 – 16th St to 18th St Drainage Improvements and shall override the construction notes on the plans:

Jackson St: 10 inches Type C-3/4 (three lifts) over 7-in of Aggregate Base Course

16th Pl: 3 inches of Type C-3/4 over 6-in of Aggregate Base Course

Madison St: 4 inches of Type C-3/4 (two lifts) over 10-in of Aggregate Base Course

All other pavement sections will remain as per plans.

Measurement and Payment

Measurement and payment for permanent pavement replacement will be by the square yard, complete in place, including all necessary subgrade preparation and tack coat. In computing the pay quantity for trench patch pavement replacement, the field measurement along the centerline of the trench and the trench pay width as listed in MAG 336 will be used. When the longitudinal trench is only partially in the pavement, adjustments in

the pay width will be made by the Engineer. Where required, Aggregate Base Course will be paid by the square yard for the thickness identified on these special provisions.

There will be no separate measurement or payment for trench backfill. The cost of the backfill is considered included in the cost of the pipe.

Payment will be made under bid items "ASPHALT CONCRETE FOR PERMANENT PAVEMENT REPLACEMENT"

13. **337 ASPHALT PAVEMENT CRACK SEALING AND CRACK FILLING**, Add the following to **Subsection 337.1 GENERAL:**

Crack sealing and crack filling must be applied to all pavement receiving a pavement treatment. Delete **Subsections 337.6, MEASUREMENT, and 337.7, PAYMENT**, and substitute the following:
337.8 MEASUREMENT:

No separate measurement or payment will be made for crack sealing or crack filling. Payment will be made under the pavement treatment type.

14. **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. Approved detectable warning material manufacturers include the following:

- a. Strongo, TekWay Dome-Tiles
- b. Tuftile, Cast Iron ADA Detectible Warning Plates
- c. Neenah Foundry, Cast Iron Detectable Warning Plate

Alternate materials may be submitted subject to review and approval prior to use. All detectable warnings will be of the same type and color within the project limits, unless otherwise specified.

Add the following subsection **MAG Subsection 340.2.1.1 Color and Contrast:**

Unless shown otherwise on the plans, the color of the detectable warning tiles to be used shall be terracotta color on grey concrete and yellow color on colored concrete sidewalk ramps – color to be approved by the Engineer.

Add the following to **MAG Subsection 340.3.6 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 to meet ADA placement requirements. 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 "CONCRETE CURB RAMP by Standard Detail "CURB AND GUTTER", and "VALLEY GUTTER, 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 "CONCRETE CURB RAMP". The cost of installing truncated domes is included in the cost of "CONCRETE CURB RAMP".

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".

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 shall 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) shall 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, shall 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 shall be maintained in a secure area, and the Contractor shall bear full responsibility for this hardware material. Any hardware lost by the Contractor shall 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 shall be temporarily filled with hot-mix Type D-1/2 asphalt and roller-compacted flush with the adjacent pavement. There shall 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 shall be rolled with a self-propelled, steel wheel roller.

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

A single No. 4 rebar hoop shall be placed in each adjustment collar. The hoop diameter shall 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 shall be such that it is centered in the thickness of the collar. Each concrete ring shall be scored radially at quarter-circle points. Score lines shall be 1/4-inch wide by 1/2-inch deep. The concrete collar surface shall be rough broom-finished. All pavement removed for adjustments shall be replaced with concrete.

Traffic shall 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 shall 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 shall submit a written adjustment plan and schedule to the Engineer for approval. At the request of the City, the contractor will provide access to all services under construction at no additional cost.

Sewer manhole frames and covers shall be matched, kept together, and replaced to their original locations. The Contractor shall 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 shall be approved by the Engineer prior to actual work. Cover cleaning shall be completed prior to adjustment of frames. Also, all water valve risers shall 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 shall 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 shall purchase the additional sets.

WATER VALVE AS-BUILTS

Upon completion of water valve box adjustments, the Contractor shall provide one complete accurate and clearly legible set of as-built waterline Quarter Section maps to the Engineer. The Contractor shall 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 **MAG Subsections 345.5 MEASUREMENT and 345.6 PAYMENT** and substitute the following:

345.5 MEASUREMENT

Measurement for adjustments shall be per each respective item.

345.6 PAYMENT

No separate measurement or payment will be made for maintaining access and exposing existing valve frame and cover or survey monuments to finished grade.

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

SEQUENCE OF CONSTRUCTION

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

The project shall follow a phasing plan approved by the Engineer. All lanes shall be maintained on a paved surface at all times during construction. This may be accomplished by using existing, new, or temporary asphalt pavement. Trenches shall 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, unless required by the City of Phoenix. If the City of Phoenix requires work to be done at night, it will be done at no additional cost to the City.

The right to direct the sequence of construction is a function vested solely with the Engineer. Prior to commencement of the work, the Contractor shall prepare and submit to the Engineer, a written phasing plan and work schedule for the project. This plan and work schedule shall be submitted to the Engineer at the Preconstruction Conference for review.

When approved, the phasing plan and work schedule shall not be changed without the written consent of the Engineer. Orderly procedure of all work to be performed under this contract shall be the full responsibility of the Contractor. The work schedule shall include the hours per day and the days per week that the Contractor plans to work on the project site.

17. **401 TRAFFIC CONTROL**, add the following to **Subsection 401.5 GENERAL TRAFFIC REGULATION**:

TRAFFIC REGULATIONS

A. The following shall be considered Arterial streets:

35th Ave, 16th St, 32nd St, and Indian School Rd,

The following shall be considered Collector streets:

Polk St, 34th Ave, 33rd Ave, Taylor St, Jackson St, Madison St, 18th St, 28th St, and 16th Pl,

- B. All traffic and/or traffic control devices on this project shall be provided, maintained and/or controlled as specified in the City of Phoenix Traffic Barricade Manual, latest edition and addendums thereof.
- C. Permission to restrict City streets, sidewalks and alleys (street closure permits) shall be requested as specified in the City of Phoenix Traffic Barricade Manual, latest edition and addendums thereof.
- D. Unless otherwise provided for in the following "Special Traffic Regulations", all traffic on this project shall be regulated as specified in the City of Phoenix Traffic Barricade Manual, latest edition and addendums thereof.
- E. No deviation to the "Special Traffic Regulations will be allowed or implemented unless submitted to the Engineer for review and approval two (2) weeks 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 <u>Traffic Barricade Manual</u> without authorization
\$1,000	Failing to correct or cure a violation, as listed in this schedule, 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 <u>Traffic Barricade Manual</u>
\$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.

18. **401 TRAFFIC CONTROL**, Add the following to **Subsection 401.5 GENERAL TRAFFIC REGULATION**:

SPECIAL TRAFFIC REGULATIONS

Any Restrictions and/or Closures will only be approved based on scope of work.

Traffic restrictions are not permitted on Arterial/Collector streets during peak traffic hours (6:00 a.m. to 8:30 a.m. and 4:00 p.m. to 6:30 p.m. weekdays). Outside of these hours the following applies:

Arterial Streets

Minimum number of travel lanes to be open to through traffic:

- a. If more than four lanes exist:.....Two will be open each way;
- b. If four or less lanes exist:One will be open each way
- c. On one-way streets:.....Two lanes open

At signalized intersections, a minimum of four lanes (two each way) plus left-turn lanes will be maintained open from 8:30 a.m. to 4:00 p.m., and from 6:30 p.m. to 6:00 a.m., Monday through Fridays including weekends unless otherwise noted within the approved TRACS permit issued to the contractor.

Collector Streets

A minimum of two travel lanes (one each way) will be open to through traffic.

At signalized intersections, a minimum of two lanes (one each way) plus left-turn lanes will be maintained open from 8:30 a.m. to 4:00 p.m., and from 6:30 p.m. to 6:00 a.m., Monday through Fridays including weekends unless otherwise noted within the approved TRACS permit issued to the contractor.

Pre-construction Field Meeting

Prior to requesting a TRACS Permits, the Contractor must coordinate in advance with the construction inspector to schedule a pre-construction field visit. The following personnel shall attend the meeting: Contractor, contracted barricade company, construction inspector and right-of-way inspector.

Nighttime Regulations

To minimize disruption to traffic, crews may be requested to work at night during off-peak hours. In this case, an after-hours permit will be required to authorize work in residential areas. Permits may be granted for up to 30

days for hours including nights, weekends, and holidays and are issued under Phoenix City Code 23-14 for building and roadway construction by the Planning and Development and Street Transportation departments, respectively. The purpose of the permits is to authorize work yet minimize loud and disturbing noises in residential areas due to construction or maintenance activities.

Variable Message Boards

Variable Message Boards (VMB) shall be provided on this project, 24 hours per day, from up to 10 days prior to any roadway closures and from at least 5 days prior to; maintaining a single thru lane at a signalized intersection, restricting left turn movement or 24-hour lane restrictions. The VMB shall remain in place until all roadway traffic restrictions are removed or approval from the area Right-of-Way Inspector.

Special Sign Requirements

The Contractor shall provide, install and maintain advance notification, public informational and directional access signs (for businesses, churches, hospitals, schools, 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 shall be included in the bid item for Traffic Control Devices.

No Parking Signs

When used, temporary NO PARKING signs must be placed 72 hours in advance for notification.

Signs should be spaced 80 feet apart for collector and arterial streets. On local Streets, a minimum of one (1) sign must be placed in front of each affected resident not to exceed 80 feet.

Signs must be clearly marked with "Date" to "Date" and the time period of the no parking.

NO PARKING Signs must be new and not reused, dates and times must be legible.

Contractor must provide Parking enforcement a picture of the placement of the no parking sign with a date and time stamp on the picture.



Police Officer Requirements

Off-duty police officers are required for construction projects as defined in the most recent edition of the City of Phoenix Traffic Barricade Manual and TRACS permit. The Contractor must competitively procure off-duty police with vendors who are Authorized Traffic Coordinators with the City of Phoenix Police Department or Phoenix Police Department off-duty detail.

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.

The Contractor shall provide one off-duty police officer, as defined in the City of Phoenix Traffic Barricade

Manual, at signalized intersections affected from 6:00 a.m. to 6:30 p.m. weekdays, and during working hours nights and weekends when traffic is restricted (as described in the Traffic Barricade Manual).

When construction activities do not restrict traffic through the intersections, police officer hours may be reduced or suspended at the direction of the ROW Inspector.

Signalized Intersection Requirements

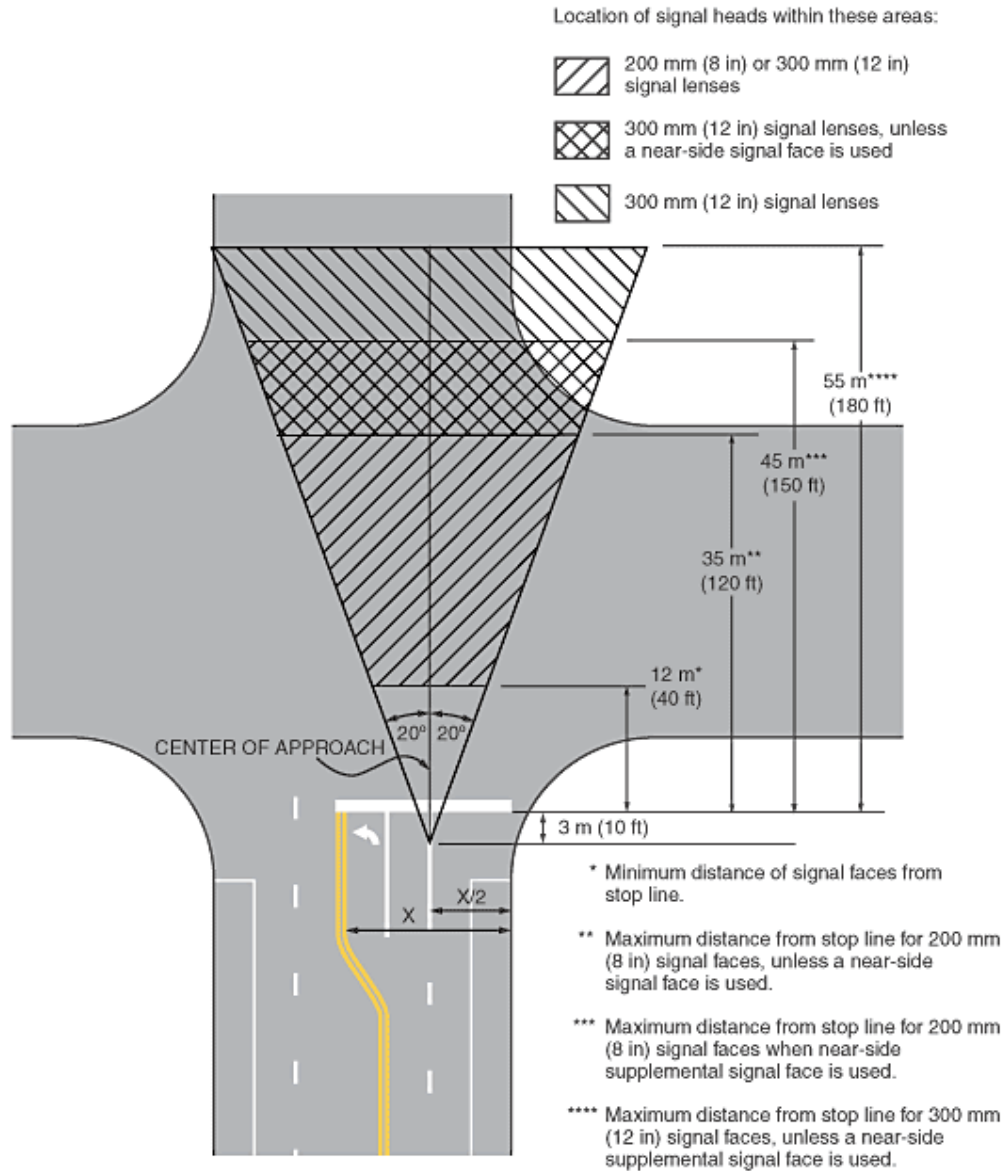
When left turns are prohibited at signalized intersections with left-turn arrow indications or when working in vicinity of a signalized intersection, the contractor will coordinate with the project inspector five days in advance and provide a written schedule indicating days, times and specific locations where left turns will be prohibited or where signals will be interrupted. The project inspector will notify the City Traffic Signal Shop (phxtmc@phoenix.gov) at least 72 hours in advance to make arrangements for arrow indications to be turned off or to coordinated signals being affected by the construction.

The contractor shall maintain the project inspector informed of any schedule changes or when work will be completed. When the work has been completed the inspector will immediately notify Traffic Signal Shop (phxtmc@phoenix.gov) so they can reactivate the left-turn arrow.

Traffic Signal Head Visibility Requirements

The contractor shall maintain a "40-degree Cone-of-Vision" at all intersections, for full view of the intended traffic. If during construction, traffic will be positioned in such a manner that the driver cannot see a minimum of two (2) traffic signal head indications within 20-degrees either side of straight ahead (40-degree Cone-of-Vision), immediately contact the Signal Engineer at 602-262-4693 prior to the start of any work.

Figure 4D-2. Horizontal Location of Signal Faces



Note: This figure illustrates the horizontal location of signal faces.

Local Access Requirements

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

Business Access Requirements

Access shall 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. Access to adjacent driveways shall be provided during all non-working hours. Any business restrictions shall be coordinated with the affected business in writing at least fourteen (14) days prior to imposing restrictions.

Pedestrian Access Requirements

The Contractor shall ensure that all sidewalks on this project remain in compliance with all the issues outlined by the American Disabilities Act of 1990. All pedestrian-walking areas, whether paved or unpaved, shall be maintained open and safely or a suitable pedestrian detour route will be provided. Such measures as backfilling or ramping at a 12:1 slope to existing sidewalks, or providing alternate sidewalk areas adjacent to existing sidewalks may be used. Right-of-Way inspector may also request an ADA/Pedestrian plan for any proposed sidewalk restrictions or closures. In high pedestrian use areas, the Engineer may request temporary hard-surface walkways, and/or covered pedestrian walkways to be installed at no additional cost to the City.

Frontage Road Access Requirements

Local access shall be maintained at all times on frontage roads. Frontage roads shall not be used for through traffic, equipment parking, material storage, or spoil stockpile area. Frontage road closures shall follow the same special provisions as described in "Local Access Requirements".

School Access Requirements

The Contractor shall provide clean and safe school zones, crosswalks, and walkways for students attending nearby schools during all hours of school use.

This may require backfilling trenches, temporary pavement, shoring, plating, or pedestrian bridges with handrails across open trenches.

In addition to school zones and crosswalks, the Contractor shall maintain accessibility to all school bus routes during all hours of school use. The Contractor shall notify the school Principal(s) and the school Transportation Director at least fourteen (14) days prior to any restrictions, and shall restore access as soon as possible.

Church Access Requirements

The Contractor shall maintain a high level of access to churches during all hours of church use. The Contractor shall coordinate any access restrictions with the clergy at least fourteen (14) days prior to any restrictions, and shall restore access as soon as possible.

Hospital Access Requirements

The Contractor shall maintain the Emergency entrance to nearby Hospitals by way of a paved lane for emergency vehicles at all times for the duration of the project. The Contractor shall coordinate any access restrictions with the hospital administrator at least fourteen (14) days prior to any restrictions, and shall restore access as soon as possible.

Fire Station Access Requirements

The Contractor shall maintain emergency vehicle access to and from the fire station at all times. The Contractor shall coordinate with the Fire Station Commander at least seven days prior to any restrictions and shall restore access as soon as possible.

Police Station Access Requirements

The Contractor shall maintain emergency vehicle access to and from nearby police stations at all times. The Contractor shall coordinate with the Police Station Commander at least seven days prior to any restrictions and shall restore access as soon as possible.

City Park Access Requirements

The Contractor shall maintain access to nearby parks during park hours. Any restrictions shall be coordinated with the appropriate Parks District Supervisor at least seven days in advance, and full access shall be restored as soon as possible.

Recreational Trail Crossing

The Contractor shall maintain the trail crossings safely open at all times, and shall maintain all special trail signs required.

Canal Access Road Requirements

Canal access and maintenance roads shall remain open at all times.

Any work that may affect this project shall be coordinated with the appropriate Agency contact at least 14 working days in advance.

Coordination With Other Agency Projects

The Contractor will coordinate and schedule work to minimize disruption or conflicts with nearby agency projects.

Any work that may affect this project will be coordinated with the appropriate Agency contact at least 14 days in advance.

Sanitation Pick-up

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

Special Events

Should there be special events scheduled to take place during the construction of this project, it is the responsibility of the Contractor to coordinate their Construction schedule around the special event. No compensation for delays associated with special events will be considered.

Bus Stops

The Contractor shall 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 Inspector. Relocation of bus stops shall be coordinated through the area. Relocation of bus stops shall be coordinated through the City of Phoenix Public Transit Department, contact 602-534-6284 or 602-262-4087.

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 6:30 p.m. weekdays. If construction requires, intermittent flagging will be allowed from 8:30 a.m. to 4:00 p.m., if approved by City project inspector, to facilitate access for heavy construction equipment.

Traffic Control Plans

The Contractor shall 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 shall be professionally drawn on a reproducible medium, and shall be submitted to the Engineer two (2) weeks prior the contract start time or at the Pre-Construction conference, whichever occurs first.

Holiday Season Requirements

Restrictions near retail shopping areas on Major or Collector streets during the Holiday Season from November 23rd to January 1st will not be approved without pre-approval from the RMP Inspector. Contractor shall plan and coordinate their work schedule around this holiday season requirement.

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, latest 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 feet on centers, having a minimum height of six 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 FOR SIGNING AND STRIPING BY CITY FORCES

The City of Phoenix Traffic Services Division (TSD) may complete the signing and striping work for the project. When the Contractor is ready for final signing and striping, he shall notify the Engineer and make a request for the City Forces to complete the work. TSD will not schedule the signing and striping until they inspect the Site and see that the final pavement treatment is applied. It may take up to 16 weeks to complete the final signing and striping. During that time, the Contractor shall keep all traffic control devices in place, according to the approved traffic control plan, until their removal is approved by the Engineer. The Engineer may request a new traffic control plan or changes to the traffic control during this period. The Contractor shall make requested changes at no additional cost. No separate measurement or payment will be made for the extended duration of traffic control devices between the time that the Contractor makes the request until the time of completion of the work by City Forces. The work shall be included in the bid item "TRAFFIC CONTROL DEVICES".

19. **401 TRAFFIC CONTROL**, Add the following to **Subsection 401.10 PAYMENT**:

ALLOWANCE FOR UNIFORMED, OFF-DUTY LAW ENFORCEMENT OFFICER

Project ST83140115 and ST83140120 includes a lump sum "ALLOWANCE FOR UNIFORMED, OFF-DUTY LAW ENFORCEMENT OFFICER. The amount of this allowance is determined by the Engineer, and is not subject to individual bid pricing. All bidders shall incorporate the amount pre-entered in the bid proposal and shall reflect the same in the total amount bid for this project.

Payment for uniformed, off-duty law enforcement officers shall be made from this allowance based on approved invoiced cost plus taxes, and a maximum 10 percent markup for overhead and profit.

TRAFFIC CONTROL

Payment for traffic control will be on a lump sum basis under the bid item "Traffic Control Devices".

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

402.1 FIELD DOCUMENTATION

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

402.2 CONTRACTOR COMMUNICATION INFORMATION

The Contractor shall provide a mobile phone to his on-site Project Superintendent to ensure that the Engineer can reach the Contractor's Superintendent. This mobile phone must be accessible by local land-line telephone service. The Superintendent's mobile phone shall remain in service for the duration of the project, and these phone numbers shall 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 shall 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 shall not be allowed to stockpile trench material or store any equipment the right-of-way. The Engineer may consider allowing storing the main track hoe in a nearby local street and the contractor shall 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 shall be allowed on any major streets. The open trench is defined as trench that is not backfilled up to the sub-grade level or deeper than 1-ft from adjacent pavement grade. Trenches across driveways, and where required for traffic control, shall be plated to maintain access. The cost of these plates shall be considered incidental to the project.

402.6 CAST-IN-PLACE PIPE RESTRICTION

Cast-in-place pipe shall not be allowed as an alternate.

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 shall clean the requested areas with a power pick-up broom.

Use of the power pick-up broom in the special requested areas only shall be measured and paid for on an hourly basis under the bid item, 'ALLOWANCE FOR EXTRA WORK'.

402.8 PUBLIC INFORMATION SERVICES

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

The Contractor shall 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 shall also provide schedule update information to the specialist.

The Contractor shall 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 shall be deducted from the Contractor's final pay request.

402.10 POLLUTION AWARENESS MARKERS

Pollution Awareness Markers (PAM's) shall 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 shall be installed at the location identified by the Engineer. For existing catch basins, flat PAM's will be supplied, and the contractor shall 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 shall install them as the catch basin is cast.

21. 505 CONCRETE STRUCTURES, Add the following Subsection 505.1.1.1 TRENCH DRAIN INSTALLATION:

The contractor shall follow section 505 for construction placement of concrete, curing, reinforcement, and finishing for the installation of a trench drain.

Item description

The Contractor shall refer to the engineer's estimate detail of the trench drain for dimensions and design notes. The Contractor shall provide shop drawings for approval. The grate shop drawings would need approval to show it provides HS20 loading capacity before installation.

The Contractor shall avoid damaging any pipes, conduits or duct bank facilities during excavation, foundation and bedding placement, and trench backfilling and compaction.

Measurement and Payment

The Contractor will include all associated costs in the unit bid price for the trench drain installation, excavation, and earthwork.

22. Add the following to MAG Subsection 505.12 PAYMENT:

CATCH BASINS

Storm drain catch basins shall 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 shall 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 shall install 3-inch diameter standard strength iron pipe through the catch basin. This pipe shall project a minimum of 6-inches past the outside wall.

23. 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 during the days production shall 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, shall be hauled from the job site and disposed of by the Contractor.

24. **601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION**, Add the following to **Subsection 601.2.7 Shoring and Sheeting:**

The Contractor shall 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 shall not be removed in one operation, but shall 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 shall be included in the unit price for the pipe.

25. **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), shall not exceed 1,320 feet in the aggregate at any one location. The open trench is defined as trench that is not backfilled up to the sub-grade level or deeper than 1-ft from adjacent pavement grade.

Any excavated area shall be considered open trench until all backfill material is placed and compacted up to 1-ft below adjacent grade. 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 shall be completely backfilled as soon as possible after pipe laying.

Substantial steel plates with adequate trench bracing shall 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 shall be provided. The Engineer may designate a passage to be provided at any point he deems necessary.

26. **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 shall be sawcut to neat, vertical, true lines in such a manner that the adjoining surface will not be damaged. The minimum depth of cut shall be 1 ½ inches or ¼ of the thickness, whichever is greater.

Asphalt pavement shall 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 shall be hauled from the job site immediately, and will not be permitted in the backfill.

27. **601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION**, Add the following to **Subsection 601.3.3 Bedding for Storm Sewers Maintained by the City of Phoenix:**

All Controlled Low Strength Material (CLSM) shall 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.

28. **601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION**, Add the following to **Subsection 601.3.4 Backfill**:

BACKFILL TYPE REQUIREMENTS FOR PIPE TRENCHES

Type "B" backfill, as shown on City of Phoenix Detail P1200, shall be used for all mainline pipe installations across major, collector, or other signalized intersections. At a minimum, the extent of the Type "B" backfill shall be from curb-return-to-curb-return through the intersection, unless noted otherwise on the plans or in the special provisions. Type "B" backfill shall 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 shall be as specified on the plans or in the special provisions, and shall be paid for by the square yard or by the ton, whichever is indicated in the special provisions and on the bid proposal.

29. **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 shall be considered incidental to the cost of the pipe.

30. **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, shall be maintained in continuous service throughout the entire contract period. The Contractor shall 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 shall make the necessary arrangements and agreements with the owner and shall be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. All property shall 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 shall be subject to inspection and approval by both the Engineer and the owner of the utility.

The Contractor shall 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 shall 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, shall 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 shall take all necessary precaution against damage to them. The Contractor shall 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 shall 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 shall 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 shall be 9-feet, unless otherwise directed by the Engineer. Mechanical or restrained joints shall 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 shall 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 shall 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 shall be coated per the specification 751, "CIPP LINING FOR DUCTILE IRON PIPE USED FOR SEWER LINES" in the Water Services Department Design Standards Manual.

Upon completion of a sanitary sewer line support or encasement, including backfilling and compacting, but prior to permanent pavement replacement, the Contractor shall 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 shall 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 shall provide the necessary equipment and televise the line to determine proper pipe alignment. The Engineer shall be present during the televising, and a video tape of the televising shall 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 shall be included in the bid price paid for the pipe support or encasement.

Permanent pipe supports shall be paid for at the unit price bid for each unit installed regardless of type. Encasements shall be paid for at the unit price bid per linear foot installed regardless of type. The unit price bid for either item of work shall 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 shall be supported and protected by the Contractor. Support for plastic pipes shall 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 shall 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 the work of protecting utilities. The Contractor will include all associated costs in the unit bid price for the pipe installation.

Permanent Pipe support for Sanitary Sewerlines will be made under bid item "Permanent Pipe Support, MAG Standard Details 403-1, 403-2, or 403-3", regardless of the cost of the option used. The cost for each pipe crossing support shall include any CIPP lining if the Ductile Iron pipe section is used.

31. **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 shall 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 shall 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.

32. **610 WATERLINE CONSTRUCTION**, Add the following to **Subsection 610.4 CONSTRUCTION METHODS:**
WATER MAIN REALIGNMENT

In the event of unavoidable conflict between proposed construction and an existing water main, the Contractor shall vertically and/or horizontally realign the water main in accordance with COP Detail P1370 and Section 610, and restrained joint length requirements of MAG STD Detail 303. No concrete thrust blocks will be allowed. All pipe shall be ductile iron with restrained joints. Existing Asbestos Cement Pipe shall be removed and properly disposed of, and the pipe shall be replaced with new ductile iron with restrained joints to achieve required restrained lengths.

The water main realignment shall include, but not be limited to, excavation, backfill, compaction, pipe, fittings, offsets, couplings, sleeves, joint restraint and hardware. The realigned water main shall be visually inspected for leaks under line pressure prior to backfilling. The contractor shall as-built all realignments in accordance with the requirements of WSD Engineering Standard DCE-D01, and provide the information on the final as-builts.

The Contractor shall 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 cuttings, take the line out of service and flush the relocated line prior to placing it back in service. The contractor may require multiple shutdowns to complete the work of realignment and minimizing impacts to the water meter customers. The contractor shall request quarter section maps from the Water Services Department to identify all water mains and service connections within the limits of the water realignment.

Materials for water main realignment shall 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, inclusive of replacement of pipes to achieve required restrained joints, for the various water main sizes encountered.

On Project ST83140111 and ST83140113, Payment for realignment of water mains will be made at the unit price bid per each under proposal items " VERTICAL REALIGNMENT OF EXISTING 6" WATER PIPE". Measurement will include the additional pipe removal and replacement, or installation of external restrains, to achieve require restrained lengths on both sides of the realignment

On project ST83140116, Payment for realignment of water mains will be made at the unit price bid per each under proposal items " 6" DUCTILE IRON WATER PIPE & FITTINGS, RESTRAINED, FURNISH & INSTALL" and "8" DUCTILE IRON WATER PIPE & FITTINGS, RESTRAINED, FURNISH & INSTALL". Measurement will include the additional pipe removal and replacement to achieve require restrained lengths on both sides of the realignment. The cost of reconnecting existing services and water mains within the limits of the realigned section is incidental to this item.

New 6-inch ductile iron pipe for Fire Hydrant relocation shall be measured and paid under "6" DUCTILE IRON WATER PIPE & FITTINGS, RESTRAINED, FURNISH & INSTALL". Any additional water main needed to connect existing mains to the realigned section will also be paid under this item.

On project, ST83140113 and ST83140116, contingency items have been created to reconnecting existing services and water mains within the limits of the realigned section is incidental to this item.

33. 610 WATER LINE CONSTRUCTION, Add the following to Subsection 610.7 VALVES:

LOCATING, CLEANING AND INSTALLING WATER VALVE BOX DEBRIS CAP WITH LOCATOR COIL

The Contractor shall furnish and install a debris cap with a locator coil in all new water valve boxes installed; in all existing water valve boxes adjusted to grade; and in all other existing water valve boxes within the project limit right-of-way, even if not called out for adjustment to grade. The debris cap shall be in accordance with City of Phoenix Supplement to MAG Detail P-1165 and shall include a locator coil.

Prior to installation of the debris cap, valve risers shall be thoroughly cleaned, fully exposing the operating nut. In addition, the Contractor shall attempt to locate all unexposed water valves within the project limits, as indicated by City of Phoenix Water Services Department water valve Quarter-Section maps. In attempting to locate unexposed valve boxes, the Contractor shall excavate a minimum depth of eighteen (18) inches from the surface. Unexposed valve boxes found shall be brought up to finish grade; cleaned to fully expose the operating nut; and a debris cap with locator coil shall be installed.

Measurement for debris caps furnished and installed in water valve boxes (adjusted to grade or not) shall be

per each unit, including locating and cleaning. The Contractor shall obtain the appropriate Water Services Department water valve Quarter-Section maps at Phoenix City Hall, 200 W. Washington Street, 8th Floor, at no additional cost to the City, and shall make a diligent effort to locate all existing unexposed water valves shown on these maps. The Contractor shall clearly mark all unexposed water valve boxes actually located on record plans and copies of the water valve Quarter-Section maps showing specific found location information, and these plans shall be provided to the Engineer. The cost for the Contractor to extend any risers on found unexposed valve boxes to bring them up to finish grade shall also be considered incidental.

No separate payment will be made for this work in paved and unpaved areas. The work shall be considered incidental to "ADJUST EXISTING TYPE A WATER VALVE, STANDARD DETAIL P-1391 and P-1391-1".

There will be no separate measurement or payment for any labor, materials or equipment used in attempting to locate valves shown on the Quarter-Section maps that are not actually found. Valve locating attempts that do not produce any resulting "finds" shall be considered incidental.

34. 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 shall make written request to Water Distribution at least three (3) calendar weeks before the shutdown. Requests shall 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 shall be prepared to de-water as necessary to accomplish the work.

The Contractor shall be responsible for maintaining accessibility to the valve operating nuts for all valves within the project boundaries. Failure to maintain accessibility to valves shall 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.

For Project ST83140111, the contractor shall verify the depth of the 48-inch transmission main on Madison Street as one of the first items of work, to confirm that the installation of the pipe and catch basin can maintain 2 ft of undisturbed cover over the transmission main. If this cover cannot be maintained, the transmission main may need to be shut down to complete the work. The Contractor will be required to coordinate with the Water Services Department to develop a Maintenance Of Plant Operation (MOPO) schedule outlining any required outages and additional steps to protect the integrity of the pipe including but not limited to avoiding joints in the new storm drain pipe over the transmission main, hand digging or use of hydro vacuum equipment, in around the main, trench backfill with CLSM over the main, scheduling de-energizing periods, and processes related to emergency repairs caused by the contractor. Contractor is advised that review and coordination of a MOPO and related transmission main outage must be approved by the Water Services Department Shutdown Committee, which is a process that can take four to six months, and it is subject to maintain adequate level of service citywide. No additional payment will be made for coordination or additional construction requirements outlined

in the approved MOPO.

35. **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 shall 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 shall be two (2) inches in diameter.

36. **610 WATER LINE CONSTRUCTION**, Add the following to **Subsection 610.19 MEASUREMENT AND PAYMENT**:

(I) 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, shall be paid for separately under the bid item, "ALLOWANCE FOR EXCESS DUCTILE IRON FITTINGS, FURNISH AND INSTALL". Payment for these fittings shall 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 shall be considered incidental to the cost of the water pipe.

(J) Replacement of existing Asbestos Cement Pipe required as part of City Supplement Section 601.2.8, or where shown in the plans, will be paid under "8" DUCTILE IRON WATER PIPE & FITTING, RESTRAINED, FURNISH & INSTALL (ACP REPLACEMENT)" or "WATERLINE REPLACEMENT (ACP REPLACEMENT, 20 FT) and includes all cost involved with the pipe replacement including fittings, couplers, and proper disposal of ACP pipe.

37. **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."

38. **618 STORM SEWER CONSTRUCTION WITH PRE-CAST CONCRETE PIPE, HIGH DENSITY POLYETHYLENE PIPE, OR STEEL REINFORCED POLYETHYLENE PIPE**,

Add the following to Subsection 618.1 DESCRIPTION:

The work under this item shall consist of furnishing all materials, equipment, tools and labor for installing 15" and 12" inline elastomeric check valve and all associated fittings. The inline elastomeric check valves are designed to function when line pressure exceeds the backpressure, and the line pressure forces the valve open, allowing flow to pass. When the backpressure exceeds the line pressure, or in the absence of any upstream or downstream pressure, the valve is forced closed, preventing backflow.

Add the following to Subsection 618.2 MATERIALS:

- A. Inline Elastomeric Check Valves are to be all rubber flow operated check type with slip-in cuff connection. A separate valve body or pipe used as the housing is not acceptable. The inline elastomeric check valve shall be manufactured with no metal, mechanical hinges or fasteners, which would be used to secure any component of the valve to a valve housing. The port area of the saddle shall contour into a circumferential sealing area that is concentric with the pipe which shall allow passage of flow in one direction while preventing reverse flow. The entire inline elastomeric check valve shall fit within the pipe inside diameter and must be easily installed in pipes without the need to modify to seal and anchor the valve. Once installed, the inline elastomeric check valve shall not protrude beyond the face of the structure or end of the pipe.
- B. The outside diameter of the upstream and downstream sections of the inline elastomeric check valve must be circumferentially in contact with the inside diameter of the pipe.
- C. Slip-in style inline elastomeric check valves will be furnished with a set of stainless steel expansion clamps. The clamps, which will secure the valve in place, shall be installed in the upstream or downstream cuff of the valve, depending on installation orientation, and shall expand outwards by means of a turnbuckle. Each band shall be pre-drilled allowing for the inline elastomeric check valve to be pinned and secured into position in accordance with the manufacturer's installation instructions.
- D. Manufacturer must provide flow test data from an accredited hydraulics laboratory to confirm pressure drop and hydraulic data.
- E. Contractor to submit product literature to the engineer that includes information on the performance and operation of the valve, materials of construction, dimensions and weights, elastomer characteristics, headloss, flow data and pressure ratings.
- F. Upon request, the contractor is to submit to the engineer shop drawings that clearly identify the valve materials for construction and dimensions.

Add the following to Subsection 618.3 CONSTRUCTION METHOD:

- A. The inline elastomeric check valves shall be installed in accordance with the manufacturer's written Installation and Operation Manual and approved submittals.

Add the following to **Subsection 618.6 MEASUREMENT:**

- (F) Pipe Plugs: Pipe plugs, per MAG Detail 427, shall be measured per each unit installed, regardless of dimensional differences.
- (G) Storm Dain Inline Elastomeric Check Valve: shall be measured per each, regardless of dimensional differences.

39. 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:**

- (A) Pipe Plugs: Pipe plugs, per MAG Detail 427, shall be paid for at the unit price bid for each plug, and price shall 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.
- (B) Storm Dain Inline Elastomeric Check Valves shall be paid for at the unit price bid for each check valve, and price shall be compensation in full for furnishing all labor, material, tools, equipment, and incidentals for furnishing and installing the inline elastomeric check valves complete-in-place per Manufacturer's Specifications.

40. **620 STORM SEWER CONSTRUCTION WITH CAST-IN-PLACE CONCRETE PIPE:**

Revise all references to the term "storm sewer" to read "storm drain."

41. **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 shall not be used in the City of Phoenix.

42. **625 MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS,** Add the following to **Subsection 625.3.1 MANHOLES:**

If steps are inadvertently installed, they shall be removed and the holes shall be filled with epoxy or Class "B" concrete.

43. **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 shall be seal coated in accordance with COP Supplement to MAG Specification Sections 626 and 627.

44. **625 MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS,** Delete the first paragraph in **Subsection 625.5 PAYMENT** and replace with the following:

Manholes shall be paid for at the unit price bid for each type, 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 shall be compensation in full for furnishing and placing manhole structures as shown on the plans and as specified, including concrete, reinforcing steel, forming, vibrating, finishing, curing, cast iron manhole frame and cover, frame adjustment to grade, structural excavation, backfill, compaction and any pavement replacement in excess of the applicable pay widths assigned to the adjacent pipes.

45. **631 WATER TAPS AND METER SERVICE CONNECTIONS,** Add the following **Subsection 631.3 Excavation and Backfill:**

Bedding and backfill shall be full depth ABC for water services installed under pavement using open trench method. The cost of the ABC material, labor and compaction shall be included in the cost of the water service work.

46. **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 shall 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 shall be replaced.

The water service shall 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 shall remain, but the Contractor shall not use any other salvaged service connection components. If the saddle is a single strap, the saddle shall be replaced with a double strap saddle. In the event there is no tapping saddle, The Contractor shall install one. The cost of the saddle and reinstallation of the corporation stop shall 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 shall be full depth aggregate base course. Payment for furnishing and compacting the aggregate base course shall be included in the bid item for replacing or extending existing water services.

The Contractor shall schedule his work so that no open trenches are left overnight.

Materials for water service connections shall conform to MAG Section 754 and City of Phoenix Supplement 610.4.4 and 610.4.5. Joints in the copper tubing shall 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 shall 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 shall 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 shall pick up the specified number of units from the Water Distribution Warehouse located at 2500 S. 22nd Avenue.

Water meter boxes and covers shall be Type 1, 2 or 3 in accordance with MAG Details 310, 311, 312, and 320

and P-1315.

All materials and fittings shall conform to the requirements of Section 610 and 754. No salvaged service connection components shall 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 "3/4INCH AND 1INCH WATER SERVICE REPLACEMENT PER SPECIAL PROVISIONS";

47. Add the following new **Section 635 ABANDONMENT AND REMOVAL OF EXISTING WATER FACILITIES** as follows:

635 ABANDONMENT AND REMOVAL OF EXISTING WATER FACILITIES

635.1 ABANDONMENT OF EXISTING WATERLINE

Existing waterlines shown on the plans to be abandoned shall be done after all water services have been disconnected. The Water Services Department will locate and mark the specific locations where the water lines are to be abandoned. The Contractor shall expose the existing water main to be abandoned and cut and plug as required on the plans.

For connections where an existing tee, cross or tapping sleeve and valve, or corporation stop exists at the main, the Contractor shall remove the tee, cross or tapping sleeve and valve or corporation stop and replace the water main in accordance with City of Phoenix Standard Detail P1344. Payment for this work will be made at the unit price bid for "WATERLINE CUT-OUT, STD DETAIL P1344", and shall include all labor and material necessary to locate; remove crosses, tees, or tapping sleeves and valves or corporation stops; replace section of mainline pipe; backfill and compact.

For locations where a "Cut and Plug" is called for on the plans, the Contractor shall provide a cut and plug on the existing pipe in accordance with City of Phoenix Standard Detail P1343. Measurement and payment for this work will be made at the unit price bid per each for the bid item "CUTTING AND PLUGGING EXISTING WATER LINE" and shall include all labor and material necessary to complete this item in place.

Concrete and asphalt concrete pavement removal and replacement for curbs, sidewalks, driveways, etc. necessary to complete this work shall be considered incidental to the abandonment work and shall be included in the cost for each abandonment. Pavement replacement, if any, shall be paid for under a separate bid item for that work.

48. **702 BASE MATERIALS** Add the following to **MAG Section 702 BASE MATERIALS**:

All Select Material specified on the plans and Standard Details shall be Type "A" in accordance with Table 702-1.



STREET TRANSPORTATION DEPARTMENT

PROJECT ENVIRONMENTAL REQUIREMENTS MEMORANDUM (PERM)

Project Information:

Project Name:	Drainage Improvements: 16 th St-18 th St., between Madison St. & Union Pacific Railroad				
Project No.:	ST83140111	Project Manager	Ryan Bentz	Plan Stage:	100%

PERM Completed By:

Andrea Love

Digitally signed by Andrea Love
Date: 2024.06.25 16:33:12 -07'00'

6/25/2024

Environmental Quality Specialist
Office of the City Engineer

Signature

Date

Environmental Summary:

Resource	Present? (Y/N)	Environmental Mitigation Measures (include in project specifications)
Area of disturbance equal or greater than 1 acre	N	<ul style="list-style-type: none"> Less than 1 acre of ground disturbance is anticipated; if accurate, no AZPDES Construction General Permit is required. Regardless of acreage, the contractor must comply with Phoenix City Code 32C. The City Project Manager (PM) or design engineer must complete the MS4 Plan Review Checklist at or near the final design stage.
Biological Resources (wildlife and vegetation)	N	<ul style="list-style-type: none"> Project area has very sparse landscaped vegetation present. Based on the scope of work, impacts to vegetation should be avoided. Due to proximity, the Migratory Bird Treaty Act construction flyer, attached, shall be provided to the contractor prior to the start of work.
Clean Water Act-Section 404/401	N	<ul style="list-style-type: none"> No potential Waters of the U.S. were observed in the area of impact. No Clean Water Act Section 404 permitting is required.
Archaeological Resources	Y	<ul style="list-style-type: none"> The project area is partially located within a large prehistoric habitation and agricultural site, and the historic Eastlake Park Neighborhood. The project area potentially crosses, the historic Southern Pacific Railroad: Wellton-Phoenix- Eloy Spur, at the southern extent of the project. The project area is also crossed in two places by a projected prehistoric canal alignment. The current project area is completely within cultural sites and their 250-ft buffer zones. According to records, archaeological monitoring was conducted on 18th Street between Madison Street and the Union Pacific Railroad (UPRR) within this project area as part of another drainage project, the results of which are documented. No archaeological resources were identified within the current project area. The City of Phoenix Archaeology Office recommends archaeological monitoring of ground-disturbing activities within portions of the project area not previously monitored. At least three months before construction, contact the Environmental Program Manager, James Marshall (james.marshall@phoenix.gov) to arrange to have an archaeologist under contract to provide archaeological monitoring. The archaeologist must attend the pre-construction meeting and must be given the schedule and contact information for coordination efforts. The Acknowledgement of Project Archaeological Requirements Form, attached, must be

		given to the contractor, signed, and a copy returned to the City of Phoenix PM and the Office of the City Engineer EQS BEFORE construction begins.
Historic Resources	N	<ul style="list-style-type: none"> There are listed or eligible historic properties or districts within or adjacent to the project. The City Historic Preservation Office determined the project will have “no adverse effect to these properties or districts.
Hazardous Materials	TBD	<ul style="list-style-type: none"> If suspected hazardous materials are encountered during construction, work shall cease at that location and the PM will be notified immediately to make arrangements for proper treatment and disposal of those materials.
General Environmental		<ul style="list-style-type: none"> If the project scope or footprint changes, the City of Phoenix PM will contact the City Engineer-EQS to determine if additional environmental review is required. The City of Phoenix PM shall include all required environmental mitigation measures in the project specifications.

Attachments:

- Migratory Bird Treaty Act construction flyer
- The Acknowledgement of Project Archaeological Requirements Form



City of Phoenix

STREET TRANSPORTATION DEPARTMENT
Office of the City Engineer

ACKNOWLEDGEMENT OF PROJECT ARCHAEOLOGICAL REQUIREMENTS

Project No.: ST83140111

Project Name: Drainage Improvements: 16th St-18th St., between Madison St. & Union Pacific Railroad

The City of Phoenix Office of the City Engineer is requesting that the Project Archaeological Requirements Acknowledgment Form is completed for all City sponsored or managed projects involving ground subsurface disturbance activities in areas that may include archaeological resources, as determined by the City of Phoenix Archaeology Office (CAO).

Background

In 1990, the Arizona legislature amended two state laws (Arizona Antiquities Act & State Historic Preservation Act) that protect human burials and associated artifacts on both private and state land. As specified in these laws and rephrased below:

- I. A person shall not knowingly excavate in or upon any historic or prehistoric archaeological site, except when acting as a duly authorized agent of an institution or corporation organized for scientific, research or land use planning purposes. [Arizona Revised Statute §41-841(A) and §41-842(A) - Archaeological Discoveries] Any person, institution or corporation violating any provision of this article is guilty of a class 2 misdemeanor. [A.R.S. §41-846 - Violation]
- II. A person who knowingly excavates in violation of A.R.S. §41-841 is guilty of a class 5 felony pursuant to Arizona Criminal Code - Title 13. A second or subsequent violation under this subsection is a class 3 felony. [A.R.S. §13-3702.01 - Excavating Certain Sites].

A class 5 felony carries potential penalties of up to two years in prison. The City of Phoenix (City) project located at 16th St-18th St., between Madison St. & UPRR may impact historic or pre-historic archaeological resources. Therefore, no subsurface disturbance activities related to this project shall occur without having an archaeological consultant on-site prior to and during this project's ground disturbance activities.

Terms and Conditions

This section is to be completed by General Contractor Supervisor or Onsite Supervisor ("Supervisor"). The completed acknowledgement form shall be submitted to the Street Transportation Project Manager/Inspector and City Engineer's Environmental Section prior to the start of ground disturbance activities.

By signing below, I agree that I am the Supervisor for the above-mentioned project. As the Supervisor, I also agree that:

- 1) I have been duly informed of the above-referenced laws.
- 2) I have been duly informed of the consequences that violations of the above referenced laws carry.
- 3) I have been duly informed that this project may impact historic or pre-historic archaeological resources.

- 4) I am overseeing the subsurface disturbance activities that occur in areas that require archaeological monitoring. No activities will occur, regardless of the person or entity undertaking them, without these activities being monitored by an Archaeological Monitor appointed by the City of Phoenix.
- 5) I will submit to the Street Department Project Manager and the Office of the City Engineer, Street Transportation Environmental Quality Specialist, this fully signed document prior to beginning ground disturbing activities.
- 6) I will have the City's On-Call Field Archaeologists sign this document upon their completion of the required archaeological mitigative actions for all the ground disturbing activities for this project and provide them a copy (hardcopy or electronic).

Failure to comply with any or all these requirements will cause the City to pursue necessary legal action for violation of this contract and the City will notify the appropriate state department(s) of the violation of state archaeological regulation(s) and the Arizona Criminal Code. The City of Phoenix reserves the right to withhold payment for services and seek damages if the provisions in the Terms and Conditions of this Acknowledgement of Project Archaeological Requirements form are ignored and unlawful activity takes place which results in damages.

Signed: _____ Title: _____
(General Contractor or On-Site Supervisor)

Name: _____ Date: _____

Completion of Archaeological Monitoring

This section is to be signed after completion of the required archaeological monitoring:

Signed: _____ Title: _____
(General Contractor or On-Site Supervisor)

Name: _____ Date: _____

Signed: _____ Title: _____
(Archaeological Monitor)

Name: _____ Date: _____

Please email the fully-signed acknowledgement form to the project manager, andrea.love@phoenix.gov, and james.marshall@phoenix.gov when archaeological monitoring is completed for the entire project. Copies of this Acknowledgement of Archaeological Requirements form may be requested by various stakeholders or consulting parties (e.g., Arizona State Museum, Tribal and State Historic Preservation Offices).



STREET TRANSPORTATION DEPARTMENT

PROJECT ENVIRONMENTAL REQUIREMENTS MEMORANDUM (PERM)

Project Information:

Project Name:	18th St and Jackson Street Drainage Improvements				
Project No.:	ST83140113	Project Manager	Ryan Bentz	Plan Stage:	100%

PERM Completed By:

Andrea Love

Digitally signed by Andrea Love
 Date: 2024.06.25 14:23:23 -07'00'

6/25/2024

Environmental Quality Specialist
 Office of the City Engineer

Signature

Date

Environmental Summary:

Resource	Present? (Y/N)	Environmental Mitigation Measures (include in project specifications)
Area of disturbance equal or greater than 1 acre	N	<ul style="list-style-type: none"> Less than 1 acre of ground disturbance is anticipated; if accurate, no AZPDES Construction General Permit is required. Regardless of acreage, the contractor must comply with Phoenix City Code 32C. The City Project Manager (PM) or design engineer must complete the MS4 Plan Review Checklist at or near the final design stage.
Biological Resources (wildlife and vegetation)	N	<ul style="list-style-type: none"> No vegetation or other suitable habitat in the project location or adjacent area. No impacts to sensitive species.
Clean Water Act-Section 404/401	N	<ul style="list-style-type: none"> No potential Waters of the U.S. were observed in the area of impact. No Clean Water Act Section 404 permitting is required.
Archaeological Resources	N	<ul style="list-style-type: none"> If any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the CAO must be notified immediately and allowed time to properly assess the materials
Historic Resources	Y	<ul style="list-style-type: none"> There is a conditional finding of "no adverse effect" contingent upon the submittals of plan sets to the Office of Historic Preservation. Crews will likely discover a former UPRR spur at this intersection and continuing west down Jackson Street. There is no adverse effect to removing this abandoned spur beneath the pavement.
Hazardous Materials	TBD	<ul style="list-style-type: none"> If suspected hazardous materials are encountered during construction, work shall cease at that location and the PM will be notified immediately to make arrangements for proper treatment and disposal of those materials.
General Environmental		<ul style="list-style-type: none"> If the project scope or footprint changes, the City of Phoenix PM will contact the City Engineer-EQS to determine if additional environmental review is required. The City of Phoenix PM shall include all required environmental mitigation measures in the project specifications.

- **Attachments:** N/A



STREET TRANSPORTATION DEPARTMENT

PROJECT ENVIRONMENTAL REQUIREMENTS MEMORANDUM (PERM)

Project Information:

Project Name:	Indian School Rd & 28th St Drainage Improvement				
Project No.:	ST83140115-1	Project Manager	Ryan Bentz	Plan Stage:	100%

PERM Completed By:

Andrea Love

Digitally signed by Andrea Love
Date: 2024.06.26 13:49:57 -07'00'

6/26/2024

Environmental Quality Specialist Office of the City Engineer	Signature	Date
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Environmental Summary:

Resource	Present? (Y/N)	Environmental Mitigation Measures (include in project specifications)
Area of disturbance equal or greater than 1 acre	N	<ul style="list-style-type: none"> Less than 1 acre of ground disturbance is anticipated; if accurate, no AZPDES Construction General Permit is required. Regardless of acreage, the contractor must comply with Phoenix City Code 32C. The City Project Manager (PM) or design engineer must complete the MS4 Plan Review Checklist at or near the final design stage.
Biological Resources (wildlife and vegetation)	N	<ul style="list-style-type: none"> No vegetation or other suitable habitat in the project location or adjacent area. No impacts to sensitive species.
Clean Water Act-Section 404/401	N	<ul style="list-style-type: none"> No potential Waters of the U.S. were observed in the area of impact. No Clean Water Act Section 404 permitting is required.
Archaeological Resources	N	<ul style="list-style-type: none"> If any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the CAO must be notified immediately and allowed time to properly assess the materials
Historic Resources	N	
Hazardous Materials	TBD	<ul style="list-style-type: none"> If suspected hazardous materials are encountered during construction, work shall cease at that location and the PM will be notified immediately to make arrangements for proper treatment and disposal of those materials.
General Environmental		<ul style="list-style-type: none"> If the project scope or footprint changes, the City of Phoenix PM will contact the City Engineer-EQS to determine if additional environmental review is required. The City of Phoenix PM shall include all required environmental mitigation measures in the project specifications.

- **Attachments:** N/A



STREET TRANSPORTATION DEPARTMENT

PROJECT ENVIRONMENTAL REQUIREMENTS MEMORANDUM (PERM)

Project Information:

Project Name:	33rd Ave & Taylor St Storm Drain				
Project No.:	ST83140116-1	Project Manager	Ryan Bentz	Plan Stage:	100%

PERM Completed By:

Andrea Love

Digitally signed by Andrea Love
Date: 2024.06.26 14:56:05
-07'00'

6/26/2024

Environmental Quality Specialist Office of the City Engineer	Signature	Date
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Environmental Summary:

Resource	Present? (Y/N)	Environmental Mitigation Measures (include in project specifications)
Area of disturbance equal or greater than 1 acre	N	<ul style="list-style-type: none"> If less than 1 acre of ground disturbance will occur, no AZPDES Construction General Permit is required. Regardless of acreage, the contractor must comply with Phoenix City Code 32C. The City Project Manager (PM) or design engineer must complete the MS4 Plan Review Checklist at or near the final design stage.
Biological Resources (wildlife and vegetation)	Y	<ul style="list-style-type: none"> Sparse landscaped vegetation is present and should be avoided to the extent practicable. The Migratory Bird Treaty Act construction flyer, attached, shall be provided to the contractor prior to the start of work
Clean Water Act-Section 404/401	N	<ul style="list-style-type: none"> No potential Waters of the U.S. were observed in the area of impact. No Clean Water Act Section 404 permitting is required.
Archaeological Resources	Y	<ul style="list-style-type: none"> A projected prehistoric canal alignment crosses this project area. According to records, no previous archaeological projects have been conducted within this project area. The City of Phoenix Archaeology Office recommends archaeological monitoring of ground-disturbing activities associated with this project within 50 feet of the projected prehistoric canal alignment. At least three months before construction, contact the Environmental Program Manager, James Marshall (james.marshall@phoenix.gov) to arrange to have an archaeologist under contract to provide archaeological monitoring. The archaeologist must attend the pre-construction meeting and must be given the schedule and contact information for coordination efforts. The Acknowledgement of Project Archaeological Requirements Form, attached, must be given to the contractor, signed, and a copy returned to the City of Phoenix PM and the Office of the City Engineer EQS BEFORE construction begins.
Historic Resources	N	
Hazardous Materials	TBD	<ul style="list-style-type: none"> If suspected hazardous materials are encountered during construction, work shall cease at that location and the PM will be notified immediately to make arrangements for proper treatment and disposal of those materials.
General		<ul style="list-style-type: none"> If the project scope or footprint changes, the City of Phoenix PM will contact the City

Environmental		<p>Engineer-EQS to determine if additional environmental review is required.</p> <ul style="list-style-type: none">• The City of Phoenix PM shall include all required environmental mitigation measures in the project specifications.
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Attachments:

- Migratory Bird Treaty Act construction flyer
- Acknowledgement of Project Archaeological Requirements Form



PROJECT ENVIRONMENTAL REQUIREMENTS MEMORANDUM (PERM)

Project Information:

Project Name:	32nd Street and Monterosa Street Drainage Improvements			
Project No.:	ST83140120-1	Project Manager	Ryan Bentz	Plan Stage: 90%

PERM Completed By: **Andrea Love** Digitally signed by Andrea Love
 Date: 2024.06.26 15:10:12 -07'00' 6/26/2024

Environmental Quality Specialist Signature Date
 Office of the City Engineer

Environmental Summary:

Resource	Present? (Y/N)	Environmental Mitigation Measures (include in project specifications)
Area of disturbance equal or greater than 1 acre	N	<ul style="list-style-type: none"> Less than 1 acre of ground disturbance is anticipated; if correct, no AZPDES Construction General Permit is required. Regardless of acreage, the contractor must comply with Phoenix City Code 32C. The City Project Manager (PM) or design engineer must complete the MS4 Plan Review Checklist at or near the final design stage.
Biological Resources (wildlife and vegetation)	Y	<ul style="list-style-type: none"> Landscaped vegetation is present in the area. Impacts to vegetation may occur but should be avoided to the extent practicable. The Migratory Bird Treaty Act construction flyer, attached, shall be provided to the contractor prior to the start of work.
Clean Water Act-Section 404/401	N	<ul style="list-style-type: none"> No potential Waters of the U.S. were observed in the area of impact. No Clean Water Act Section 404 permitting is required.
Archaeological Resources	N	<ul style="list-style-type: none"> If any archaeological materials are encountered during construction, all ground-disturbing activities must cease within 10 meters of the discovery and the City of Phoenix Archaeology Office must be notified immediately and allowed time to properly assess the materials
Historic Resources	N	
Hazardous Materials	TBD	<ul style="list-style-type: none"> If suspected hazardous materials are encountered during construction, work shall cease at that location and the PM will be notified immediately to make arrangements for proper treatment and disposal of those materials.
General Environmental		<ul style="list-style-type: none"> If the project scope or footprint changes, the City of Phoenix PM will contact the City Engineer-EQS to determine if additional environmental review is required. The City of Phoenix PM shall include all required environmental mitigation measures in the project specifications.

Attachments:

- Migratory Bird Treaty Act construction flyer



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:

Andrea Love 602-495-6718 or via e-mail at <andrea.love@phoenix.gov>

James Marshall 602-534-3747 or via e-mail at <james.marshall@phoenix.gov>

Updated December 8, 2022



Credit: AGFD



City of Phoenix
STREET TRANSPORTATION DEPARTMENT

Sonoran Desert Tortoise

(Gopherus morafkai)

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 Sonoran Desert tortoise.

Legal Status:

The Sonoran Desert tortoise is a Tier 1A Species of Greatest Conservation Need in the State of Arizona, as defined by the Arizona Game and Fish Department (AGFD) and is a Candidate Species under the Endangered Species Act.

Species Description:

- Length: 8-15 inches
- Bottom shell yellowish and not hinged
- Hind limbs stocky and elephantine
- High-domed, brownish shell with a pattern and prominent growth lines
- Flattened forelimbs for digging, covered with conical scales

Where are they found?

- Rocky, steep slopes and lower mountain slopes
- Native desert scrubland
- Between 904 and 4,198 feet in elevation
- Washes and valley bottoms may be used in dispersal

Where are they active?

- Sonoran Desert tortoise spend the bulk of time in burrows, which provide protection from heat and cold
- Emerge from burrows on rocky slopes, desert scrub or grassland to feed, bask and breed, mostly during the monsoon season

How to avoid impacting Sonoran Desert tortoise:

- Scan ahead as you work
- ***If Sonoran Desert tortoise observed, STOP WORK, call the contact below and allow the tortoise to leave under its own power***
- Do NOT pick up or handle the Sonoran Desert tortoise unless the tortoise is in imminent danger. Improper handling can result in tortoise death. If a tortoise must be moved, strictly adhere to the following AGFD guidelines (rev. 9/22/2014): <https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/2014%20Tortoise%20handling%20guidelines.pdf>.
- When working in Sonoran Desert tortoise habitat, check for tortoises under parked vehicles before driving

Questions? Concerns? Think your project will impact Sonoran Desert tortoise? Contact the City of Phoenix Street Transportation Department, Environmental Services:

Andrea Love 602-495-6718 or via e-mail at <andrea.love@phoenix.gov>

Greta Halle 602-534-6030 or via e-mail at <greta.halle@phoenix.gov>



City of Phoenix

Disadvantaged Business Enterprise Program

DBE –Design Bid Build (DBB) Contract Clause Race & Gender-Neutral – Non-Negotiated

PROJECT NOS: ST83140111, ST83140113, ST83140115, ST83140116 and ST83140120

CONTRACT #:

PROJECT NAME: ARPA Local Drainage Mitigation Package 2 DBB

Phoenix is one of the fastest growing, multicultural cities in the country and has shown a historical commitment to business diversity. The City and its partners strive to advance the economic growth of small businesses through its Disadvantaged Business Enterprise (DBE) Program.

The City of Phoenix DBE Program is managed and administered by the City's Equal Opportunity Department, Contract Compliance Division. Through a coordinated effort among several city departments and partner agencies, the DBE Program provides certification and opportunities in construction, purchasing, management and technical assistance, educational services, and networking.

SECTION I. DEFINITIONS

Agency means the City of Phoenix for purposes of this Contract.

Arizona Unified Certification Program (AZUCP) means a consortium of government agencies organized to provide reciprocal DBE certification within Arizona pursuant to 49 Code of Federal Regulations (CFR) Part 26. The official DBE database containing eligible DBE firms certified by AZUCP can be accessed at: <https://utracs.azdot.gov>. The certification system is called the Arizona Unified Transportation Registration and Certification System (AZ UTRACS).

Business to Government Now (B2G) means the web-based certification and compliance system used to track and monitor DBE and Small Business Participation. The B2G system can be accessed at: <https://phoenix.diversitycompliance.com>

Contract means a legally binding relationship obligating a seller to furnish supplies or services (including construction and professional services) and the buyer to pay for them.

DBE Compliance Specialist means an Agency employee responsible for compliance with this DBE Contract Clause.

EOD means the City of Phoenix Equal Opportunity Department.

Joint Venture (JV) means 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, asset, and labor of the participants must be combined in an effort to accrue profit.

Outreach Efforts means the diligent and good faith efforts demonstrated by a Bidder to solicit participation from interested and qualified DBEs and other Small Businesses. Bidder shall identify and document potential business opportunities for DBEs and other Small Businesses, describe what efforts were undertaken to solicit DBE and Small Business participation, disclose results of negotiations with Small Businesses, and communicate and record Bidder's selection decisions relating to DBE and Small Business participants.



City of Phoenix

Disadvantaged Business Enterprise Program

Disadvantaged Business Enterprise (DBE) means a Small Business Concern that has successfully completed the DBE certification process and has been granted DBE status by an AZUCP member pursuant to the criteria contained in 49 CFR Part 26.

Commercially Useful Function means that a DBE is responsible for executing the work of the contract and is carrying out its responsibilities by performing, managing, and supervising the work involved. If a DBE does not perform or exercise responsibility for at least 30% of the total cost of its contract with its own work force, or if the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, the DBE is presumed not to be performing a Commercially Useful Function.

Goods and Services Providers are firms that provide goods and services that represent a Commercially Useful Function directly to Transit as a DBE or Small Business.

Manufacturer means a firm that owns; operates or maintains a factory or establishment that produces on the premises the components, materials, or supplies obtained by the recipient, successful bidder, or Transit Vehicle Manufacturer.

Regular dealer/broker 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 released to the public in the usual course of business.

Supplier means a firm that engages in, as its principal business, the purchase and sale of material or supplies required for the performance of a contract. The firm must own, operate, and maintain a store, warehouse or other establishment where the supplies are bought, kept in stock, and regularly sold to the public in the usual course of business.

Small Business Concern (SBC) means, with respect to firms seeking to participate in contracts funded by the U.S. Department of Transportation (US DOT), a Small Business Concern as defined in section 3 of the Small Business Act and Small Business Administration regulations implementing the Act (13 CFR part 121), which Small Business Concern does not exceed the cap on average annual gross receipts specified in 49 CFR § 26.65(b). "Small Business" and "Small Business Concern" are used interchangeably in this DBE Contract Clause.

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 firms is located at <https://phoenix.diversitycompliance.com>.

Race- and Gender-Neutral (RGN) Measures means a measure or program that is or can be used to assist all Small Businesses.

Subcontract means a contract at any tier below the prime contract, including a purchase order.

Subcontractor means an individual, partnership, JV, corporation or firm that holds a contract at any tier below the prime contract, including a vendor under a purchase order.

Submitter means an individual, partnership, JV, contractor, corporation, or firm that tenders a submittal to the Agency to perform services requested by a solicitation or procurement. The submittal may be direct or through an authorized representative. (Submitter is inclusive of the terms: *Bidder, Offeror, Proposer, Respondent*, etc.).



City of Phoenix

Disadvantaged Business Enterprise Program

Responsive Submitter means a firm that has met the minimum program requirements as outlined in the solicitation and due at the time of submittal.

Successful Submitter means a firm that has been awarded the contract by the Agency to perform services or furnish supplies requested by a solicitation or procurement.

Responsible Submitter means a firm that has been selected to continue in the procurement process by the Agency.

Transit Vehicle Manufacturers (TVMs) means any manufacturer whose primary business purpose is to manufacture vehicles specifically built for public mass transportation. Such vehicles include, but are not limited to buses, rail cars, trolleys, ferries, and vehicles manufactured specifically for paratransit purposes. Producers of vehicles that receive post-production alterations or retrofitting to be used for public transportation purposes (e.g., so-called cutaway vehicles, vans customized for service to people with disabilities) are also considered transit vehicle manufacturers. Businesses that manufacture, mass-produce, or distribute vehicles solely for personal use and for sale “off the lot” are not considered transit vehicle manufacturers.

Transit Vehicle Manufacturers Goals for FTA recipients each transit vehicle manufacturer, as a condition of being authorized to bid or propose on FTA-assisted transit vehicle procurements, to certify that it has complied with the requirements of 49 CFR Part 26.49.

SECTION II. GENERAL REQUIREMENTS

A. **Applicable Federal Regulations**

This Contract is subject to DBE requirements issued by USDOT in 49 CFR Part 26. Despite the lack of a race- and gender-conscious DBE participation goal for this Contract, the Agency must track and report DBE participation that occurs as a result of any procurement, JV, goods/services, or other arrangement involving a DBE. For this reason, the Successful Bidder shall provide all relevant information to enable the required reporting.

B. **DBE Participation**

For this solicitation, the Agency has *not* established a race- or gender-conscious DBE participation goal. The Agency extends to each individual, firm, vendor, supplier, contractor, and subcontractor an equal economic opportunity to compete for business. The Agency uses race- and gender-neutral measures to facilitate participation by DBEs and Small Businesses. The Agency *encourages* each Bidder to voluntarily subcontract with DBEs and Small Businesses to perform part of the work—a Commercially Useful Function—that Bidder might otherwise perform with its own forces.

C. **Small Business Participation**

The Agency will track the participation of all approved businesses throughout the life of this contract. The Agency will count Small Business participation as authorized by federal regulations. A summary of these regulations can be found at www.ecfr.gov (49 CFR Part 26.39).

D. **DBE Certification**

Only firms (1) certified by the Agency or another AZUCP member, and (2) contracted to perform a Commercially Useful Function on scopes of work for which they are certified, may be considered to determine DBE participation resulting from RGN measures on this Contract. This DBE determination affects the Agency’s tracking and reporting obligations to USDOT.



City of Phoenix

Disadvantaged Business Enterprise Program

E. Civil Rights Assurances.

As a recipient of USDOT funding, the Agency has agreed to abide by the assurances found in 49 CFR Parts 21 and 26. Each Contract signed by the Agency and the Successful Bidder, and each Subcontract signed by the Successful Bidder and a Subcontractor, must include the following assurance verbatim:

“The contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, sex, or creed in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Parts 21 and 26 in the award and administration of USDOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the City of Phoenix deems appropriate.”

Note: For purposes of the required Contract and Subcontract language above, Successful Bidder is the “contractor” awarded the contract.

SECTION III. REQUIRED OUTREACH EFFORTS

The Agency has implemented outreach requirements for this Contract. Specifically, Bidders shall: (1) identify small-business-participation opportunities, including Commercially Useful Functions; (2) actively solicit proposals from small businesses; (3) evaluate small-business proposals; and (4) communicate selection decisions to small businesses, including each rejection of a small-business proposal. If a Bidder fails to conduct these Outreach Efforts or fails to submit the required documentation of Bidder’s Outreach Efforts as indicated in Section IV, Parts A and B below, the Agency may determine that the Bidder is nonresponsive. A determination of non-responsiveness *disqualifies* Bidder from further consideration for the Contract award.

SECTION IV. BID REQUIREMENTS

A. Documentation due at time of bid:

All required Outreach Efforts documentation due with the bid must be submitted in a separate sealed envelope with the bid submittal.

1. Form EO2 (Outreach Efforts)

Each Bidder shall submit Form EO2 with Columns A through D completed to document their diligent and earnest Outreach Efforts.

Each Bidder shall list in Form EO2 all Small Businesses contacted by Bidder in preparing its bid. Each Bidder shall also provide the following minimum information to document its Outreach Efforts. The DBE Compliance Specialist will consider this information to determine whether Bidder has demonstrated the required Outreach Efforts:

a. Column A - Small Business Name and Contact Information

Must list each business’s full legal name and contact information. Successful Bidder shall inquire to obtain the following: the number of its employees, number of years in business and its estimated range of annual gross receipts.

b. Column B - Business Status

Indicate the business status. Check all that apply, if known.

- The official DBE database containing eligible DBE and SBC firms can be accessed at: <https://utracs.azdot.gov>



City of Phoenix

Disadvantaged Business Enterprise Program

- City of Phoenix SBE Certification Directory can be accessed at: <https://phoenix.diversitycompliance.com>

c. Column C - Scope(s) of Work Solicited

List the scope(s) of work solicited for which the small business was considered for participation in the proposal. The solicitation shall include a description of the scope(s) of work being requested.

d. Column D - Solicitation Method

Indicate the solicitation method by which each small business was contacted for your outreach efforts and provide supporting documentation. Supporting documentation must include a copy of the actual solicitation sent to Small Businesses. The solicitation may be in the form of letters or attachments to email, phone logs, newspapers and trade papers, outreach events, etc. If using a log as supporting documentation, it must include:

- List the Solicitation Method
- Name of Bidder's Representative
- Name of Company Contacted
- Name of Person Contacted
- Date and Time of Contact
- Details of the Communication

Each Bidder shall complete Columns A through D on Form EO2 in accordance with the following instructions:

1. Each Bidder shall actively contact Small Businesses for each scope of work or business opportunity selected for Outreach Efforts (**Columns A and C**).
2. Bidder's contacts with Small Businesses should occur well before the deadline for the bid to afford the firms contacted a reasonable opportunity to prepare a proposal and participate in the Contract.
3. Bidder shall ask each firm to indicate the number of its employees (**Column A**).
4. For each Small Business's annual gross receipts, Bidder shall ask the firm to indicate the gross-receipts bracket into which it fits (e.g., less than \$500,000; \$500,000 – \$1 million; \$1 – 2 million; \$2 – 5 million; etc.) rather than requesting an exact figure (**Column A**).

B. Documentation due within FIVE (5) CALENDAR DAYS of the Bid Deadline

All required Outreach Efforts documentation is due within the five (5) calendar days of the bid deadline must be submitted in a sealed envelope.

1. Form EO2 (Outreach Efforts)

Each Bidder shall submit **Form EO2 with Columns E and F** completed to document its diligent, earnest Outreach Efforts.

a. Column E - Selection Decision

Indicate the Successful Bidders selection decision for each small business that responded to the solicitation.

If selected, indicate the Dollar Value.

If not selected, provide an explanation why firm was NOT selected.



City of Phoenix

Disadvantaged Business Enterprise Program

b. **Column F - Method of Communication of Final Selection Outcome**

The Successful Bidder must notify the final selection outcome to all small businesses that responded. The supporting documentation for this notification may be in the form of an email, fax, letter, in person or a telephone log, etc. This documentation must show the following information regarding the final selection:

- List the Selection Outcome
- Name of Bidder's Representative
- Name of Company Contacted
- Name of Person Contacted
- Date and Time of Contact
- Details of the Communication

*Successful Bidder shall provide supporting documentation that shows Bidder has communicated its final selection decisions and outcomes to all Small Businesses, including those not chosen to participate in this Contract.

2. **Form EO2 Supporting Documentation**

Each Bidder shall complete and submit supporting documentation of its Outreach Efforts related to Form EO2 – as specifically related to Columns E & F.

- Within FIVE (5) Calendar Days of the Bid Deadline, Bidder shall submit all supporting documentation of Bidder's contacts with Small Businesses for each scope of work or business opportunity in regard to their Outreach Efforts.
- This documentation must include: (1) descriptions of scopes of work and business opportunities identified for Small Business participation, and (2) a copy of the actual solicitation sent to interested Small Businesses. The solicitation may be in the form of a letter, attachment to an e-mail, advertisements in newspapers and trade papers, or written communications with chambers of commerce.
- For all of the above documentation, if Bidder uses a blast e-mail or fax format, the documentation submitted must include a copy of the e-mail or fax, and Bidder must disclose all e-mail addresses and fax numbers to which the solicitation or outcome notification was sent and the date and time of the transmission. For telephone contacts, Bidder shall document the date and time of the call and the names of the respective persons representing Bidder and the Small Business.
- Bidder shall submit documentation that establishes how Bidder communicated its selection decisions and outcomes to each Small Businesses **SELECTED OR NOT SELECTED** for this Contract. This documentation may be in the form of a letter, e-mail, or a telephone log and must show the name of the person contacted and date.
- For all of the above documentation, if Bidder uses an email blast or fax format, the documentation submitted must include a copy of the e-mail or fax, and Bidder must disclose all e-mail addresses and fax numbers to which the solicitation or outcome notification was sent and the date and time of the transmission. For telephone contacts, Bidder shall document the date and time of the call and the names of the respective persons representing Bidder and the Small Business.



City of Phoenix

Disadvantaged Business Enterprise Program

3. **Form EO3 (Small Business Utilization Commitment)**

Due within FIVE (5) CALENDAR DAYS of the Bid Deadline. Bidder shall complete, sign, date and submit Form EO3 within the five (5) calendar days of the bid deadline, EO3 commits Bidder to the Agency as follows:

- a. The firms indicated as "Selected" on Form EO2 – Small Business Outreach Efforts will participate in the Contract;
- b. Bidder will comply with the Race- and Gender-Neutral post-award requirements as stated in the DBE contract clause;
- c. Any and all changes or substitutions will be authorized by the Compliance Specialist before implementation; and
- d. The proposed total Small Business participation percentage is true and correct.

Bidder shall ensure that the dollar amount or percentages proposed for Small Business participation on Form EO2 equal the total percentage proposed in Form EO3.

C. Failure to Meet Outreach Requirements

The DBE Compliance Specialist will determine, in writing, whether the Bidder has satisfied all outreach requirements. If the DBE Compliance Specialist determines the Bidder failed to satisfy the outreach requirements, then the DBE Compliance Specialist may determine the bid is nonresponsive. A determination of non-responsiveness *disqualifies* Bidder from further consideration for the Contract award. The Agency shall send written notice to Bidder stating the basis for the DBE Compliance Specialist's decision.

D. Administrative Reconsideration

In the event the City determines the Bidder failed to submit required documentation to meet the Small Business Outreach Requirements, an opportunity for reconsideration of this determination will be provided. This opportunity for reconsideration will seek to obtain clarification of documentation submitted with the bid.

Within three business days of being informed by the City that the Bidder is not responsive based on insufficient demonstration and/or documentation of Outreach Efforts, the Bidder may submit its written request to:

**City of Phoenix Equal Opportunity Department
Office of the Director
200 W. Washington St., 15th Floor
Phoenix, AZ 85003**

If the request for Administrative Reconsideration is not submitted within the allotted three business days, the non-responsive Bidder shall not utilize the DBE Program submittal requirements as the basis for its future protest.

As part of this reconsideration process, the Bidder will have an opportunity to provide written clarification or argument concerning the issue of whether it met the Outreach Requirements or

provided sufficient supporting documentation of this efforts at the time of bid. As the Disadvantaged Business Enterprise Liaison Officer (DBELO) for the City, The Equal Opportunity Director shall review solely the written clarification or argument, along with any document(s) originally submitted at the time of bid. No new or revised forms or supporting documentation will be reviewed for consideration.



City of Phoenix

Disadvantaged Business Enterprise Program

The DBELO or his designee will send the Bidder a written decision on the reconsideration, explaining the basis for finding that the Bidder did or did not meet the Small Business Outreach Requirements. The result of the DBE reconsideration process is not administratively appealable and cannot be escalated or included in any other protest not related to the DBE Program.

SECTION VI. POST-AWARD COMPLIANCE REQUIREMENTS

A. Subcontracting Commitment

The small business subcontractors identified and accepted in the Small Business Outreach documents must have an executed contract* in place prior to the performance of work.

Successful Bidder shall submit to Agency, through the B2G system, all executed contracts, purchase orders, subleases, JV agreements, and other arrangements formalizing agreements between Successful bidder and all subcontractors, upon execution throughout the life of this contract.

The Successful Bidder shall not terminate any approved DBE or Small Business Subcontracts, nor shall the Successful Bidder alter the scope of work or reduce the Subcontract amount, without the DBE Compliance Specialist's prior written approval. Any request to alter a DBE or Small Business Subcontract must be submitted in writing to the DBE Compliance Specialist before any change is made. If the Successful Bidder fails to do so, the Agency may declare Successful Bidder in breach of contract.

*Executed contracts and all lower tier contracts must contain the required Civil Rights Assurances and Prompt Payment provisions.

B. Post-Award Relief from Small Business Requirements

After Contract award, the Agency will not grant relief from the proposed Small Business utilization except in extraordinary circumstances. The Successful Bidder's request to modify Small Business participation must be in writing to the DBE Compliance Specialist, which has final discretion and authority to determine if the request should be granted.

The Successful Bidder's waiver request must contain the amount of relief being sought, evidence demonstrating why the relief is necessary, and any additional relevant information the DBE Compliance Specialist should consider. The Successful Bidder shall include with the request all documentation of its attempts to subcontract with the Small Business and any other action taken to locate and solicit a replacement Small Business.

If an approved DBE allows its DBE status to expire or its DBE certification is removed during the course of the subcontract, the Agency will consider all work performed by the DBE under the original contract to count as DBE participation. No increased scopes of work negotiated after expiration or revocation of the DBE's certification may be counted. Likewise, any work performed under a Contract extension granted by the Agency may not be counted as DBE participation.

C. Counting Small Business Participation

The prime contractor may only count expenditures to AZUCP certified DBE subcontractors that perform a commercially useful function on the contract. A DBE performs a commercially useful function when it 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 DBE subcontractor must perform a minimum of 30% of its subcontract value with its own



City of Phoenix

Disadvantaged Business Enterprise Program

workforce and equipment before its participation can be counted. DBEs must manage and control the performance of its contract and not be dependent on the prime's personnel and equipment to complete its work. Scope(s) of work not covered in the DBE firm's certification description **will not** be counted as DBE participation.

Commercially Useful Function & Counting of DBE Trucking/Hauling:

49 CFR Part 26.55 Section (d) defines Commercially Useful Function and the counting of DBE participation Trucking/Hauling as follows:

- The DBE must be responsible for **the management and supervision of the entire trucking operation for which it is responsible on a particular contract**, and there cannot be a contrived arrangement for the purpose achieving DBE participation.
- The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
- The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE lessees not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE lessees receives credit only for the fee or commission it receives as a result of the lease arrangement.
- Amounts paid for dump fees or materials being hauled/dumped cannot be counted as DBE participation.

Counting DBE certified Manufactures, Suppliers, and Brokers:

49 CFR Part 26.55 Section (e) permits the counting of expenditures with DBEs for materials or supplies toward DBE participation as provided in the following:

- If the materials or supplies are obtained from a **DBE manufacturer**, count 100 percent of the cost of the materials or supplies toward DBE participation,
- If the materials or supplies are purchased from a **DBE regular dealer (supplier)**, count 60 percent of the cost of the materials or supplies toward DBE participation.
- If materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, **(broker or manufacturer's rep.)** count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies toward DBE participation.

If an approved DBE allows its DBE certification to expire, or the certification is revoked during the course of the Subcontract, the Agency will consider all work performed by the DBE under the original contract to count as DBE participation. No increased scope of work negotiated after expiration or revocation of the DBE's certification may be counted. Any work performed under a Contract extension granted by the Agency may not be counted as DBE participation.

D. Small Business Substitutions or Terminations

As set forth in 49 CFR Section 26.53 (f)(1)(2)(3) after Contract award, the Agency will not allow substitution or termination from the proposed Small Business utilization except in



City of Phoenix

Disadvantaged Business Enterprise Program

extraordinary circumstances. The Successful Bidder's request to modify Small Business participation must be in writing to the Phoenix DBE Compliance Specialist.

Successful Bidder's written request must set forth the amount of substitution or why termination is sought, evidence that demonstrates why it is necessary, and any additional relevant information that the Phoenix DBE Compliance Specialist should consider. The Successful Bidder shall include with the request all documentation of Bidder's attempts to subcontract with the Small Business and any other action taken to locate and solicit a replacement Small Business.

If the Small Business was approved by the Agency, the Phoenix DBE Compliance Specialist will consider whether or not the Successful Bidder has exercised diligent and good-faith efforts to find another Small Business as a replacement. The Successful Bidder shall notify the Phoenix DBE Compliance Specialist in writing of the necessity to substitute a Small Business and provide specific reason(s) for the substitution or replacement. Actual substitution or replacement of a Small Business may not occur before the Phoenix DBE Compliance Specialist's written approval has been obtained.

E. Prompt Payment of Subcontractors

The prompt payment clause shall be included in every contract and subcontract.

Per A.R.S. § 32-1129.01 the Successful Bidder must promptly pay its subcontractors, subconsultants, or suppliers **within seven (7) calendar days**. If the Successful Bidder diverts any payment received for a DBE's,

Small Business's, or other Subcontractor's work performed on the Contract or fails to reasonably account for the application or use of the payment, the Agency may declare the Successful Bidder in breach of contract.

Under the prompt-payment provisions of 49 CFR Part 26, the Successful Bidder must ensure prompt and full release of retentions to Subcontractors and suppliers when their scope of work is complete, and the Agency has paid Successful Bidder for the work. The Successful Bidder shall pay each Subcontractor's and supplier's retention no later than 30 days after the Agency has paid for the scope(s) of work, regardless if there's outstanding retention held against the Successful Bidder. If the Agency reduces the Successful Bidder's retention, the Successful Bidder shall correspondingly reduce the retentions of Subcontractors and suppliers that have performed satisfactory work.

Nothing in this section prevents the Successful Bidder from enforcing its Subcontract with a Subcontractor or supplier for defective work, late performance, and other claims arising under the Subcontract.

F. Remedies

If the Successful Bidder fails to comply with these contract provisions and the requirements set forth in 49 CFR 26.101 and 26.103, the Agency may take any one or more of the following actions:

1. Withhold future payments, including retention, until the Successful Submitter is determined to be in compliance;
2. Cancel the Contract.



City of Phoenix

Disadvantaged Business Enterprise Program

SECTION VII. RECORDS & REPORTING REQUIREMENTS

A. Records

During performance of the Contract, the Successful Bidder shall keep all records necessary to document Small Business participation. The Successful Bidder 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:

1. A complete listing of all Subcontractors and suppliers on the project;
2. Each Subcontractor's and supplier's scope performed;
3. The dollar value of all subcontracting work, services, and procurement;
4. Copies of all executed Subcontracts, purchase orders, and invoices; and
5. Copies of all payment documentation and Change Orders.

B. Reports

Successful Bidder is required to file the following payment reports in the B2G system:

1. **Progress Payments:**

By the 15th of ***each*** month, the Successful Bidder must enter payment information and related supporting documentation into the Agency's web-based certification and compliance reporting system.

- a. The total of all payments received from the Agency during the previous month.
- b. All payments made to Subcontractors during the previous month.

The Successful Bidder is responsible for ensuring that subcontractors confirm receipt of payment in the B2G system by the end of each month.

2. **Final Payment:**

Before the Agency processes the Successful Bidder's final payment and/or outstanding retention held against the Successful Bidder, the Successful Bidder shall notate in the B2G system:

- a. The payment to each subcontractor is considered "Final".
- b. Every subcontractor must confirm they have received full and "Final" payment in the B2G system.
- c. For federal reporting purposes, Attachment E must be completed and signed by the Successful Bidder and DBE firm(s) prior to Successful Bidder receiving final payment.

The Successful Bidder is responsible for ensuring that subcontractors confirm the receipt of full and "Final" payment in the B2G system.

EQUAL EMPLOYMENT OPPORTUNITY
COMPLIANCE REPORTS

(Project, Training and Annual)

Federal-Aid Projects

February 1, 1977; Revised July 1, 1978; Revised November 3, 1980
Revised April 15, 1981; Revised September 7, 1983
Revised October 15, 1998; Revised August, 1, 2005;
Revised March 1, 2015, Revised August 24, 2016

ANNUAL REPORT:

For each contract in the amount of \$10,000 or more, and for each subcontract, regardless of tier not including material suppliers, in the amount of \$10,000 or more, the contractor and each subcontractor regardless of tier shall submit an annual Equal Employment Opportunity (EEO) Report containing all the information required on Form FHWA-1391.

The staffing figures to be reported should represent the project workforce on board in all or any part of the last payroll period preceding the end of July.

The report shall be submitted no later than August 15 to the agency (contract owner) compliance officer.

**CERTIFICATION WITH REGARD TO THE PERFORMANCE OF
PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE
EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS
APRIL 1969**

The bidder _____, proposed subcontractor _____, hereby certifies that he has _____, has not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, and that he has _____, has not _____, filed with the Joint Reporting committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

(Company)

By: _____

(Title)

Date: _____

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7b (1),) and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5 (Generally only contracts or subcontracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Information concerning Standard Form 100 (EEO-1) is available from:

Joint Reporting Committee P.O.
Box 19100
Washington, D.C. 20036-9100

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

R7/03

Equal Employment Opportunity Clause

All contracts for all services and supplies entered into in connection with the Project or operation of the Property will contain the following provisions as required by 41 CFR § 60-1.4(b):

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, 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 agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or

action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

The City and the United States are beneficiaries of this **clause** and are entitled to enforce it.

Borrower compliance

Borrower will comply with all applicable local, state, and federal fair employment laws and regulations.

SUPPLEMENTAL TERMS AND CONDITIONS

AMERICAN RESCUE PLAN ACT STATE AND LOCAL FISCAL RECOVERY FUNDS

Uniform Guidance

SLFRF awards are subject to requirements set forth in the Uniform Guidance, 2 CFR Part 200, available at <https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200?toc=1>

Suspension, & Debarment

Consultant agrees to abide by Executive Orders 12549 and 12689, Debarment and Suspension, and implementing regulations found at 2 CFR Part 180 and 31 CFR Part 19. The City may by giving written notice to Consultant, immediately terminate this Agreement if the City determines that Consultant has been debarred, suspended, or otherwise lawfully prohibited from participating in any public procurement activity, including but not limited to, being disapproved as a subcontractor of any public procurement unit or other governmental body. Consultant will include a term or condition in all related contracts and subcontracts described in 2 CFR Part 180, Subpart B that the award is subject to 2 CFR Part 180 and 31 CFR Part 19.

Award Terms and Conditions

The Award Terms and Conditions of the SLFRF financial assistance agreement (<https://home.treasury.gov/system/files/136/Financial-Assistance-Agreement-Local-governments.pdf>) sets forth the compliance obligations for Consultant pursuant to the SLFRF statute, the Uniform Guidance, Treasury's final rule, and applicable federal laws and regulations. Consultant should ensure it remains in compliance with all Award Terms and Conditions. These obligations include the following items in addition to others:

- **Conflicts of Interest.** The Consultant must disclose in writing to the City of Phoenix any potential conflict of interest affecting this agreement in accordance with 2 C.F.R. § 200.112. The City of Phoenix will disclose such conflict to Treasury.
- **Compliance with Applicable Law and Regulations.** Consultant agrees to comply with the requirements of section 603 of the American Rescue Plan Act, and regulations adopted by the Treasury pursuant to section 603(f) of the Act, and guidance issued by the Treasury. Consultant also agrees to comply with all other applicable federal statutes, regulations, and executive orders. Consultant shall provide for such compliance by other parties in any agreements it enters into with other parties relating to this award which may include, but not limited to the following:
 - Uniform Administrative Regulations, Cost Principles and Audit Requirements for Federal Awards, 2 C.F.R. Part 200;
 - OMB Guidelines to Agencies on Government wide Debarment and Suspension, 2 C.F.R. part 180;
 - Government wide Requirements for Drug-Free Workplace, 31 C.F.R. Part 20;
 - New Restrictions on Lobbying, 31 C.F.R. Part 21;
 - Generally applicable federal environmental laws and regulations;

- **Clean Air Act and Federal Water Pollution Control Act.** Consultant will comply with all applicable standards, orders or regulations Issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).
- **Equal Employment Opportunity.** Except as otherwise provided under 41 CFR Part 60, for all contracts that qualify as “federally assisted construction contracts” as defined in 41 CFR Part 60–1.3, Consultant agrees to comply with the equal opportunity clause under 41 CFR 60-1.4(b), incorporated herein by reference, and E.O. 11246, “Equal Employment Opportunity,” as amended by E.O. 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and as supplemented by regulations at 41 CFR Part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”
- **Copeland “Anti-Kickback” Act.** Consultant shall comply with the Copeland “Anti-Kickback” Act (40 U.S.C. § 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.
- **Contract Works Hours and Safety Standards Act.** If the contract exceeds \$100,000 and involves the employment of mechanics or laborers, Consultant shall comply with 40 U.S.C. §§ 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. § 3702 of the Act, Consultant shall compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than 1½ times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. § 3704 are applicable to construction work and provide that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.
- **Byrd Anti-Lobbying Certification (31 U.S.C. 1352; 31 CFR Part 21).** Consultant hereby certifies, to the best of its knowledge and belief, that:
 - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of Consultant, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of and Federal contract, grant,

loan, or cooperative agreement.

- b. Each contractor tier must certify to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization or influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C, 1352.
 - c. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, Consultant shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions. Such disclosures are forwarded from tier to tier up to the non-Federal award.
- **Protection for Whistleblowers.** In accordance with 41 U.S.C. § 4712, Consultant may not discharge, demote, or otherwise discriminate against an employee in reprisal for disclosing to any of the persons or entities provided below, information that the employee reasonably believes is evidence of gross mismanagement of a federal Agreement or grant, a gross waste of federal funds, an abuse of authority relating to a federal Agreement or grant, a substantial and specific danger to public health or safety, or a violation of law, rule, or regulation related to a federal Agreement (including the competition for or negotiation of an Agreement) or grant.

The list of persons and entities referenced in the paragraph above includes the following:

- i. A member of Congress or a representative of a committee of Congress;
 - ii. An Inspector General;
 - iii. The Government Accountability Office;
 - iv. A Treasury employee responsible for Agreement or grant oversight or management;
 - v. An authorized official of the Department of Justice or oversight or management;
 - vii. A court or grand jury; or
 - viii. A management official or other employee of the City, Consultant or a subcontractor who has the responsibility to investigate, discover, or address misconduct.
- **Drug-Free Workplace Act of 1988:** Consultant must comply with drug-free workplace requirements in 31 CFR Part 20, which implements the Drug-Free Workplace Act of 1988.
 - **Victims of Human Trafficking.** Consultant agrees to follow the requirements of Section 106(g) of the Trafficking Victims Protection Act of 2000, as amended (22 U.S.C. 7104) and ensure that it and none of its employees engage in server forms of trafficking in persons, procure commercial sex acts during the subaward term, used forced labor in the performance of obligations under this Agreement. Consultant agrees to notify the City immediately once it has information from any source alleging a violation of this Section.

- **Preference for Domestic Procurement.** Pursuant to 2 C.F.R. 200.322, to the greatest extent practicable, Consultant will purchase, acquire, or use goods, products or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products).
- **Prohibition on Certain Telecommunications Equipment.** Consultant is prohibited from obligating or expending funds to (i) procure or obtain; (ii) extend or renew a contract to procure or obtain; or (iii) enter into a contract to procure or obtain equipment, services or systems that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. Covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities) and such other entities described in 2 C.F.R. 200.216.
- **Additional Federal Requirements.** Consultant will comply with any additional terms and conditions imposed by 2 CFR Part 200, as applicable, and any guidance issued by the U.S. Department of Treasury regarding this agreement. .

CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN

Add the following new Section, **233 STORM WATER POLLUTION PREVENTION PLAN SUBMITTAL PROCESS**

233.1 DESCRIPTION

The Contractor shall 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 shall apply for a "Stormwater Construction General Permit" with the project type "MUNICIPAL/PUBLIC".

Before any construction on site begins, the Contractor shall submit the Notice of Intent (NOI) and the SWPPP through the Smart NOI program as the sole permittee. The Contractor shall not commence any construction activities until the ADEQ send a written Notice Of Intent assigning an AZCON number.

As required by ADEQ the Contractor shall submit a Notice of Termination (NOT) through the Smart NOI program. The Contractor shall 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 shall 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 shall 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 shall comply with all AZPDES requirements under the supervision of the General Contractor, and shall 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 shall 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 SHALL FILL IN PROJECT NAME**
 Project No(s): **CONTRACTOR SHALL FILL IN PROJECT NUMBER**
- 1.2 Project Location: **CONTRACTOR SHALL 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 SHALL FILL IN PROJECT DESCRIPTION**

1.6 Runoff Coefficient and Soils Information:

1. Overall runoff coefficient of upstream drainage area shall be unchanged by project.
2. Surface Soils Information: **(EXAMPLE ONLY, CONTRACTOR SHALL FILL IN FOR PROJECT SITE LOCATION)**

<u>SOIL UNIT</u>	<u>SOIL TYPE (USDA TEXTURE)</u>	<u>PERMEABILITY (IN./HR.)</u>
<u>Laveen</u>	<u>Loam</u>	<u>0.6-2.0</u>
<u>Mohall</u>	<u>Clay Loam</u>	<u>0.2-0.6</u>
<u>Tucson</u>	<u>Clay Loam</u>	<u>0.2-0.6</u>
<u>Vecont</u>	<u>Clay</u>	<u>0.06-0.2</u>

1.7 Name of Receiving Water:
EXAMPLE: SALT RIVER, CONTRACTOR SHALL 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 SHALL 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 SHALL ADD OR REMOVE STABILIZATION PRACTICES AS NECESSARY**

2.1.c Narrative: Sequence of major activities.

CONTRACTOR SHALL COMPLETE NARRATIVE

2.1.d Storm Water Management: **(CONTRACTOR SHALL 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 INVENTORY FOR POLLUTION PREVENTION PLAN (CONTRACTOR TO EDIT AS NECESSARY)

The materials or substances listed below are expected to be present on-site during construction:

- | | |
|----------------------------|------------------------------|
| • Concrete | • Wood |
| • Asphaltic Concrete | • Paints |
| • Fertilizers | • Herbicide/Pesticide |
| • Petroleum-Based Products | • Soil Treatment Products |
| • Cleaning Solvents/Agents | • Other Building Materials |
| • Sealants | • 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 shall be conducted regularly, and documentation of all use and disposal shall 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 shall 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 shall be maintained onsite with the SWPPP at all times during the project, and shall be maintained for not less than three (3) years after the project is complete.

OTHER REQUIRED CERTIFICATIONS

The Contractor shall complete and submit the following certification forms to the City before construction begins:

- Permittee Certification
- Contractor Certification
- Subcontractor Certification (for all Subcontractors as necessary)
- Operator's Compliance Evaluation Report

PERMITTEE'S CERTIFICATION

As Contractor of the **ARPA Local Drainage Mitigation Package 2 Design-Bid-Build** 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 **ARPA Local Drainage Mitigation Package 2 Design-Bid-Build** 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 **ARPA Local Drainage Mitigation Package 2 Design-Bid-Build** 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.

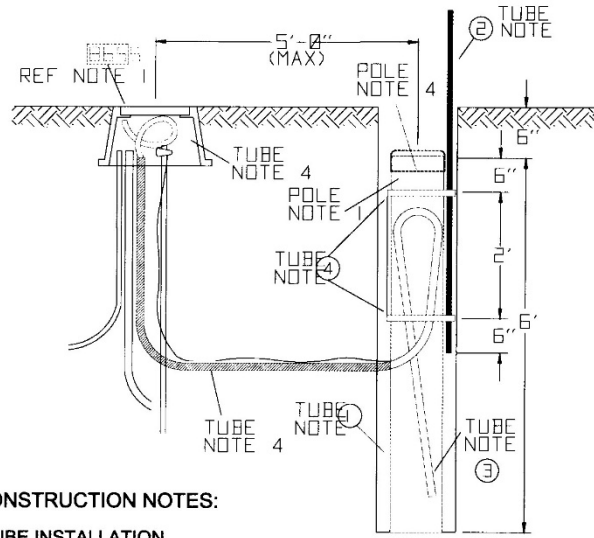
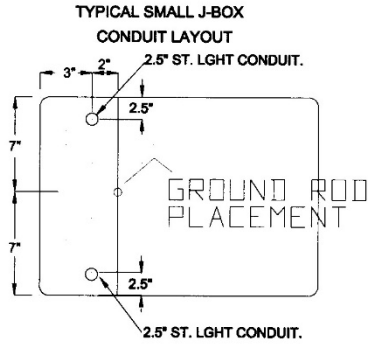
I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage 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



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	
	WC#:	DATE: 5/14/03
	BY:	SCALE:
	FILENAME:	SHEET OF

BID PROPOSAL
CITY OF PHOENIX, ARIZONA
OFFICE OF THE CITY ENGINEER
PROJECT TITLE: ARPA LOCAL DRAINAGE MITIGATION PACKAGE 2 DBB
PROJECT NOS.: ST83140111, ST83140113, ST83140115, ST83140116 AND ST83140120
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 and Vendor Number)

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

Understands that construction of this project shall be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Uniform Standard Details, latest edition, and the City of Phoenix Supplements to the MAG Uniform Standard Specifications and Details, latest edition, 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 shall 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 shall be completed within 232 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 shall 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.

<u>ADDENDUM NO.</u>	<u>DATE</u>	<u>ADDENDUM NO.</u>	<u>DATE</u>
_____	_____	_____	_____
_____	_____	_____	_____

**CITY OF PHOENIX
BID PROPOSAL**

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140111
ST83140111 - 16TH STREET TO 18TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	E699200	Allowance for Stormwater Pollution Prevention Best Management Practices (BMP's)	JOB	1	\$12,000.00	\$12,000.00
2	M1042007	Allowance for Extra Work	Job	1	\$100,000.00	\$100,000.00
3	M1058000	Construction Surveying and Layout	JOB	1		
4	M1058002	2-Person Survey Party (CONTINGENT ITEM)	Hour	8		
5	M1081000	Mobilization	JOB	1		
6	M3001001	Sawcut & Remove Existing Asphalt Pavement	Sq. Yd.	2,123		
7	M3001002	Sawcut & Remove Existing Curb & Gutter	Lin. Ft.	214		
8	M3360250	Asphalt Concrete For Permanent Pavement Replacement, Type C 3/4, 5" Thick (Two lifts)	Sq. Yd.	2,123		
9	M3370103	Apply Crack Seal and Micro-Surface Treatment Per MAG SPEC 331, and Special Provisions	Sq. Yd.	7,955		
10	M3400240	Concrete Valley Gutter, Std. Detail 240	Sq. Ft.	116		
11	M3400400	Concrete Sidewalk, COP Std. Detail P-1230	Sq. Ft.	298		
12	M3402200	Combined Concrete Curb & Gutter, MAG Std. Detail 220, Type "A"	Lin. Ft.	53		
13	M3500005	Remove Existing Manhole	Each	1		
14	M3500020	Remove Portland Cement Concrete Sidewalk, Driveway, Valley Gutter & Slab	Sq. Ft.	695		
15	M3500045	Remove Pipe Plug	Each	2		
16	M3500100	Remove Existing Pump Facilities	Each	1		
17	M4013020	Traffic Control Devices	JOB	1		
18	M5051528	Concrete Catch Basin, TYPE "M-1, L=10-Ft", per Phx Supp. Detail P-1569-2	Each	9		
19	M5051565	Concrete Catch Basin, Type "N, Single", Phx. Supp. Detail P-1570	Each	1		
20	M6014030	Permanent Pipe Support, MAG Standard Details 403-1, 403-2, or 403-3	Each	3		
21	M6103706	Vertical Realignment of Existing 6" Water Pipe	Lin. Ft.	135		
22	M6104008	8" Ductile Iron Water Pipe & Fitting, Restrained, Furnish & Install (ACP Replacement)	Lin. Ft.	20		
23	M6180506	Concrete Pipe Collar for 24" Pipe and Larger, COP Standard Detail P-1505	Each	2		
24	M6183018	18" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	226		
25	M6183024	24" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	96		
26	M6183030	30" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	160		
27	M6183036	36" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	10		
28	M6183042	42" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	1,514		
29	M6250005	Storm Sewer Manhole, MAG Standard Detail 522, COP Supp. Std. Detail P-1520	Each	9		

**CITY OF PHOENIX
BID PROPOSAL**

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140111
ST83140111 - 16TH STREET TO 18TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
					TOTAL	
ST83140111 BASE BID (ITEMS 1 THROUGH 29 - INCLUSIVE)						
						& /100 DOLLARS
WRITTEN WORDS						

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140113
ST83140113 - 18TH STREET AND JACKSON STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
30	E699200	Allowance for Stormwater Pollution Prevention Best Management Practices (BMP's)	JOB	1	\$12,000.00	\$12,000.00
31	M1042007	Allowance for Extra Work	JOB	1	\$25,000.00	\$25,000.00
32	M1058000	Construction Surveying and Layout	JOB	1		
33	M1058002	2-Person Survey Party (CONTINGENT ITEM)	Hour	4		
34	M1081000	Mobilization	JOB	1		
35	M3001001	Sawcut & Remove Existing Asphalt Pavement	Sq. Yd.	92		
36	M3001002	Sawcut & Remove Existing Curb & Gutter	Lin. Ft.	58		
37	M3001005	Sawcut & Remove Existing Sidewalk	Sq. Ft.	254		
38	M3360250	Asphalt Concrete For Permanent Pavement Replacement, Type C 3/4, 5" Thick (Two lifts)	Sq. Yd.	92		
39	M3370103	Apply Crack Seal and Micro-Surface Treatment Per MAG SPEC 331, and Special Provisions	Sq. Yd.	546		
40	M3400400	Concrete Sidewalk, Per COP Std. Detail P-1230	Sq. Ft.	191		
41	M3402200	Combined Concrete Curb & Gutter, Per MAG Standard Detail 220, Type "A"	Lin. Ft.	8		
42	M3500307	Remove and Reinstall Existing Traffic Signs	Each	1		
43	M4013020	Traffic Control Devices	JOB	1		
44	M5051546	Concrete Catch Basin, Type "M-1, L=17-F", Phx. Supp. Detail P-1569-2	Each	2		
45	M6103706	Vertical Realignment of Existing 6" Water Pipe	Lin. Ft.	135		
46	M6104004	4" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install (CONTINGENT ITEM)	Lin. Ft.	20		
47	M6104005	6" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install (CONTINGENT ITEM)	Lin. Ft.	25		
48	M6101805	Water Service Connection (Main to Meter) (CONTINGENT ITEM)	Each	3		
49	M6101810	3/4" or 1" Water Meter Service Connect. Pipe and Fittings, Main to Meter, Furnish & Instal (CONTINGENT ITEM)	Lin. Ft.	30		
50	M6014030	Permanent Pipe Support, MAG Standard Details 403 1, 403-2, or 403-3	Each	1		
51	M6183018	18" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	47		

**CITY OF PHOENIX
BID PROPOSAL**

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140111
ST83140111 - 16TH STREET TO 18TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
52	M6187610	Connect Existing Storm Drain Pipe to New Manhole	Each	1		
53	M6250005	Storm Sewer Manhole, MAG Standard Detail 522, COP Supp. Std. Detail P-1520	Each	1		
					TOTAL	
ST83140113 BASE BID (ITEMS 30 THROUGH 53 - INCLUSIVE)						
						& /100 DOLLARS
WRITTEN WORDS						

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140115
ST83140115 - INDIAN SCHOOL ROAD & N 28TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
54	E699200	Allowance for Stormwater Pollution Prevention Best Management Practices (BMP's)	JOB	1	\$2,000.00	\$2,000.00
55	M1042007	Allowance for Extra Work	Job	1	\$30,000.00	\$30,000.00
56	M1058000	Construction Surveying and Layout	JOB	1		
57	M1058002	2-Person Survey Party (CONTINGENT ITEM)	Hour	8		
58	M1081000	Mobilization	JOB	1		
59	M3001001	Sawcut & Remove Existing Asphalt Pavement	Sq Yd	66		
60	M3001002	Sawcut & Remove Existing Curb & Gutter	Lin. Ft.	32		
61	M3001005	Sawcut & Remove Existing Sidewalk	Sq. Ft.	88		
62	M3369809	Asphalt Concrete For Permanent Pavement Replacement, 9" Thick, Per Special Provisions	Sq. Yd.	66		
63	M3370103	Apply Crack Seal and Micro-Surface Treatment Per MAG SPEC 331, and Special Provisions	Sq. Yd.	1,045		
64	M3400400	Concrete Sidewalk, Per COP Std Detail P-1230	Sq Ft	57		
65	M3402200	Combined Concrete Curb & Gutter, Per MAG Standard Detail 220, Type "A"	Lin. Ft.	18		
66	M4013003	Allowance for Uniformed, Off-duty, Law Enforcement Officer	Lump Sum	1	\$15,000.00	\$15,000.00
67	M4013020	Traffic Control Devices	JOB	1		
68	M5051569	Concrete Catch Basin, Modified, Type "R-1, L=6 Ft." Phx. Supp. Detail P-1584	Each	1		
69	M5051575	Concrete Catch Basin, Type "N, Triple", Phx. Supp. Detail P-1570	Each	1		
70	M6180506	Concrete Pipe Collar For 24" Pipe and Larger, COP Standard Detail P-1505	Each	2		
71	M6183018	18" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	71		
72	M6186020	30" x 30" x 18" Pre-Fabricated Tee	Each	1		
73	M6187610	Connect Existing Storm Drain Pipe to New Manhole	Each	1		

**CITY OF PHOENIX
BID PROPOSAL**

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140111
ST83140111 - 16TH STREET TO 18TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
74	M6250005	Storm Sewer Manhole, MAG Standard Detail 522, COP Supp. Std. Detail P-1520	Each	1		
					TOTAL	
ST83140115 BASE BID (ITEMS 54 THROUGH 74 - INCLUSIVE)						\$0.00
						& /100 DOLLARS
WRITTEN WORDS						

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140116
ST83140116 - 33RD AVENUE & TAYLOR STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
75	E699200	Allowance for Stormwater Pollution Prevention Best Management Practices (BMP's)	JOB	1	\$5,000.00	\$5,000.00
76	M1042007	Allowance for Extra Work	Job	1	\$75,000.00	\$75,000.00
77	M1058000	Construction Surveying and Layout	JOB	1		
78	M1058002	2-Person Survey Party (CONTINGENT ITEM)	Hour	1		
79	M1081000	Mobilization	JOB	1		
80	M3001001	Sawcut & Remove Existing Asphalt Pavement	Sq. Yd.	1,406		
81	M3001002	Sawcut & Remove Existing Curb & Gutter	Lin. Ft.	253		
82	M3360250	Asphalt Concrete For Permanent Pavement Replacement, Type C 3/4, 5" Thick (Two lifts)	Sq. Yd.	1,386		
83	M3369809	Asphalt Concrete For Permanent Pavement Replacement, 9" Thick, Per Special Provisions	Sq. Yd.	20		
84	M3370103	Apply Crack Seal and Micro-Surface Treatment Per MAG SPEC 331, and Special Provisions	Sq. Yd.	7,041		
85	M3400240	Concrete Valley Gutter, Std. Detail 240	Sq Ft	T		
86	M3400400	Concrete Sidewalk, Per COP Std. Detail P-1230	Sq. Ft.	776		
87	M3402200	Combined Concrete Curb & Gutter, Per MAG Standard Detail 220, Type "A"	Lin. Ft.	90		
88	M3402243	Concrete Curb Transition Type Per MAG Std. Detail 221	Each	4		
89	M3500020	Remove Portland Cement Concrete Sidewalk, Driveway, Valley Gutter & Slab	Sq. Ft.	1,110		
90	M3500307	Remove and Reinstall Existing Traffic Sign	Each	1		
91	M4013003	Allowance for Uniformed, Off-duty, Law Enforcement Officer	Lump Sum	1	\$20,000.00	\$20,000.00
92	M4013020	Traffic Control Devices	JOB	1		
93	M4051202	Survey Marker, MAG Std Det 120-1, Type B	Each	1		
94	M5051540	Concrete Catch Basin, Type "M-1, L=10-Ft", Phx. Supp. Detail P-1569-1	Each	8		
95	M6014030	Permanent Pipe Support, MAG Standard Details 403 1, 403-2, or 403-3	Each	1		

**CITY OF PHOENIX
BID PROPOSAL**

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140111
ST83140111 - 16TH STREET TO 18TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
96	M6012000	Waterline Replacement (ACP Replacement, 20 ft)	Each	1		
97	M6104006	6" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install	Lin. Ft.	278		
98	M6104008	8" Ductile Iron Water Pipe & Fittings, Restrained, Furnish & Install	Lin. Ft.	134		
99	M6104401	Waterline Abandon in Place, Grout Solid	Lin. Ft.	250		
100	M6101850	Allowance for Excess Ductile Iron Fittings, Furnish and Install	L Sum	1	\$25,000.00	\$25,000.00
101	M6101805	Water Service Connection (Main to Meter) (CONTINGENT ITEM)	Each	5		
102	M6101810	3/4" or 1" Water Meter Service Connect. Pipe and Fittings, Main to Meter, Furnish & Instal (CONTINGENT ITEM)	Lin. Ft.	170		
103	M6108014	6" Insertion Valve (CONTINGENT ITEM)	Each	1		
104	M6183015	15" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	41		
105	M6183018	18" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	104		
106	M6183024	24" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	128		
107	M6183030	30" Rubber Gasket Reinforced Concrete Pipe, Class III	Lin. Ft.	1,551		
108	M6187610	Connect Existing Storm Drain Pipe to New Manhole	Each	1		
109	M6250005	Storm Sewer Manhole, MAG Standard Detail 522, COP Supp. Std. Detail P-1520	Each	7		
110	M6250015	Storm Sewer Manhole Base Transition, Phoenix Supp. Detail P-1560 and MAG Std. Detail 522	Each	1		
111	M6303006	6" Valve, Box and Cover, Furnish & Install, P1391 Type A	Each	1		
					TOTAL	
ST83140116 BASE BID (ITEMS 75 THROUGH 111 - INCLUSIVE)						
					/100 DOLLARS	
WRITTEN WORDS						

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
PROJECT NO. ST83140120
ST83140120 - 32ND STREET & MONTEROSA STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
112	E699200	Allowance for Stormwater Pollution Prevention Best Management Practices (BMP's)	JOB	1	\$3,000.00	\$3,000.00
113	M1042007	Allowance for Extra Work	Job	1	\$30,000.00	\$30,000.00
114	M1058000	Construction Surveying and Layout	JOB	1		
115	M1058002	2-Person Survey Party (CONTINGENT ITEM)	Hour	4		
116	M1081000	Mobilization	JOB	1		
117	M3100000	Aggregate Base Course, 6" Thick (Monterosa St)	Sq. Yd.	13		

**CITY OF PHOENIX
 BID PROPOSAL**

**PROJECT TITLE: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
 PROJECT NO. ST83140111
 ST83140111 - 16TH STREET TO 18TH STREET**

ITEM NO.	BID (OR) M NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
118	M3100001	Aggregate Base Course, 8" Thick (32nd St)	Sq. Yd.	9		
119	M3360212	Sawcut, Remove and Replace A.C. Pavement	Sq. Yd.	13		
120	M3369793	Asphalt Concrete for Permanent Pavement Replacement, 3" Thick, Per Special Provisions (Monterosa St)	Sq. Yd.	13		
121	M3369809	Asphalt Concrete For Permanent Pavement Replacement, 6" Thick, Per Special Provisions (32nd St)	Sq. Yd.	9		
122	M3370102	Apply Crack Seal and Slurry Seal Treatment per MAG SPEC 332, and Special Provisions	Sq. Yd.	254		
123	M3370103	Apply Crack Seal and Micro-Surface Treatment Per MAG SPEC 331, and Special Provisions	Sq. Yd.	170		
124	M3500041	Remove Pipe	Lin. Ft.	26		
125	M3500043	Remove Existing Catch Basin	Each	1		
126	M4011903	Traffic Control Devices	Lump Sum	1		
127	M5051776	Concrete Catch Basin, Modified , TYPE "M-2, L=10-FT" PHX DET P-1569	Each	1		
128	M6180012	12" Storm Sewer Pipe (RGRCP, CLASS III)	Lin. Ft.	16		
129	M6180015	15" Storm Sewer Pipe (RGRCP, CLASS III)	Lin. Ft.	5		
130	M6181505	Concrete Pipe Collar for 18" Pipe and Smaller, MAG Standard Detail 505	Each	2		
131	M6187712	12" Storm Drain Check Valve in Outlet Pipe	Each	1		
132	M6187715	15" Storm Drain Check Valve In Outlet Pipe	Each	1		
133	M6250005	Storm Sewer Manhole, MAG Standard Detail 522, COP Supp. Std. Detail P-1520	Each	1		
					TOTAL	
ST83140120 BASE BID (ITEMS 112 THROUGH 133 - INCLUSIVE)						
						& /100
<u>DOLLARS</u>						
WRITTEN WORDS						

TOTAL BID FOR PROJECT NOS. ST83140111, ST83140113, ST83140115, ST83140116, ST83140120 (ITEMS 1 THROUGH 133 - INCLUSIVE) \$						
						& /100
<u>DOLLARS</u>						
WRITTEN WORDS						

Prepared By:

Signature

Name

Position/Title

Firm Name

PROPOSAL SUBMITTAL

**Project Title: ARPA Local Drainage Mitigation Package 2 DBB
Project Nos.: ST83140111, ST83140113, ST83140115, ST83140116 AND
ST83140120**

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 _____ CITY _____ CITY _____

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)

SURETY BOND

City of Phoenix Project Nos.: ST83140111, ST83140113, ST83140115, ST83140116 AND ST83140120

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 **ARPA LOCAL DRAINAGE MITIGATION PACKAGE 2 DESIGN-BID-BUILD**.

NOW, THEREFORE, if the City of Phoenix shall accept the proposal of the Principal and the Principal shall 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 shall 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 shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____ A.D., 2024

Principal

Title

Mailing Address

Surety

WITNESS:

A.M. BEST RATING:

Disadvantaged Business Enterprise (DBE) Program

DBE-Race & Gender Neutral (Non-Negotiated)

Form EO2 SMALL BUSINESS OUTREACH EFFORTS

Bidder's Name:	Contract # / Project #: ST83140111, ST83140113, ST83140115, ST83140116, and ST83140120	Contract Name: ARPA Local Drainage Mitigation Package 2 DBB
Email:	Phone #:	Point of Contact:

Each bidder must conduct outreach efforts and submit documentation of those outreach efforts as described in the Disadvantaged Business Enterprise (DBE) Program Race & Gender Neutral Contract Clause. Detailed instructions for this form are included in the Contract Clause. Supporting documentation is required for Columns D and F. Bidders should make additional copies of this form as needed for their submittal.

(A) Small Business Name and Contact Information	(B) Business Status	(C) Scope(s) of Work Solicited	(D) Solicitation Method	(E) Selection Decision*	(F) Communication Final Selection Outcome*										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2">Name:</td></tr> <tr><td colspan="2">Address:</td></tr> <tr> <td style="width: 70%;">City, State, Zip:</td> <td style="width: 30%;">Number of Employees:</td> </tr> <tr> <td>Phone Number:</td> <td>Email or Fax:</td> </tr> <tr> <td>Number of Years in Business:</td> <td>Range of Annual Gross Receipts:</td> </tr> </table>	Name:		Address:		City, State, Zip:	Number of Employees:	Phone Number:	Email or Fax:	Number of Years in Business:	Range of Annual Gross Receipts:	<input type="checkbox"/> DBE <input type="checkbox"/> SBC - Small Business Concern <input type="checkbox"/> SBE - City of Phoenix Certified <input type="checkbox"/> Unknown	List Scope(s) of Work Estimated percentage of total contract value: %	<input type="checkbox"/> E-mail Blast <input type="checkbox"/> Phone Call <input type="checkbox"/> In-Person <input type="checkbox"/> Newspaper <input type="checkbox"/> Website <input type="checkbox"/> Trade Listing <input type="checkbox"/> Outreach Event <input type="checkbox"/> Other	<input type="checkbox"/> Firm was selected Dollar Value: <input type="checkbox"/> Firm was not selected Provide explanation of why firm NOT selected _____ _____	Date Firm was Notified: _____ Method used to Communicate Selection: <input type="checkbox"/> Email <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> Letter <input type="checkbox"/> In person
Name:															
Address:															
City, State, Zip:	Number of Employees:														
Phone Number:	Email or Fax:														
Number of Years in Business:	Range of Annual Gross Receipts:														
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Name:															
Address:															
City, State, Zip:	Number of Employees:														
Phone Number:	Email or Fax:														
Number of Years in Business:	Range of Annual Gross Receipts:														



City of Phoenix

Disadvantaged Business Enterprise (DBE) Program

**FORM EO3 SMALL BUSINESS UTILIZATION COMMITMENT (RGN)
(Due within 3 calendar days of the bid deadline.)**

Project Numbers: ST83140111, ST83140113, ST83140115, ST83140116 and ST83140120	Project Title: ARPA Local Drainage Mitigation Package 2 Design-Bid-Build
--	--

On behalf of the Successful Bidder, I certify under the penalty of perjury that the information submitted herein is true and correct:

1. The firms indicated as "Selected" in **Form EO2 Small Business Outreach Efforts**, will participate in this contract;
2. The Successful Bidder will comply with the Race- and Gender-Neutral post-award compliance requirements as stated in the DBE contract clause;
3. Successful Bidder understands and agrees that any and all changes or substitutions to subcontracts with DBE's and Small Businesses must be authorized by the Phoenix DBE Compliance Specialist prior to implementation; and
4. The following statements are true and correct:

The Proposed Total Small Business percentage on this contract will be:

_____ %

Company Name: _____

Company Mailing Address: _____

Representative Name: _____

Title: _____

Email Address: _____

Phone Number: _____

Signature: _____

Date: _____

CITY OF PHOENIX
LIST OF MAJOR SUBCONTRACTORS AND SUPPLIERS

PROJECT NOS.: ST83140111, ST83140113, ST83140115, ST83140116, ST83140120 PROJECT TITLE: ARPA LOCAL DRAINAGE MITIGATION PKG 2 DBB

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	DOLLAR VALUE OF WORK OR MATERIALS IN BID
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				

I hereby certify by signing below that the above listed companies will be utilized to perform work on this project for an **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 that ALL vendors providing work equal to or greater than 5% of the base bid are listed or you will be disqualified. If you are self-performing work, you must still list any suppliers for materials or list any subcontractors with whom you will directly contract.

COMPANY NAME _____ SIGNATURE _____

NAME & TITLE _____ PHONE NUMBER _____ DATE _____

EMAIL ADDRESS _____

CITY OF PHOENIX

LIST OF ALL SUBCONTRACTORS AND SUPPLIERS

PROJECT NOS.: ST83140111, ST83140113, ST83140115, ST83140116, ST83140120 PROJECT TITLE: ARPA LOCAL DRAINAGE MITIGATION PKG 2 DBB

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	DOLLAR VALUE OF WORK OR MATERIALS IN BID
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> NO				
	<input type="checkbox"/> YES <input type="checkbox"/> 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 that ALL vendors providing work are listed or you will be disqualified. If you are self-performing work, you must still list any suppliers for materials or list any subcontractors with whom you will directly contract.

COMPANY NAME _____ SIGNATURE _____
 NAME & TITLE _____ PHONE NUMBER _____ DATE _____
 EMAIL ADDRESS _____

BIDDER'S DISCLOSURE STATEMENT

Authorized Contact for this Disclosure Statement

Name: _____

Title: _____

E-mail: _____

Phone number: _____

List any EIN, DBA, trade name, or other identity used in the last five 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:

- | | | | |
|--------------------------|-------------------------------|------------------------------|-------|
| <input type="checkbox"/> | Corporation | Date of incorporation: | _____ |
| <input type="checkbox"/> | Limited Liability Company | Date organized: | _____ |
| <input type="checkbox"/> | Limited Liability Partnership | Date of registration: | _____ |
| <input type="checkbox"/> | Limited Partnership | Date established: | _____ |
| <input type="checkbox"/> | General Partnership | Date established: | _____ |
| <input type="checkbox"/> | Sole Proprietor | How many years in business?: | _____ |
| <input type="checkbox"/> | 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: _____

Business License Number and Classification: _____

Business Transaction Privilege License Number: _____

Special Use or other zoning permits required for Bidder's operation and performance of the services under this Agreement:

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 _____



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:

Four empty boxes for license numbers/letters

Arizona non-operating identification license.

Print first four numbers/letters:

Four empty boxes for license 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:

Four empty boxes for passport numbers/letters

Foreign Passport with United States Visa.

Print first four numbers/letters on Passport:

Four empty boxes for passport numbers/letters

Print first four numbers/letters on Visa:

Four empty boxes for visa numbers/letters

I-94 Form with a photograph.

Print first four numbers on I-94:

Four empty boxes for I-94 numbers

USCIS Employment Authorization Document (EAD).

Print first four numbers/letters on EAD:

Four empty boxes for EAD numbers/letters

or Perm. Resident Card (acceptable alternative):

Four empty boxes for Perm. Resident Card numbers/letters

Refugee Travel Document.

Date of issuance: _____; Refugee country: _____

U.S. Certificate of Naturalization.

Print first four digits of CIS Reg. No.:

Four empty boxes for CIS Reg. No. digits

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: _____

BUY AMERICA CERTIFICATE

FOR COMPLIANCE WITH TITLE 49 USC § 5323(J)(1)
(For Procurement of Steel, Iron, or Manufactured Products)
(EXCLUDES ROLLING STOCK)

PROJECT NO. ST83140111, ST83140113, ST83140115, ST83140116 and ST83140120

PROJECT TITLE ARPA Local Drainage Mitigation Project Package 2 Design-Bid-Build

(Complete form and submit with bid)

The Bidder/Proposer hereby certifies that it will comply with the requirements of Title 49 USC § 53230) (1) and the applicable regulations in 49 CFR Part 661.

Executed on _____, 2024 at _____
(Date) (City) (State)

Printed Name Signature of Authorized Official Title

BUY AMERICA CERTIFICATE FOR NON-COMPLIANCE WITH TITLE 49 use §. 5323(J)(1)

The Bidder/Proposer hereby certifies that it cannot comply with the requirements of Title 49 USC § 5323(j)(1), but it may qualify for an exception pursuant to Title 49 USC § 5323 (j)(2)(B) or (j)(2)(D) and the regulations in 49 CFR 661.7.

Executed on _____, 2024 at _____
(Date) (City) (State)

Printed Name Signature of Authorized Official Title

ARPA Local Drainage Mitigation Package 2
Design-Bid-Build

ST83140111, ST83140113, ST83140115, ST83140116 and ST83140120

NON-COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he/she has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to include anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He/She further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee gift, commission or thing of value on account of such sale.

OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES FOR PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT.

Dated this ___ day of _____, _____

(Name of Organization)

(Title of Person Signing)

(Signature)

ACKNOWLEDGEMENT

STATE OF _____)
) ss
COUNTY OF _____)

Before me, a Notary Public, personally appeared the above named and swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to me this _____ day of _____, _____.

Notary Public Signature

My Commission Expires: _____

CERTIFICATION OF NON-SEGREGATED FACILITIES

_____ assures Government Contractors and concerned Federal, State and Local Agencies that we do not and will not maintain or provide for our employees any segregated facilities at any of our establishments, and that we do not and will not permit our employees to perform their services at any location under or control where segregated facilities are maintained.

_____ understands that the phrase "Segregated Facilities" includes facilities which are, in fact, segregated on a basis of race, color, creed, or national origin, because of habit, local custom or otherwise.

_____ understands and agrees that maintaining or providing segregated facilities for our employees or permitting our employees to perform their services at any location under our control, where segregated facilities are maintained is a violation of the Equal Opportunity Clause required by Executive Order 12246 of September 24, 1955.

_____ further understand and agrees that a breach of the assurance herein contained subjects us to the provisions of the Orders of the Secretary of Labor and the provisions of the Equal Opportunity Clause enumerated in contracts or referenced on purchase orders by the government and government contractors.

Finally, _____ is aware that whoever knowingly and willingly makes any false, fictitious representation may be liable to criminal prosecution under 18 U.S.X. #1001.

(Signature)

Corporate Seal

(Printed Name and Title)

Company Name

Company Address

CERTIFICATION OF NON-SEGREGATED FACILITIES - 41 CFR PART 60-1.8

Notice to Prospective Federally Assisted Construction Contractors

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a federally-assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving federally-assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Notice to Prospective Sub-Contractors of Requirements for Certification of Non-Segregated Facilities

1. A Certification of Non-Segregated Facilities shall be submitted prior to the award of a subcontract exceeding \$10,000, which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The federally-assisted construction contractor certifies that she or he does not maintain or provide, for his employees, any segregated facilities at any of his establishments and that she or he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally-assisted construction contractor certifies that she or he will not maintain or provide, for his or her employees, segregated facilities at any of his or her establishments and that she or he will not permit his or her employees to perform their services at any location under his or her control where segregated facilities are maintained. The federally-assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time-clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directives or are, in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally-assisted construction contractor agrees that (except where she or he has obtained identical certifications from proposed subcontractors for specific time periods) she or he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that she or he will retain such certifications in his files.

Application

Incorporate in all construction contracts and subcontracts that exceed \$10,000. The notices should be placed within the solicitation for proposals. The actual certification should be incorporated in the contract agreement.

Reference

Executive Order 11246
41 CFR Part 60 -1.8
AC 150/5100-15, Para. 22.b.

**GEOTECHNICAL EXPLORATION REPORT
ARPA LDS GEOTECHNICAL SERVICES
MADISON STREETS: 16TH STREET TO
18TH STREET
PHOENIX, ARIZONA**

Prepared for:
City of Phoenix Street Transportation
Department
1034 East Madison Street
Phoenix, Arizona



Prepared by:
ATEK Engineering Consultants, LLC
111 South Weber Drive, Suite 1
Chandler, Arizona 85226



ATEK Project # 230190-1

March 27, 2024

March 27, 2024
ATEK Project #230190-1

Rob Duvall, Materials Supervisor
City of Phoenix Streets Transportation Department
1034 East Madison Street
Phoenix, Arizona 85034

Regarding: Geotechnical Exploration Report

Project: ARPA LDS Geotechnical Servies
ST83140111
Madison Street: 16th Street to 18th Street
Phoenix, Arizona

Dear Mr. Duvall:

ATEK Engineering Consultants, LLC is pleased to present the attached Geotechnical Exploration Report for the ARPA LDS Geotechnical Servies (ST83140111) located on Madison Street between 16th Street to 18th Street in Phoenix, Arizona. The purpose of our study was to explore and evaluate the subsurface conditions at the proposed site to develop geotechnical engineering recommendations for project design and construction.

Based on our findings, the site is considered suitable for the proposed construction, provided geotechnical recommendations presented in the attached report are followed. Specific recommendations regarding the geotechnical aspects of the project design and construction are presented in the attached report. The recommendations contained within this report are dependent on the provisions provided in the Limitations and Recommended Additional Services sections of this report.

We appreciate the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned.

Sincerely,
ATEK Engineering Consultants, LLC

A handwritten signature in blue ink, appearing to read "Armando Ortega".

Armando Ortega, P.E.
Principal Geotechnical Engineer

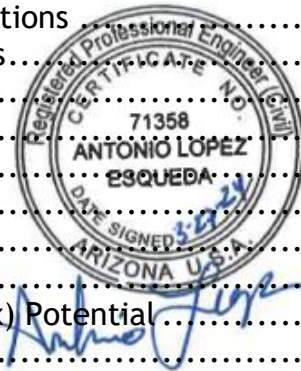


Antonio Lopez, P.E.
Geotechnical Group Manger

Distribution: (1) Addresses (Electronic Copy)

TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1.	Project Description.....	1
1.2.	Purpose.....	1
1.3.	Scope of Services	1
2.	FIELD EXPLORATION.....	2
2.1.	General.....	2
2.2.	Soil Test Borings	2
2.3.	Seismic Refraction Survey	3
3.	LABORATORY TESTING.....	3
4.	GENERAL SITE CONDITIONS	4
4.1.	Geologic Setting	4
4.2.	Surface Conditions.....	5
4.2.1.	Pavement Profile	5
4.3.	Subsurface Conditions	5
4.4.	Groundwater Conditions.....	6
4.5.	Geologic Hazards	6
4.5.1.	Liquefaction Potential	6
4.6.	Seismic Considerations.....	6
4.7.	Earth Fissures and Land Subsidence	7
5.	ENGINEERING ANALYSES AND RECOMMENDATIONS	7
5.1.	Earthwork.....	7
5.2.	Excavation	8
5.2.1.	Trench Backfill.....	9
5.2.2.	Temporary Excavations	9
5.2.3.	Pavement Site Preparation and Grading	10
5.2.4.	Borrow Requirements	11
5.3.	Design Values for Buried Pipes	11
5.3.1.	Soil Loads on Buried Flexible Pipes	11
5.3.2.	Design Values for Buried Flexible Pipes	11
5.3.3.	Flexible Pipe Trench Width Recommendations	13
5.3.4.	Flexible Pipe Construction Considerations.....	14
5.3.5.	Soil Loads on Buried Rigid Pipes.....	14
5.3.6.	Live Loads on Buried Conduits.....	15
5.4.	Moisture Protection	17
5.5.	Corrosion Potential.....	17
5.5.1.	10-point System.....	17
5.5.1.1.	Electrical Resistivity	18
5.5.1.2.	Oxidation-Reduction (Redox) Potential	19
5.5.1.3.	Sulfides	19
5.5.1.4.	Moisture	19
5.5.2.	Concrete Corrosion.....	20



5.6. Pavement Areas..... 20

6. CLOSURE..... 21

6.1. Limitations..... 21

6.2. Recommended Additional Services..... 22

- APPENDIX A - Site Location Map
- APPENDIX B - Sample Location Plan
- APPENDIX C - Field Study and Boring Logs
- APPENDIX D - Laboratory Test
- APPENDIX E - Seismic Refraction Survey



1. INTRODUCTION

This report presents the results of our geotechnical exploration for the ARPA LDS Geotechnical Services located on Madison Street: 16th Street to 18th Street in Phoenix, Arizona. A Site Location Map is presented in **Appendix A** of this report. The following sections of this report describe our understanding of the project and our scope of services.

1.1. Project Description

The project consists of storm drain improvements at Madison Street from 16th Street to 18th Street in Phoenix, Arizona. The storm drain improvements start at Jackson Street from 16th Street to 16th Place, continues north on 16th place, turns east on Madison Street, and ends on 17th Street. The length of the 30-inch storm drainpipe is approximately 1,050 linear feet.

1.2. Purpose

The purpose of this geotechnical study was to evaluate the general surface and subsurface conditions at the site, and to present recommendations related to geotechnical aspects of design and construction of the proposed project.

1.3. Scope of Services

Our study included a site reconnaissance, subsurface exploration, soil sampling, field and laboratory testing, engineering analyses, and preparation of this report. This report presents geotechnical recommendations for design and construction of proposed structures. The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the “Limitations” section of this report.

2. FIELD EXPLORATION

2.1. General

Prior to the start of drilling, the Arizona 811 was contacted to locate existing utilities at the boring locations. In addition, the City of Phoenix Street Transportation Department Right-of-Way Management was contacted to obtain TRACS permit (C-23-020209, C-23-020210, and C-24-001314). The field exploration was performed on January 26, 2024. Three soil borings were drilled to depths ranging between fifteen (15) and eighteen (18) feet below existing grade. Auger refusal was encountered at each boring location on coarse gravel and cobbles. The soil test borings were drilled using a truck mounted CME-55 power drill rig equipped with 7 and ¼-inch outside diameter hollow stem augers. The borings were located in the field at the approximate locations shown on the Sample Location Plan included in **Appendix B** of this report. Upon completion of the borings, the boreholes were backfilled using ½ sack aggregate base slurry. Aggregate base slurry was mixed and placed on site by American Materials.

2.2. Soil Test Borings

Disturbed and relatively undisturbed samples were taken at the direction of the field engineer during drilling operations. Relatively undisturbed samples of the subsurface materials were obtained using a California sampler with a 2.5-inch inside diameter and a 3.0-inch outside diameter. Disturbed samples were obtained using a Standard Penetration/Split Spoon Sampler (SPT) with a 1.5-inch inside diameter and 2.0-inch outside diameter. The California and the SPT samplers were driven 12 and 18 inches, respectively, using a 140-pound hammer falling 30 inches, and blow counts for successive 6-inch penetration intervals were recorded. After the sampler was withdrawn from the borehole, the samples were removed, sealed to minimize moisture loss, and submitted to the laboratory.

Soil classifications made in the field from auger cuttings and samples were re-evaluated in the laboratory after further examination and testing. The soils were classified in accordance with the Unified Soil Classification System presented in **Appendix C**.

Sample classifications, blow counts recorded during sampling, and other related information, were recorded on the soil boring logs. The boring logs are presented in **Appendix C**. The information presented on the logs are a combination of factual and interpretive information. Lines delineating subsurface strata and group symbols are based on field observations made at the time of the field study. Actual subsurface lines delineating subsurface strata may be gradual and vary.

2.3. Seismic Refraction Survey

One seismic refraction survey line was completed on 16th Place between Jackson Street and Madison Street on February 15, 2024, as part of the Subsurface Investigation. The seismic refraction survey line was completed to obtain site subsurface conditions. The results may be used as guide to qualitatively assess the relative ease of excavation of the site soils and bedrock like material, and provide a strength estimate of the material encountered. Seismic velocities, calculated zone thickness and depth to velocity zone boundaries for each interpreted bedrock or soil types are depicted in Figures 2 through 4 presented in **Appendix E**. The results of the seismic refraction survey should be used with caution and only used as guidelines.

3. LABORATORY TESTING

Selected soil samples from the borings were tested in the laboratory for classification purposes and to evaluate their engineering properties. The laboratory tests included:

- Gradation;
- Atterberg limits;
- Moisture content;

- Undisturbed ring density;
- Standard Proctor;
- pH tests;
- Resistivity tests;
- Sulfide content;
- Redox potential;
- Sulfate content;
- And chloride content.

A brief description of each test performed on the soil samples and the results are presented in **Appendix D** of this report.

4. GENERAL SITE CONDITIONS

4.1. Geologic Setting

The study area falls within the Sonoran Desert of the Basin and Range Physiographic Province. The Basin and Range is characterized by its broad and low elevation valleys perimeter by long mountain ranges. The site elevation is approximately 1095 feet above sea level and generally, drainage flows through intermittent streams and dry washes that connect to the Gila or Salt River. The project is located near downtown phoenix, approximately 2.2 miles west of the center of Phoenix Sky Harbor and approximately 1.86-miles north of the Salt River. The surficial soils within the project bound are mapped as Holocene surficial Deposits (Qy) and late and middle Pleistocene surficial deposits (Qm)¹. These types of soils are transported to their current location by means of rivers. The young and middle alluvial soils are described fine-grained, well-sorted sediments, and includes gravelly channels terrace².

¹ Reynolds, S.J., and Skotnicki, S.J., 1993, [Geologic map of the Phoenix South 30' x 60' quadrangle, central Arizona](#): Arizona Geological Survey, Open-File Report OFR 93-18, scale 1:100,000

² Horton, J.D., C.A. San Juan, and D.B Stoeser, 2017, The State Geologic Map Compilation (SGMC) geodatabase of the conterminous United States: U.S. Geological Survey Data series 1052, doi: 10.3133/ds1052

4.2. Surface Conditions

The project is in downtown Phoenix within Quarter Section Q10-31 in Arizona. The storm drain alignment is on Jackson Street from 16th Street to 16th Place, 16th Place from Jackson Street to Madison Street, and Madison Street from 16th Place to 17th Street. These roads are bounded by concrete curb and gutter. The properties surrounding the site are generally developed as commercial and industrial properties.

4.2.1. Pavement Profile

The pavement section was measured at each of the soil test boring locations. A summary of the thickness of the pavement sections encountered at each location is tabulated below.

BORING NUMBER	ROADWAY	OFFSET	AC THICKNESS (IN)	ABC THICKNESS (IN)
B-1	EB Jackson St	100' W of 16 th Pl	10.0	7.0
B-2	NB 16 th Pl	280' N of Jackson St	2.0	6.0
B-3	WB Madison St	65' W of 17 th St	3.5	10.0

4.3. Subsurface Conditions

As indicated by the exploratory borings, in general the subgrade soils under the pavement consist of Sandy Lean Clay (CL) and Clayey Sand (SC) with low to medium plasticity. These soils were found to have a relative firmness ranging from soft to moderately firm. The underlying subsurface soils encountered during our field exploration consisted of Sandy Lean Clay (CL), Clayey Sands (SC), and Poorly Graded Gravel with Sand (GP). These soils were found to have a relative firmness of soft to hard with low to medium plasticity and relative density of medium dense to very dense with no plasticity. Auger refusal was encountered on sand, gravel and potential cobbles. For additional information see Boring Logs presented in **Appendix C**.

4.4. Groundwater Conditions

Groundwater was not encountered within the soil test borings. Based on a review of published groundwater data maintained by Arizona Department of Water Resources anticipated depth to groundwater is approximately 73 feet below the existing ground surface elevation (Site ID 332647112025101). It is anticipated that groundwater will not be a factor in design or construction of the planned improvements. It should be noted that soil moisture conditions within the area may vary depending on rainfall and/or runoff conditions not apparent at the time of our field study.

4.5. Geologic Hazards

4.5.1. Liquefaction Potential

Based on the site soils and groundwater conditions encountered at the project site during this study, the preliminary potential for soil liquefaction is considered to be negligible.

4.6. Seismic Considerations

Probabilistic earthquake ground motion values were obtained using the U.S. Seismic Design Maps Web Application by USGS which uses 2009 AASHTO Guide Specifications for LRFD Seismic Bridge Design (USGS, 2014). Interpolated, probabilistic ground motion values of Peak Ground Acceleration (PGA) on bedrock for a seven-percent probability of exceedance in 75 years were obtained for the project area by latitude and longitude and are presented in the following Table. The site-adjusted values account for amplification of peak ground acceleration and spectral response values from the bedrock contact to the ground surface, using site coefficients for peak ground and spectral accelerations for a Site Class D for stiff soil profile with average SPT N-values between 15 and 50, based on Table 3.10.3.1-1 - Site Class Definition of AASHTO (2012).

Description	PGA	Spectral Acceleration (SA)	
	7% PE in 75 years (RP = ~1,000 years)	7% PE	
		0.2 sec SA ⁽²⁾	1.0 sec SA ⁽³⁾
Bedrock Contact Values Latitude 33.446178° Longitude -112.047° (midpoint of project alignment) ⁽¹⁾	0.052	0.117	0.039
Site-adjusted Values ⁽⁴⁾	1.6	1.6	2.4
Notes:			
<p>(1) Values are for a stiff soil profile with average SPT N-values equal to or greater than 15 and equal to or less than 50, based on Table 3.10.3.1-1 of AASHTO (2019). (RP) Return Period (PGA) Peak Ground Acceleration (PE) Probability of Exceedance</p> <p>(2) Spectral acceleration at 0.2 second period</p> <p>(3) Spectral acceleration at 1.0 second period</p> <p>(4) Site-adjusted values based on application of site coefficients for Site Class D.</p>			

4.7. Earth Fissures and Land Subsidence

The project site is located in an area without documented earthen fissures and in an area without a measured land subsidence (Earth Fissure Map of the Scottsdale Study Area: Maricopa County, Arizona by Arizona Geological Survey dated August 2008 and Total Land Subsidence in Western Metropolitan Phoenix, Maricopa County between April 28, 2022, and May 5, 2023, prepared by Arizona Department of Water Resources.

5. ENGINEERING ANALYSES AND RECOMMENDATIONS

5.1. Earthwork

The following sections present earthwork recommendations based on our understanding of the project, the finding of our field exploration, results of the laboratory test and engineering analysis. Material larger than six (6) inches in diameter should not be used in subgrade for pavements or concrete flatwork per MAG section 301.3.

5.2. Excavation

The field sampling and exploration was performed using a truck-mounted drill rig with 7 and ¼-inch outside diameter hollow stem augers. In addition, one seismic refraction line was performed along portions of the new storm drain alignment. We present the following general comments regarding ease of excavation with the understanding that they are opinions based on the test borings and seismic refraction lines. The project consultant and contractor should become familiar with this report including boring logs and the results of the attached seismic refraction survey to evaluate potential hard dig conditions. **Please note that excavation characteristics are best evaluated by performing test excavations with the size and type of equipment the contractor plans on using at the site, which was not conducted as part of this study.**

It is anticipated that shallow excavations less than 15-feet in the site soils can most likely be accomplished by conventional earth moving equipment in good operating condition. Auger refusal was encountered at a depth ranging from 15-feet to 18-feet. Excavations deeper than 15-feet below existing grade may encounter slight to moderate excavation conditions due to the presence of subsurface Sand, Gravel, Cobbles and potential boulders. Seismic wave velocities are generally related to hardness/density and can be correlated to physical properties of the subsurface conditions, such as rippability or ease of excavation. The seismic velocities ranged from approximately 1,000 to 2,777 feet per second, which indicates slight to moderate qualitative excavatability. Sloughing and caving should be considered during trench excavations. Please refer to Section 4 and the boring logs presented in **Appendix C** and results of the Seismic Refraction Study presented in **Appendix E** of this report for more information.

5.2.1. Trench Backfill

Trench backfill, pipe bedding material, and compaction shall be as per City of Phoenix Standard Detail “Trench Backfill & Surface Replacement” Detail Number P1200 (dated 07/01/2015) and 2015 CITY OF PHOENIX SUPPLEMENT TO THE 2015 EDITION MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION “SECTION 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION” (dated December 10, 2020) and MAG UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION “SECTION 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION” (dated January, 2020).

5.2.2. Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Generally, Construction site safety is solely the responsibility of the Contractor, who shall also be responsible for the means, methods, and sequencing of construction operations. We are providing the information below strictly as a service to our client. **Under no circumstances should the information be interpreted that ATEK is assuming responsibility for construction site safety or the Contractor’s activities; such responsibility is not being implied and should not be inferred.**

Excavations and Slopes

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced; and, if not followed, could result in substantial

penalties to the Owner, Contractor, and/or earthwork subcontractor and/or utility subcontractors.

Near-surface soils encountered during our field study consisted predominantly of silty clayey sands. In our opinion, these soils would be considered a Type C soil when applying OSHA regulations. For this soils type OSHA recommends a maximum slope inclination of 1½(h):1(v) or flatter for excavations 20 feet or less in depth. Steeper cut slopes may be utilized for excavations less than five (5) feet deep depending on the strength, moisture content, and homogeneity of the soils as observed in the field. Flatter slopes and/or trench shields may be required if loose, cohesionless soils and/or water are encountered along the slope face.

Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within one-third the slope height from the top of any excavation. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation. Shoring, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Arizona.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water should be collected and disposed of outside the construction limits.

5.2.3. Pavement Site Preparation and Grading

Pavement replacement should be in accordance with Standard Detail P1200, "Trench Backfill & Surface Replacement" (dated 07/01/2015) of the 2015 CITY OF PHOENIX

SUPPLEMENT TO THE 2015 MAG UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION.

5.2.4. Borrow Requirements

There is no designated source for borrow on this project. Borrow shall be as specified in MAG Section 210.

5.3. Design Values for Buried Pipes

The following sections provide design information relative to flexible and rigid pipes. The recommendations provided within the following sections are based on the pipe being installed by open cut excavations.

5.3.1. Soil Loads on Buried Flexible Pipes

The pipe loading pressure for flexible pipes such as PVC, HDPE, or welded steel may be determined by calculating the soil overburden pressure, adding the live load pressures and multiplying by the pressure transfer coefficient C_p . The coefficient C_p typically varies from 0.65 to 2.0 depending on the type and degree of compaction of the bedding and initial backfill materials. The value of C_p may be determined from the pipe manufacturers or may be conservatively estimated as $C_p = 2.0$. For aggregate base or clean washed sand bedding and initial backfill materials compacted as recommended in this report, a C_p value of 0.80 is recommended for design.

5.3.2. Design Values for Buried Flexible Pipes

Flexible pipes typically derive part of their resistance to ring deflection from the initial backfill and trench wall soils. Evaluation of ring deflection of buried pipes under soil and live loads may be determined using the Iowa Formula. The elastic modulus of the soils surrounding the pipe, or E' , may be evaluated by knowing the trench width, the pipe diameter, the elastic modulus of the initial backfill ($E'b$), and

the elastic modulus of the native trench wall soils ($E'n$ - also termed Constrained Modulus). Recommendations for pipe design using the Iowa Formula are presented in the following table.

The following table presents recommended $E'b$ values for use in the Iowa Formula for proposed initial backfill materials placed and compacted in accordance with our recommendations. The value of $E'b$ is a lateral modulus of subgrade reaction for the initial backfill material. For $E'b$ values at depths between the intervals presented below, the $E'b$ value between data points may be determined by linear interpolation.

The recommended $E'b$ values presented in the following table apply to aggregate base or graded sand bedding and initial backfill material along the sides of the pipe at the recommended level of compaction. These values are applicable for pipe design where the initial backfill width is at least 2 times the pipe diameter (D) on each side of the pipe (trench width of $5D$).

$E'b$ Values for Design of Buried Flexible Pipes

Soil Type	Depth to Springline	Recommended $E'b$ (psi)
Pipe Bedding and Initial Backfill (aggregate base or graded sand)	5	1000
	10	1500
	15	1600
<i>Notes: 1. The above design values are based on "Evaluation of the Modulus of Soil Reaction, E', and its Variation With Depth," by Hartley & Duncan, dated June 1982. 2. Based on providing at least 2 pipe diameters of backfill on each side of pipes.</i>		

Where the zone of backfill beside the pipe is less than $2D$, the $E'b$ values presented above may not be applicable and the constrained soil modulus $E'n$ will affect flexible pipe design. The actual lateral soil modulus at the pipe depth will lie somewhere between $E'b$ and $E'n$ depending on the trench width.

Based on the field and laboratory data obtained along the pipeline alignments, we recommend an $E'n$ value of 3,000 psi (AWWA M45, 1996) be used for design of flexible pipes. This value is applicable to the undisturbed native soils encountered at the site. For trench widths less than $5D$, the design E' may be calculated by multiplying $E'b$ by

the Soil Support Combining Factors (S_c) presented in the following table, where B_d is the trench width at pipe springline and D is the diameter of the pipe.

$$\text{Design } E' = S_c(E'b)$$

**Sc Values For Design of Buried Flexible Pipes
 (Soil Support Combining Factor)**

$E'n/E'b$	B_d / D 1.5	B_d / D 2.0	B_d / D 2.5	B_d / D 3.0	B_d / D 4.0	B_d / D 5.0
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
≥ 5.0	2.00	1.60	1.40	1.25	1.10	1.00

Source: "AWWA M45," 1996.

5.3.3. Flexible Pipe Trench Width Recommendations

According to ASTM D 2321, "Standard Practice for Underground Installation of Thermoplastic Pipes for Sewers and other Gravity-Flow Applications", the minimum trench width for flexible pipes should be the greater of 16 inches greater than the pipe diameter or 1.25 times the pipe diameter plus 12 inches. For flexible pipes, the trench width should be kept to a minimum to reduce the soil loading on the pipes. Wider trenches will generally impart higher soil loads on buried flexible pipes. Where granular pipe zone backfill is used, the trench should be wide enough to accommodate compaction equipment and shoring along the sides of the pipe. Care should be taken during installation of the pipe zone backfill around the haunches of the pipe (i.e., from the bottom of the pipe to springline) such that voids are eliminated and the backfill material is firm and unyielding. Lateral restraint against ring deflection for the pipes will be provided by the stiffness of the pipe zone backfill material and/or the trench wall soils.

5.3.4. Flexible Pipe Construction Considerations

Flexible pipes require uniform support from bedding materials especially in haunch areas to prevent overloading. The pipeline designers should evaluate the proximity of adjacent pipelines, excavations, and their related effects on the proposed construction. If proper trench wall support cannot be provided in a portion of the pipe trench, we recommend consideration be given to the use of lean concrete or Controlled Low Strength Material (CLSM) initial backfill around the pipes.

5.3.5. Soil Loads on Buried Rigid Pipes

Soil loads on buried rigid pipes such as concrete or clay pipes can be analyzed using the Marston's Formula as follows:

$$W_c = C_d \gamma B_d^2$$

C_d = Load Coefficient based on $K\mu'$

γ = Moist unit weight of backfill material (pcf)

B_d = Width of trench at top of pipe (ft)

The coefficient C_d is dependent on the backfill type, which is dependent on the pipe manufacture's recommendation or local municipality requirements, the trench width, and pipe installation depth. Where the ratio of the backfill depth to trench width at the top of the pipe (H/B_d) is at least 1, and where trench width, at top of pipe, is no greater than 3 times the pipe diameter, the value of C_d may be determined using the following formula for load coefficient, C_d :

$$C_d = \frac{1 - e^{-2K\mu' (H / B_d)}}{2K\mu'}$$

K = Active earth pressure coefficient

μ' = Friction coefficient between fill material and sides of trench

H = Backfill height above the pipe crown

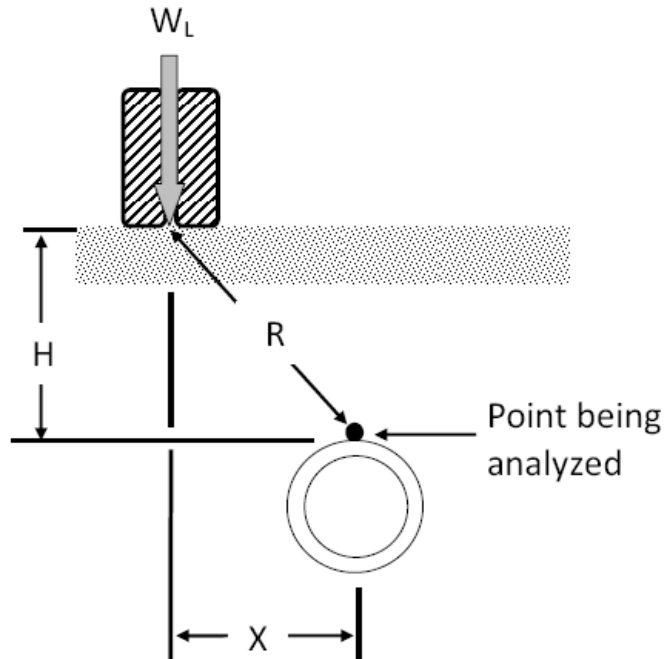
The product $K\mu'$ in the above referenced equation is dependent on the backfill type, degree of compaction, and moisture content. The following table provides estimates for the $K\mu'$ product based on various soil types.

Soil Type	$K\mu'$
Clay (CL,CH)	0.12
Silt (ML)	0.13
Silty Sand (SM)	0.15
Well and Poorly Graded 'Clean' Sands (SW, SP)	0.165
Sandy Gravels and Cobbles (GW, GP, GM, GC)	0.18
Source: ASCE (1982)	

Based on soils encountered during our field study, we recommend using a $K\mu'$ value of 0.13 for design and a wet soil unit weight, γ , equal to 110 PCF for soil backfill material.

5.3.6. Live Loads on Buried Conduits

Live loads on buried conduits due to vehicular loads may be determined as presented below:



$$P_L = \frac{3I_f W_L H^3}{2\pi R^5}$$

Where:

- P_L = live load soil pressure from a concentrated surface load, psf
- I_f = impact factor, dimensionless (See Table below)
- W_L = live load, lbs
- H = height of fill above the top of the pipe, ft
- R = distance from the point of load application to top of pipe, ft

Height of Cover , H (ft)	Impact Factor, I_f
0 to 1 ft	1.3
1 ft, 1 in to 2 ft	1.2
2 ft, 1 in to 3 ft	1.1
Over 3 ft	1.0

Source: ASCE Manual No. 60 / WEF MOP No. FD-5, 2007

5.4. Moisture Protection

Soil support values reduce with an increase of moisture content. Therefore, positive drainage is essential to the successful performance of any structure. Good surface and subsurface drainage should be established during and after construction to prevent the soils below or adjacent to the structural areas and utility trenches from becoming wet.

Infiltration of water into utility or foundation excavations must be prevented during construction. The drainage design must route all storm and sprinkler water away from the structural areas in a positive manner. All water should be diverted away from areas where it could penetrate the ground surface near the structural areas. Watering of plants should be avoided adjacent to the buildings. Desert-type landscaping is advisable near the structural areas. Plants, which require more water, should be located and drained away from the structural areas.

5.5. Corrosion Potential

5.5.1. 10-point System

The 10-point soil evaluation includes the following soil tests: resistivity, pH, oxidation-reduction (redox) potential, sulfides, and moisture. For each of these tests, results are categorized according to their contribution to corrosivity. The test results are assigned point values based on Table A.1 found in Appendix A of the American National Standard for Polyethylene Encasement For Ductile-Iron Pipes Systems (ANSI/AWWA C105/A21.5-99), dated 1999. The above referenced corrosion testing is applicable to carbon steel pipe. A sum of points greater than or equal to 10, is considered corrosive to ductile iron pipes and carbon steel pipe and protection against exterior corrosion should be provided. The sum of points of the site soils sampled is 14 (greater than 10), hence, the site soils be considered corrosive to high carbon steel and protection against exterior corrosion should be provided. Corrosivity testing was performed on selected samples, and it is tabulated below

Sample Location	pH	Resistivity (Ohm-cm)	Redox Potential (mV)	Free Sulfide
Bulk Sample B-1, 5.0' - 10.0'	8.6	1,480	188	Negative
Bulk Sample B-3, 10.0' - 15.0'	8.5	1,250	197	Negative
Average	8.6	1,365	193	Negative

5.5.1.1. Electrical Resistivity

Electrical Resistivity of a soil is a measure of resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. As a soil's resistivity decreases, its corrosivity increases.

A commonly accepted correlation between soil resistivity and corrosivity towards ferrous metals is shown in the following table.

<u>Resistivity (ohm-cm)</u>	<u>Corrosivity Classification</u>
0 to 1,000	Severely corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately corrosive
Over 10,000	Mildly corrosive

Resistivity test results indicate ten (10) points, and the pH test results indicates three (3) points in the 10-point soil evaluation for the reservoir location.

Based on the laboratory tests as shown above, this soil would be considered "corrosive". It should be noted that these corrosion conditions are for the soils at submerged moisture conditions. Resistivity to drier moisture contents would be less corrosive than the results of the test.

The pH values of the samples tested were neutral. In most cases, pH is not a significant factor in corrosion in the near-neutral pH range ($5 < \text{pH} < 9$).

Estimated life for various gage galvanized CMP, based on Figure 6.7 of the Handbook of Steel Drainage & Highway Construction Products published by American Iron and Steel Institute Fourth Edition, 1993, is tabulated below. Details of the laboratory test results are presented in the **Appendix C** of this report.

Sample Location	Design Life (yrs)		
	16 Gage	14 Gage	12 Gage
Bulk Sample B-1	76	99	136
Bulk Sample B-3	71	92	127

5.5.1.2. Oxidation-Reduction (Redox) Potential

The redox potential of a soil is significant in assessing corrosion potential because the most common sulfate-reducing bacteria can live only in anaerobic conditions. A negative redox potential indicates that anaerobic conditions are present in which sulfate reducers can live. The redox potential of site soils ranged from 188 to 197 mV and results in zero points in the 10-point soil evaluation.

5.5.1.3. Sulfides

A positive sulfides reaction reveals a potential problem caused by sulfate reducing bacteria. A negative sulfides reaction was observed from the soil sample analyzed and results in zero points in the 10-point soil evaluation.

5.5.1.4. Moisture

The prevailing moisture condition of the soil is important to all soil corrosion. The specific moisture content of the soil is not necessary but rather the drainage characteristics and moisture condition. A conservative classification of the site soils

is fair drainage and generally moist which results in 1 point in the 10-point soil evaluation.

5.5.2. Concrete Corrosion

Selected samples of the near-surface soils encountered at the site were subjected to chemical analysis for the purpose of corrosion assessment. The samples were tested for soluble sulfates, and soluble chlorides. The samples were tested in general accordance with Arizona Test Methods 733, and 736 for soluble sulfates, and soluble chlorides, respectively. The test results are provided in **Appendix C**.

Based on provisions of American Concrete Institute (ACI) 318 Section 4.3, Table 4.3.1, Requirements for Concrete Exposed to Sulfate-Containing Solutions a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. Based on the laboratory results, sulfate contents of the site soils tested indicate a negligible corrosion potential to concrete.

Based on the laboratory result of the sample collected for this project, chloride contents of the site soils tested indicate negligible corrosion potential.

5.6. Pavement Areas

Pavement replacement should be in accordance with the City of Phoenix Supplemental Standard Detail "Trench Backfill & Surface Replacement" Detail Number P1200 (dated 07/01/2015) and 2015 CITY OF PHOENIX SUPPLEMENT TO THE 2015 EDITION MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION "SECTION 336 PAVEMENT MATCHING AND SURFACING REPLACEMENT" (dated December 10, 2020).

6. CLOSURE

6.1. Limitations

Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar localities. No warranty is expressed or implied.

The recommendations contained in this report are based on our field exploration, laboratory test results, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the test borings excavated during the field subsurface exploration. It is anticipated that some variations in the soil conditions will exist on-site. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

It is the Client's responsibility to see that all parties to the project including the designer, contractor, subcontractor, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

This report is for the exclusive purpose of providing Geotechnical Engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed the site geology and the possible presence of geologic hazards.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off-site), or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify ATEK of such intended use. Based on the intended use of this report, ATEK may require that additional work be performed and that an updated report be issued.

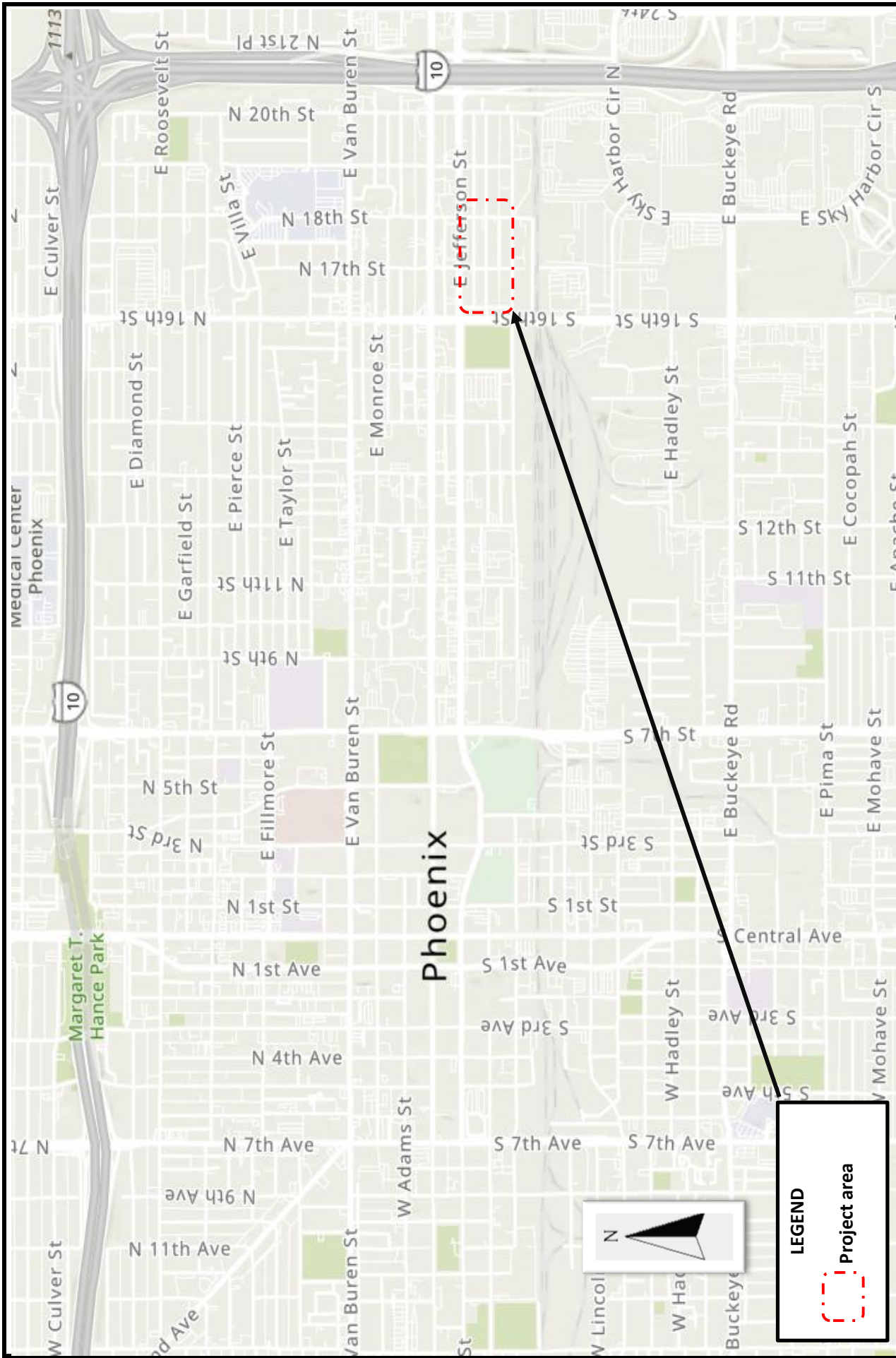
6.2. Recommended Additional Services

The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be performed during the construction. These tests and observations should be performed by the Geotechnical Engineer's representative and should include, but not limited to the following:

- Observe and document that any existing surficial vegetation and other deleterious materials have been removed from the site as required in site preparation section.
- Approve any material used as import to document that it meets the requirements outlined above before placement.
- Monitor the backfill procedures.
- Perform field density tests, as needed, to verify compaction compliance. The representative should monitor the progress of compaction and filling operations.
- Keep records of on-site activities and progress.

Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Construction testing, including field and laboratory evaluation of fill and backfill materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

APPENDIX A
Site Location Map



LEGEND

Project area

111 South Weber Drive, Suite 1
Chandler, AZ 85226

Site Location Map - Sheet 1 of 1

ARPA LDS Geotechnical Services
Phoenix, Arizona

Project #: 230190
Date: 2/8/2024
Drawn by: M Mendoza

ST83140111 Madison St-16th St to 18th St

Basemap provided by ArcGIS

APPENDIX B
Sample Location Plan



B-1

B-2

B-3

132A-01

E Jefferson St


S 16th Pl

E Madison St

S 17th St

E Jackson St

LEGEND

-  Boring Location
-  Seismic Line

<p>ST83140111 Madison St-16th St to 18th St</p> <p>Basemap provided by Google Earth</p>	<p>Project #: 230190</p>	<p>Boring Location Plan - Sheet 1 of 3</p>	
	<p>Date: 2/8/2024</p>	<p>ARPA LDS Geotechnical Services</p>	
	<p>Drawn by: M Mendoza</p>	<p>Phoenix, Arizona</p>	
<p>atek ENGINEERING CONSULTANTS</p> <p>111 South Weber Drive, Suite 1 Chandler, AZ 85226</p>			

APPENDIX C
FIELD STUDY AND BORING LOGS

APPENDIX C FIELD STUDY

BORINGS

The subsurface conditions at the site were explored on January 26, 2024, by drilling soil borings using a truck mounted CME drill rig with 7 and a ¼-inch outside diameter hollow stem auger. The locations of soil test borings performed for this study are shown in **Appendix B** of this report.

The locations of borings were located by visual sighting and pacing from existing site features and, therefore, should be considered approximate. Actual boring locations may vary from those indicated in **Appendix B**.

Our field engineer maintained a log of the excavations; visually classified soils encountered according to the Unified Soil Classification System (USCS) (see USCS Table); and obtained samples of the subsurface materials.

SAMPLING PROCEDURES

Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance, and returned to our laboratory for further testing. After borings were completed, they were backfilled with the excavated soils.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Unified Soil Classification System - C1
Log Key - C2
Charts and Definitions - C3
Terminology Used to Describe Soils - C4
Logs of Soil Borings

UNIFIED SOIL CLASSIFICATION SYSTEM

	MAJOR DIVISIONS		USCS SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LESS THAN 5% PASSING NO. 200 SIEVE	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
		GRAVELS WITH OVER 12% PASSING NO. 200 SIEVE	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
		SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LESS THAN 5% PASSING NO. 200 SIEVE	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			SANDS WITH OVER 12% PASSING NO. 200 SIEVE	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)	SANDS WITH OVER 12% PASSING NO. 200 SIEVE	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SILTS AND CLAYS (Liquid limit greater than 50)	SANDS WITH OVER 12% PASSING NO. 200 SIEVE	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY				
SILTS AND CLAYS (Liquid limit greater than 50)	SANDS WITH OVER 12% PASSING NO. 200 SIEVE	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS		
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY		
		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT		
SILTS AND CLAYS (Liquid limit greater than 50)	SANDS WITH OVER 12% PASSING NO. 200 SIEVE	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY		

Note: Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing No. 200 sieve require dual USCS symbols. (See KEY A-3 if provided)



UNIFIED SOIL CLASSIFICATION SYSTEM

ARPA LDS Geotechnical Services
 City of Phoenix Streets Transportation Department
 Phoenix, Arizona












KEY

C-1

Drafted By: M Mendoza
 Date: February, 2024


Project Number:
 230190

LOG SYMBOLS

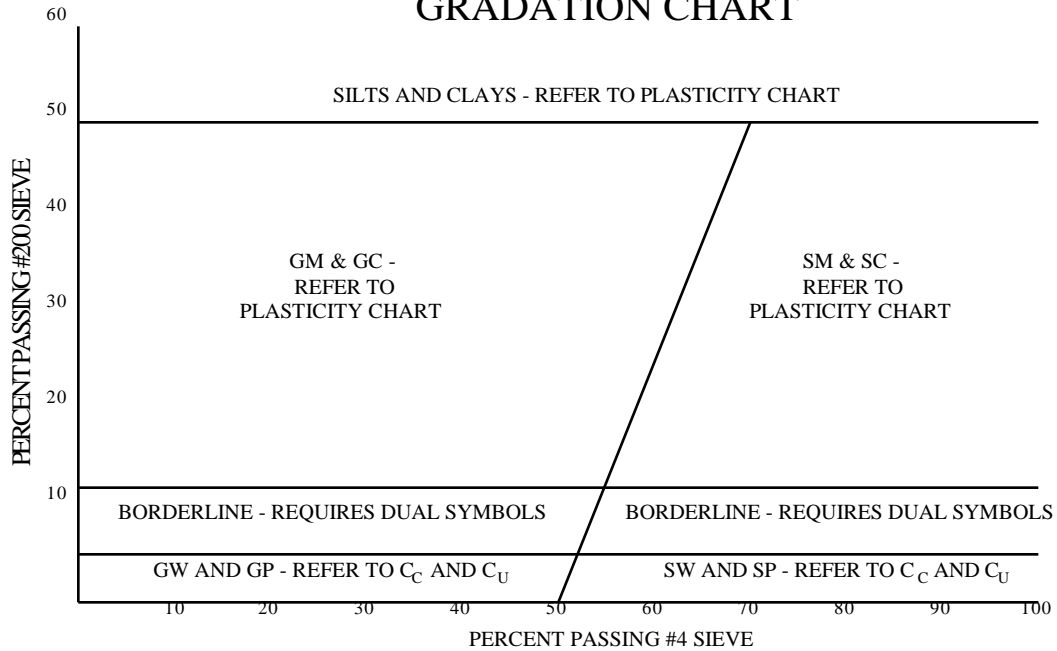
 <p>BULK / GRAB SAMPLE</p>  <p>MODIFIED CALIFORNIA SAMPLER (2 inch inside diameter)</p>  <p>GRAB SAMPLE</p>  <p>STANDARD PENETRATION SPLIT SPOON SAMPLER (2.0-inch O.D. X 1.4-inch I.D.)</p>  <p>SHELBY TUBE (3 inch outside diameter)</p>	 <p>NON-STANDARD PENETRATION SPLIT SPOON SAMPLER (1.5-inch O.D. X 0.9-inch I.D.)</p>  <p>BDBGM SIZE CORE BARREL (1.65-inch I.D.)</p>  <p>BW44 SIZE CORE BARREL (1.75-inch I.D.)</p>  <p>HQ-3 SIZE CORE BARREL (2.4-inch I.D.)</p>
 <p>WATER LEVEL (level after completion)</p>	
 <p>WATER LEVEL (level where first encountered)</p>	

GENERAL NOTES

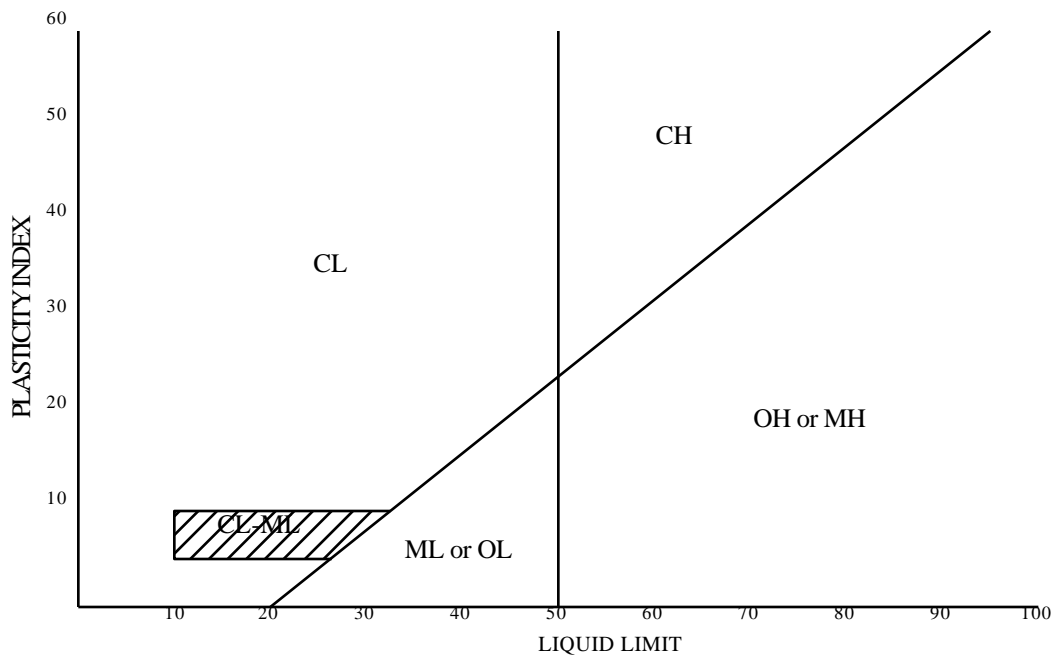
1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
3. Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
4. In general, the Unified Soil Classification designations presented on the logs were based on visual classification in the field, modified where appropriate by visual classifications in the office, and/or laboratory gradation and index testing.
5. NA = Not Analyzed

	<p>LOG KEY</p> <p>ARPA LDS Geotechnical Services City of Phoenix Streets Transportation Department Phoenix, Arizona</p>	<p>KEY</p> <p style="font-size: 2em; font-weight: bold;">C-2</p>
<p>Drafted By: M Mendoza Project Number: 230190</p> <p>Date: February, 2024</p>		

GRADATION CHART



PLASTICITY CHART



DEFINITIONS OF SOIL FRACTIONS

SOIL FRACTION	PARTICLE SIZE RANGE
Boulders	Greater than 300mm (12in.)
Cobbles	300mm to 75mm (12in. to 3in.)
Coarse Gravel	75mm to 19mm (3in. to 3/4in.)
Fine Gravel	19mm (3/4in.) to No. 4 sieve
Coarse Sand	No. 4 sieve to No. 10 sieve
Medium Sand	No. 10 sieve to No. 40 sieve
Fine Sand	No. 40 sieve to No. 200 sieve
Fines	less than No. 200 sieve



CHARTS & DEFINITIONS

ARPA LDS Geotechnical Services
City of Phoenix Streets Transportation Department
Phoenix, Arizona

KEY

C-3

Drafted By: M Mendoza

Project Number:

Date: February, 2024

230190

**TERMINOLOGY USED ON THE BORING LOGS TO DESCRIBE
THE FIRMNESS, DENSITY, OR CONSISTENCY OF SOILS**

The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1 3/8" I.D. samplers.

1. Terms for description of partially saturated and/or cemented soils including clays, cemented granular materials, silts and silty and clayey granular soils.

N	Relative Firmness
0 - 4	Very soft
5 - 8	soft
9 - 15	Moderately firm
16 - 30	Firm
31 - 50	Very firm
51+	Hard

2. Terms for description of cohesionless, uncemented sands and sand-gravel mixtures.

N	Relative Density
0 - 4	Very loose
5 - 10	Loose
11 - 30	Medium dense
31 - 50	Dense
51+	Very dense

3. Terms for description of clays which are saturated or near saturation.

N	Relative Consistency
0 - 2	Very soft
3 - 4	soft
5 - 8	Moderately stiff
9 - 15	Stiff
16 - 30	Very Stiff
31+	Hard



TERMINOLOGY USED TO DESCRIBE SOILS

ARPA LDS Geotechnical Services
City of Phoenix Streets Transportation Department
Phoenix, Arizona

KEY

C-4

Drafted By: M Mendoza

Project Number:

Date: February, 2024

230190

Project Name: ARPA LDS Geotechnical Services			Client: COP Streets Transportation Department		
Borehole Location: See Location Plan				Sheet <u>1</u> of <u>1</u>	
Borehole Number: B-1			Driller: Southlands		Logger: Marilyn Mendoza
Drilling Equipment: CME-55		Borehole Diameter (in.): 7.25 HSA	Date Started: 01/26/2024		Date Finished: 01/26/2024

Elevation (ft)										Notes:		
DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
0.8								AC		Asphaltic Concrete (Approx. thickness 10.0-inches)		
1.4								ABC		Aggregate Base Course (Approx. thickness 7.0-inches)		
			2-3	15	93.3			CL		SANDY LEAN CLAY (CL), soft, low plasticity, dark brown, moist, no cementation, moderate reaction to HCl		
5			5-5	12.3		26	9			39% coarse to fine grained sand, 61% fines, moderately firm, low plasticity, no reaction to HCl		
10			4-4-6							Slightly moist		
15			21-50/3"							Hard, weak reaction to HCl Auger grinding @ 15.0 feet on gravel and cobbles		
18			17-23-50/1"					GP		POORLY GRADED GRAVEL WITH SAND (GP), very dense, nonplastic, gray, slightly moist, no cementation, no reaction to HCl	18	
19.1											19.1	

Auger refusal @ 18.0 feet bgs on gravel and cobbles
 Bottom of sampler @ 19.1 feet bgs.
 No groundwater encountered.

230190 SITE LOG.PLT - 2-26-24 - G Lopez - ATEK BORING (W/REMARKS-SH# SAME FIG#)

Sampler Types: Split Spoon Shelby Bulk Sample Grab Sample	Penetrometer Vane Shear California	Operation Types: Hand Auger ODEX	Auger Hollow Stem Bullnose Core Barrel Excavated Pit	WATER LEVEL OBSERVATIONS			
				While Drilling ∇ <u>N/A</u> ft Upon Completion of Drilling ∇ <u>N/A</u> ft Time After Drilling <u>N/A</u> <u>N/A</u> <u>N/A</u> <u>N/A</u> Depth To Water (ft) <u>N/A</u> <u>N/A</u> <u>N/A</u> <u>N/A</u>		Remarks: Not Encountered	

ATEK Project Number: 230190		LOG OF EXPLORATORY BORING B-1	Fig. 1
---------------------------------------	--	--------------------------------------	--------

Project Name: ARPA LDS Geotechnical Services			Client: COP Streets Transportation Department		
Borehole Location: See Location Plan				Sheet 1 of 1	
Borehole Number: B-2			Driller: Southlands		Logger: Marilyn Mendoza
Drilling Equipment: CME-55		Borehole Diameter (in.): 7.25 HSA	Date Started: 01/26/2024		Date Finished: 01/26/2024

Elevation (ft)										Notes:			
DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS	
													SPT
0.167								AC		Asphaltic Concrete (Approx. thickness 2.0-inches)	0.167		
0.7								ABC		Aggregate Base Course (Approx. thickness 6.0-inches)	0.7		
5			4-3	15.3	99.6			SC		CLAYEY SAND (SC), soft, low plasticity, dark brown, moist, no cementation, weak reaction to HCl			
5			6-2-4	15		27	11	68	CL		SANDY LEAN CLAY (CL), 1% fine graded gravel, 31% coarse to fine grained sand, 68% fines, soft, low plasticity, dark brown, moist, no cementation, weak reaction to HCl		
10			5-7								Moderately firm, low plasticity, slightly moist, no reaction to HCl		
15			15-14-50/2"						GP		POORLY GRADED GRAVEL WITH SAND (GP), very dense, nonplastic, gray, moist, no cementation, weak reaction to HCl	15	
16.2												16.2	

Auger refusal @ 15.0 feet bgs on gravel and cobbles
 Bottom of sampler @ 16.2 feet bgs.
 No groundwater encountered.

230190 SITE LOG.PLT 2-26-24 G Lopez ATEK BORING (W/REMARKS-SH# SAME FIG#)

Sampler Types: Split Spoon Shelby Bulk Sample Grab Sample	Penetrometer Vane Shear California	Operation Types: Hand Auger ODEX	Auger Hollow Stem Bullnose Core Barrel Excavated Pit	WATER LEVEL OBSERVATIONS			
				While Drilling ∇ N/A ft Upon Completion of Drilling ∇ N/A ft Time After Drilling N/A N/A N/A N/A Depth To Water (ft) N/A N/A N/A N/A		Remarks: Not Encountered	

ATEK Project Number: 230190		LOG OF EXPLORATORY BORING B-2	Fig. 2
---------------------------------------	--	--------------------------------------	--------

Project Name: ARPA LDS Geotechnical Services			Client: COP Streets Transportation Department		
Borehole Location: See Location Plan				Sheet <u>1</u> of <u>1</u>	
Borehole Number: B-3			Driller: Southlands		Logger: Marilyn Mendoza
Drilling Equipment: CME-55		Borehole Diameter (in.): 7.25 HSA	Date Started: 01/26/2024		Date Finished: 01/26/2024

Elevation (ft)										Notes:		
DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
0.3								AC		Asphaltic Concrete (Approx. thickness 3.5-inches)	0.3	
1.1								ABC		Aggregate Base Course (Approx. thickness 10.0-inches)	1.1	
5			4-6	12.5	90.2	27	10	CL		SANDY LEAN CLAY (CL), 12% fine graded gravel, 26% coarse to fine grained sand, 62% fines, moderately firm, low plasticity, dark brown, slightly moist, no cementation, weak reaction to HCl	5	
5			5-8					SC		CLAYEY SAND (SC), moderately firm, low plasticity, dark brown, slightly moist, no cementation, moderate reaction to HCl	5	
10			4-4-4	14				CL		SANDY LEAN CLAY (CL), soft, low plasticity, dark brown, slightly moist, no cementation, weak reaction to HCl	10	
15			18-14-19 12-13-15					GP		POORLY GRADED GRAVEL WITH SAND (GP), medium dense, nonplastic, gray, slightly moist, no reaction to HCl	15	
17											17	

Auger refusal @ 15.5 feet bgs on sand, gravels and cobbles
 Bottom of sampler @ 17.0 feet bgs.
 No groundwater encountered.

230190 SITE LOG.PLT - 2-26-24 - G Lopez - ATEK BORING (W/REMARKS-SH# SAME FIG#)

Sampler Types: Split Spoon Shelby Bulk Sample Grab Sample	Penetrometer Vane Shear California	Operation Types: Hand Auger ODEX	Auger Hollow Stem Bullnose Core Barrel Excavated Pit	WATER LEVEL OBSERVATIONS			
				While Drilling ∇ <u>N/A</u> ft Upon Completion of Drilling ∇ <u>N/A</u> ft Time After Drilling <u>N/A</u> <u>N/A</u> <u>N/A</u> <u>N/A</u> Depth To Water (ft) <u>N/A</u> <u>N/A</u> <u>N/A</u> <u>N/A</u>		Remarks: Not Encountered	

Revised 10-14-11 (MAT)

APPENDIX D
Laboratory Test

APPENDIX D LABORATORY TESTING

LABORATORY TESTS

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils, which may affect the Geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below.

Sieve Analysis

Sieve analyses were performed to evaluate the gradation characteristics of the material and to aid in soil classification. Tests were performed in general accordance with ASTM Test Method C 136 and D 2487.

Atterberg Limits

Atterberg Limits tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Tests were performed in general accordance with ASTM Test Method D 4318.

Moisture Content

Moisture content tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading. Moisture content was evaluated in general accordance with ASTM Test Method D 2216.

Undisturbed Ring Density

Undisturbed ring density tests were performed on ring samples to evaluate the in-situ density and moisture content of the site soils. Test procedures were in general accordance with ASTM Test Method D 2937.

Standard Proctor

Standard Proctor tests were performed on bulk soil samples to evaluate the maximum dry density and optimum moisture of the site soils. Test procedures were in general accordance with ASTM Test Method D 698A.

Swell Test

Swell test was performed on bulk soil samples to evaluate the expansion potential of the site soils. Test procedures were in general accordance with ASTM Test Method D 4829.

pH and Resistivity

pH and resistivity tests were performed on the bulk soil sample to evaluate the site soil corrosion potential. Test procedure was in general accordance with Arizona Test Method 236.

Sulfate Content

Sulfate content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 733.

Chloride Content

Chloride content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 736.



PROJECT: ARPA LDS Geotechnical Services
 LOCATION: Phoenix, AZ
 DATE SAMPLED: 1/26/2024

PROJECT NO: 230190
 WORK ORDER NO: 2400020
 REVIEWED BY: A Lopez

**MECHANICAL SIEVE ANALYSIS
 GROUP SYMBOL, USCS (ASTM D-2487)**

SIEVE SIZES

Location & Depth	COBBLES				GRAVEL							SAND					Silt or Clay	
	6"	4"	3"	2"	Coarse		Fine			Coarse		Medium			Fine		#100	#200
	PI	PL	LL	USCS	1 1/2"	1 1/4"	1"	3/4"	1/2"	3/8"	1/4"	#4	#8	#10	#16	#30	#40	#50

PERCENT PASSING BY WEIGHT

Bulk B-1 @ 5.0'-10.0'	CL	26	17	9	100	100	100	100	100	100	100	100	100	100	100	100	100	100	93	83	61	1
Bulk, B-2 @ 5.0'-10.0'	CL	27	16	11	100	100	100	100	100	100	100	99	98	98	97	95	94	93	93	85	68	7
Bulk, B-3 @ 1.0'-5.0'	CL	27	17	10	100	100	100	100	98	94	92	88	85	85	83	81	80	79	74	74	62	12

This is a summarized report of the referenced procedures and does not include all reporting requirements. Additional data can be provided at client's request.



PROJECT: ARPA LDS Geotechnical Services
LOCATION: Phoenix, AZ
SAMPLE DATE: 1/26/2024

PROJECT: 230190
WORK ORDER: 2400020
REVIEWED BY: A Lopez

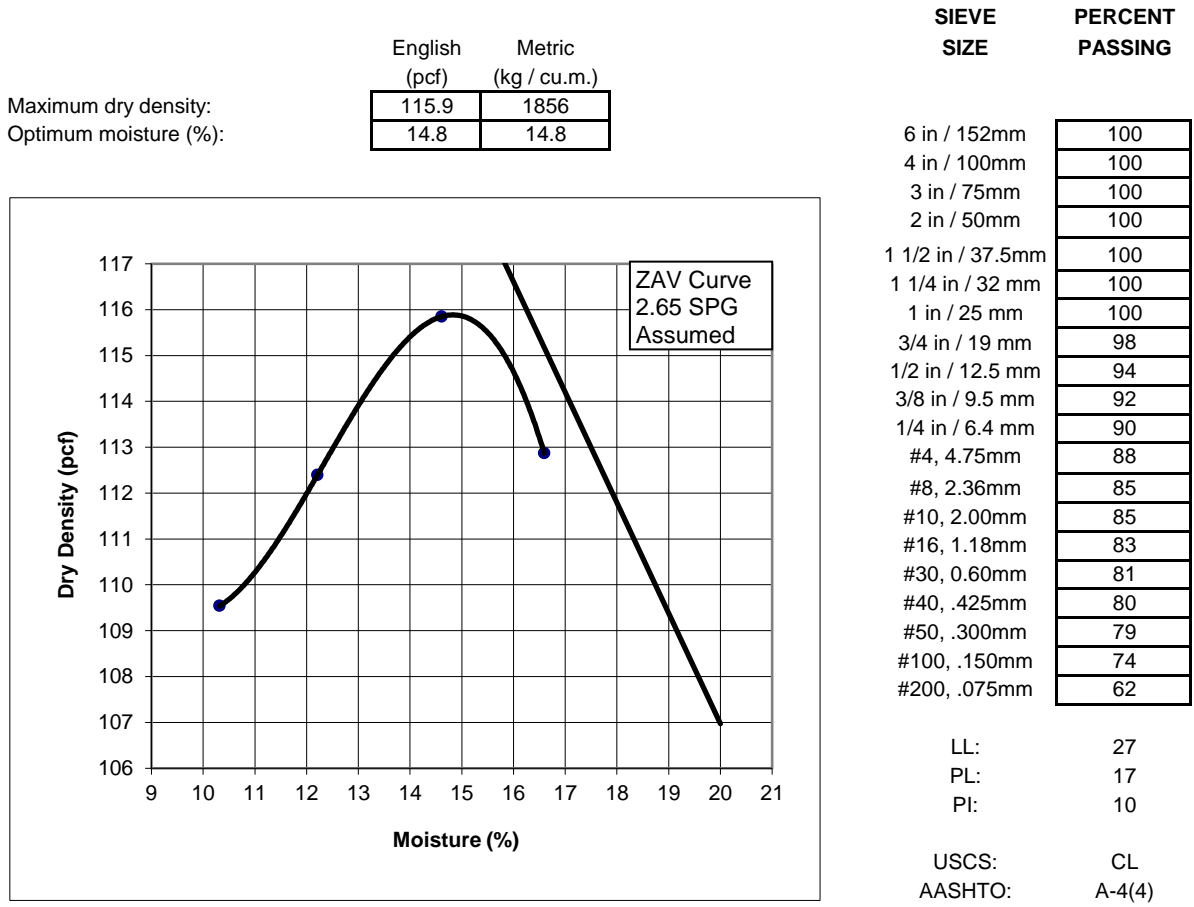
MOISTURE CONTENT OF SOIL -- ASTM D 2216

LAB #	SAMPLE SOURCE	MOISTURE		
		WET WEIGHT (g)	DRY WEIGHT (g)	MOISTURE CONTENT
1	Bulk, B-1 @ 5.0'-10.0'	303.6	270.3	12.3%
7	Bulk, B-2 @ 5.0'-10.0'	387.3	336.8	15.0%
13	Bulk, B-3 @ 10.0'-15.0'	411.2	360.6	14.0%

PROJECT: AROA LDS Geotechnical Services
LOCATION: Phoenix, AZ
MATERIAL: Native
SAMPLE SOURCE: Bulk, B-3 @ 1.0'-5.0'

PROJECT NO: 230190
WORK ORDER NO: 2400020
LAB NO: 12
SAMPLE DATE: 1/26/2024

**LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING
 STANDARD EFFORT (12,400ft-lb-ft/cu.ft) (ASTM D698A)
 SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)
 LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ASTM D4318) (DRY PREP)**



NOTES:

AASHTO Description: Silty soils

- The zero air void curve represents a specific gravity of: 2.65 assumed, (also used in the 'Rock Correction Calculation)
- This is a summarized report of the referenced procedures and does not include all reporting requirements. Additional data can be provided at clients request.

Reviewed by: M Mendoza



PROJECT: ARPA LDS Geotechnical Services
LOCATION: Phoenix, AZ
SAMPLE DATE: 1/26/2024

PROJECT: 230190
WORK ORDER: 2400020
REVIEWED BY: A Lopez

DENSITY OF SOIL IN PLACE BY THE DRIVE-CYLINDER METHOD -- ASTM D 2937

LAB #	SAMPLE SOURCE	MOISTURE			# OF RINGS	WET WEIGHT + RINGS (g)	WEIGHT OF RINGS (g)	DRY DENSITY (pcf)
		WET WEIGHT (g)	DRY WEIGHT (g)	MOISTURE CONTENT				
2	Ring, B-1 @ 2.5'-3.5'	648.3	563.6	15.0%	5	869.0	220.7	93.3
8	Ring, B-2 @ 2.5'-3.5'	415.9	360.8	15.3%	3	570.4	154.5	99.6
14	Ring, B-3 @ 2.5'-3.5'	735.4	653.7	12.5%	6	1004.3	268.9	90.2

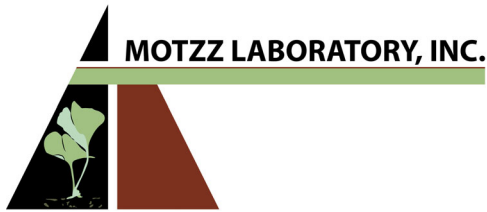


Project: ARPA LDS Geotechnical Services
Location: Phoenix, AZ
Client: COP Street Transportation Department
Material: See Below
Sample Source: See Below

Project Number: 230190
Work Order Number: 2400020
Lab Number: See Below
Date Sampled: 01/26/24

pH & Resistivity (AZ 236)

Sample Number	Sample Source	Resistivity (Ohm-cm)	pH
1	Bulk, B-1 @ 5.0'-10.0	1,480	8.6
13	Bulk, B-3 @ 10.0'-15.0	1,250	8.5



MOTZZ LABORATORY, INC.

Report: 949545
 Reported: 2/10/2024
 Received: 2/1/2024
 PO: 2400020

Laboratory Analysis Report

Atek Engineering Consultants
 Armando Ortega
 111 South Weber Dr Suite 1
 Chandler, AZ 85226

Project: 230190

Lab Number	Sample ID
949545-1	1) Bulk, B-1 (5.0-10.0')

Test Parameter

<i>Test</i>	<i>Method</i>	<i>Result</i>	<i>Units</i>
Sulfate	ARIZ 733b	18	ppm
Chloride	ARIZ 736b	102	ppm
Free Sulfide	Sodium Azide	Negative	
Redox Potential	ASTM G200-09	188	(Eo) mV

Lab Number	Sample ID
949545-2	13) Bulk, B-3 (10.0-15.0')

Test Parameter

<i>Test</i>	<i>Method</i>	<i>Result</i>	<i>Units</i>
Free Sulfide	Sodium Azide	Negative	
Redox Potential	ASTM G200-09	197	(Eo) mV

APPENDIX E
Geological Consultants Seismic Refraction Survey

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SEISMIC REFRACTION SURVEY

**ARPA LDS GEOTECHNICAL SERVICES
STORM DRAIN PROJECTS: SOUTH 16TH PLACE & EAST MADISON STREET;
NORTH 8TH STREET AND EAST MEADOWBROOK AVENUE;
WEST POLK STREET & NORTH 33RD AVENUE
CITY OF PHOENIX, ARIZONA**

GCI Project No. 2023-132

March 22, 2024

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	CONCLUSIONS AND RECOMMENDATIONS	3
2.1	132A-01 Results	3
2.1.1	132A-01 Site Geology	3
2.1.2	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132A-01	3
2.2	132B-02 Results	5
2.2.1	132B-02 Site Geology	5
2.2.2	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132B-02	5
2.3	132C-03 & 132C-04 Results	7
2.3.1	132C-03 & 132C-04 Site Geology	7
2.3.2	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132C-03	7
2.3.3	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132C-04	8
2.4	Qualitative Rippability / Excavateability	10
2.5	Excavation Constraints	10
2.6	Safety	12
3.0	GEOPHYSICAL SITE INVESTIGATION	13
3.1	Site Specific Seismic Survey	13
3.2	Equipment	13
3.3	Results	14
4.0	GENERAL LIMITATIONS	15
5.0	BIBLIOGRAPHY	16

TABLES

Table Number	Title	
1	Seismic Survey Line Calculated Depth/Velocity Ranges– 132A-01	4
2	Seismic Survey Line Calculated Depth/Velocity Ranges– 132B-02	6
3	Seismic Survey Line Calculated Depth/Velocity Ranges– 132C-03 & 132C-04 .	9
4	Qualitative Excavateability Relative to Soil/Bedrock Type & P-Wave Velocity 11	

FIGURES

Figure Number	Title
1	General Location Map
2	132A-01 Seismic Survey Location Map
3	Seismic Line Photographs– 132A-01
4	Seismic Refraction Survey 132A-01 Velocity Cross-Section & Time-Distance Plot
5	132B-02 Seismic Survey Location Map
6	Seismic Line Photographs– 132B-02
7	Seismic Refraction Survey 132B-02 Velocity Cross-Section & Time-Distance Plot
8	132C-03 & 132C-04 Seismic Survey Location Map
9	Seismic Line Photographs– 132C-03
10	Seismic Refraction Survey 132C-03 Velocity Cross-Section & Time-Distance Plot
11	Seismic Line Photographs– 132C-04
12	Seismic Refraction Survey 132C-04 Velocity Cross-Section & Time-Distance Plot

APPENDICES

APPENDIX A - SEISMIC REFRACTION SURVEY

A.1	GENERAL	A-1
A.2	SEISMIC REFRACTION SURVEY LIMITATION	A-2
A.3	DATA COLLECTION	A-2
A.4	REFRACTION DATA PROCESSING	A-2

APPENDIX B - EXCAVATEABILITY AND RIPPABILITY CHARTS

Table B-1	Rock Hardness and Excavation Characteristics
Table B-2	Typical Excavatability Performance in Cemented Soils
Table B-3	Excavateability of Materials, Caterpillar Rippability Charts

(ii)



SEISMIC REFRACTION SURVEY

ARPA LDS GEOTECHNICAL SERVICES STORM DRAIN PROJECTS: SOUTH 16TH PLACE & EAST MADISON STREET; NORTH 8TH STREET AND EAST MEADOWBROOK AVENUE; WEST POLK STREET & NORTH 33RD AVENUE CITY OF PHOENIX, ARIZONA

1.0 INTRODUCTION

This report presents the results of a seismic refraction geophysical field investigation and analysis to assess general subsurface conditions for the proposed storm drain projects for the City of Phoenix (Figure 1). Four seismic refraction survey lines were laid out at select sites including:

- 132A-01 located parallel to and east of South 16th Place, south of East Madison Street (Figure 2),
- 132B-02 located parallel to and west of North 8th Street, south of East Meadowbrook Avenue (Figure 5),
- 132C-03 located south of and adjacent to West Polk Street between North 34th Drive and North 33rd Avenue, and 132C-04 located parallel to and east of North 33rd Avenue, south of West Taylor Street (Figure 8).

The specific seismic survey line locations were selected following discussions with Mr. Antonio Lopez, Project Manager with ATEK Arizona, and a reconnaissance of the project site conducted by Mr. Kenneth M. Euge, Sr., R.G. of Geological Consultants Inc. prior to running the seismic survey lines. This report is provided to supplement the geotechnical investigation being conducted by ATEK.

Seismic survey line data are used to develop reasonable interpretations of subsurface conditions within specified areas of the project site. The objectives of the seismic refraction geophysical surveys are to provide, by indirect means, a higher level of confidence to indirectly evaluate subsurface soil conditions and, if present, soil cemented with caliche to a rocklike consistency that may underlie the proposed storm drain alignments at the subject sites.

The general requirements for this project were defined by Mr. Lopez. Field work for the seismic refraction survey lines was completed on February 15 and 16, 2024.

The Scope of Work performed to accomplish the objectives of this study included:

- Mobilization and demobilization of personnel and equipment to and from the job site.
- Completion of four shallow seismic refraction survey lines and preliminary field analysis of survey results. Figures 2, 5, and 8 depict the locations of the seismic refraction survey lines.
- A rough position survey using a hand-held GPS receiver to locate the seismic lines relative to the site topography and cultural features observed at the site.
- Computer analysis of field data and interpretation of results to complete the assessment of the materials present, their relative quality and their excavateability.
- Preparation of this report to document the seismic refraction survey, and our findings, interpretations, conclusions, and recommendations.

The results of the seismic refraction survey may also be used to qualitatively assess the relative ease of excavation of the site soils and bedrock-like material and to estimate the strength of the material encountered along the seismic survey lines. The effective penetration depth along the seismic refraction survey lines is estimated to be at least 30 feet below the ground surface. Velocity, thickness, and depth computations of different horizons, or zones, are provided to generally characterize site materials within the depth of interest expected at the project site. No direct subsurface explorations, such as test pits, were made by Geological Consultants Inc. as part of this seismic refraction survey. However boring logs were provided by ATEK at locations near the seismic refraction survey lines.

2.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the cursory site reconnaissance, the seismic survey, and the data interpretations, the following conclusions and recommendations are provided:

2.1 132A-01 Results

2.1.1 132A-01 Site Geology

Seismic survey line 132A-01 is within Holocene low terrace and alluvial fan deposits (Qy) consisting of poorly sorted silt, sand, pebbles, cobbles and boulders with weak soil development (Reynolds, 1993). However, the upper fifteen feet are likely predominantly clayey sands and clay as indicated by the adjacent ATEK boring B-2 drilled 35 feet west of the seismic line (across from station 42.5 feet measured from the north end of the line). According to the boring log, the upper five feet of the material is characterized by dark brown, moist, clayey sands with no cementation. This material is underlain by dark brown, moist clay to about 10 feet. The auger refused at 15 feet on cobbles which may potentially be related to the Holocene low terrace deposits.

The National Resources Conservation Service (NRCS) characterizes the area as Glenbar clay loam. These soils consist of well-drained soils on flood plains and alluvial fans of the Salt River and have slopes of 0 to 1 percent. They form in mixed alluvium from basic and acidic igneous rocks. In a representative profile, the material varies from light brown clay loam to light yellowish-brown clay loam to about four feet, underlain to a depth of five feet or more by yellowish-brown heavy silt loam. The lower portion of the profile contains a few fine threads or veins of lime. Additionally, these soils are moderately alkaline and are calcareous throughout (Adams, 1974).

2.1.2 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132A-01

Seismic refraction survey line 132A-01 (Figures 2 and 3) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 4 and Table 1):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clayey sand (Glenbar Clay Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from nil to 1.0 feet below the ground surface (bgs) and had an average seismic velocity of 1,000 feet per second (fps).

- A low velocity layer is interpreted to depths ranging from 13.4 to 17.6 feet bgs, having an average velocity of 1,209 fps. This material was interpreted to consist of clayey sand over clay (related to Glenbar clay loam), equivalent to very soft rock.
- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 2,777 fps. This material was interpreted to consist of Qy terrace deposits of poorly sorted silt, sand, pebbles, cobbles, and boulders with weak soil development, equivalent to very soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 1 below. All layers at 132A-01 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 pounds per square inch (psi) (Table B-1).

Table 1
Seismic Survey Line Calculated Depth/Velocity Ranges– 132A-01
ARPA LDS Geotechnical Service
City of Phoenix, Arizona

Survey Line No.	Depth Range at Shot Point (ft)			Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Excavatability/Rippability
	A	B	C			
132A-01	0 - Nil	0 - 1.0	0 - Nil	1,000	Gravel Landscape Coverage Over Clayey Sand (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	Nil - 17.6	1.0 - 13.4	Nil - 13.7	1,209	Clayey Sand Over Clay (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	17.6 - 30+	13.4 - 30+	13.7 - 30+	2,777	Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders with Weak Soil Development. Equivalent to Very Soft Rock.	Slight to Moderate

2.2 132B-02 Results

2.2.1 132B-02 Site Geology

Seismic line 132B-02 is within latest Quaternary (Holocene to latest Pleistocene) age deposits (Y) including large terraces of major drainages. Surfaces are primarily underlain by well-sorted sand and silt with local occurrences of fine gravels and may be very slightly but abundantly dissected by active gullies and washes. These deposits are typically fine-grained and smooth in appearance and may contain Stage I to II calcic horizons (Demsey, 1988). The caliche content is consistent with the ATEK boring log for B-8 near the seismic survey line, which indicated variable calcium carbonate content within clay deposits and moderate caliche mottling and cementation below ten feet depth. The late Quaternary terrace deposits may be present at depth.

According to the NRCS, the area is mapped as Estrella loam. This material consists of well-drained soils on flood plains and alluvial fans of the Salt River with slopes of 0 to 1 percent. They formed in recent alluvium over old alluvial material derived from a mixture of basic and acidic igneous rock. In a representative profile, the surface layer and the upper part of the underlying material are light brown loam. This is underlain from a depth of about two feet to a depth of five feet or more by light reddish-brown or reddish-brown clay loam. These soils are moderately alkaline and are calcareous throughout. Permeability is moderately slope and available water capacity is high (Adams, 1974).

2.2.2 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic 132B-02

Seismic refraction survey line 132B-02 (Figures 5 and 6) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 7 and Table 2):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clay (Estrella Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from 3.3 to 6.0 feet bgs and had an average seismic velocity of 1,100 fps.
- A low velocity layer is interpreted to depths ranging from 12.3 to 22.2 feet bgs, having an average velocity of 2,081 fps, equivalent to very soft rock. This material is interpreted to consist of Estrella Loam clay with variable calcium carbonate content and moderate caliche mottling below 10.0 feet depth.

- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 3,699 fps. This material was interpreted to consist of late Quaternary terrace deposits (Y) characterized by well-sorted sand with silt and local occurrences of fine gravels. Additionally, this material may have Stage I to II caliche cementation. However, this material still falls within the velocity range that is equivalent to very soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 2 blow. All layers at 132B-02 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 psi (Table B-1).

Table 2
Seismic Survey Line Calculated Depth/Velocity Ranges– 132B-02
ARPA LDS Geotechnical Service
City of Phoenix, Arizona

Survey Line No.	Depth Range at Shot Point (ft)			Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Excavatability/Rippability
	A	B	C			
132B-02	0 - 4.2	0 - 6.0	0 - 3.3	1,100	Gravel Landscape Coverage Over Clay (Estrella Loam). Equivalent to Very Soft Rock.	Slight
	4.2 - 12.3	6.0 - 21.3	3.3 - 22.2	2,081	Clay (Estrella Loam) with Variable Calcium Carbonate Content and Moderate Caliche Mottling and Cementation Below 10.0 Feet Depth. Equivalent to Very Soft Rock.	Slight to Moderate
	12.3 - 30+	21.3 - 30+	22.2 - 30+	3,699	Late Quaternary Terrace Deposits (Y) Well-Sorted Sand and Silt with Local Occurrences of Fine Gravels. Stage I to II Caliche. Equivalent to Very Soft Rock.	Moderate

2.3 132C-03 & 132C-04 Results

2.3.1 132C-03 & 132C-04 Site Geology

Similar to seismic survey line 132A-01, seismic survey lines 132C-03 and 132C-04 are within Holocene low terrace and alluvial fan deposits (Qy) consisting of poorly sorted silt, sand, pebbles, cobbles and boulders with weak soil development (Reynolds, 1993). However, according to the NRCS, the area is mapped as Glenbar clay loam (similar to at 132A-01), which consists of moderately alkaline, calcareous, clay to silt loam with a few fine threads or veins of lime at depth– see Section 2.1.1 for further description (Adams, 1974).

The nearby ATEK boring B-5 was drilled about 260 feet east of the east end of seismic survey line 132C-03, and north of West Polk Street (on the opposite side of the road as the survey line). Within the upper ten feet, the material is characterized as dark brown, moist, clay with no cementation. This material is underlain by dark brown, moist clayey sand to about 14 feet, underlain by clay and possibly terrace deposits.

Boring B-6 was drilled adjacent to seismic survey line 132C-04, west of North 33rd Avenue. The upper material here is characterized as brown to dark brown, moist, clay to a depth of about 20 feet. A weakly cemented layer may be present at around 10 feet depth. This material is underlain by brown, moist clayey sand, and possibly terrace deposits.

2.3.2 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic 132C-03

Seismic refraction survey line 132C-03 (Figures 8 and 9) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 10 and Table 3):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clay (related to Glenbar Clay Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from nil to 2.8 feet bgs and had an average seismic velocity of 694 fps.
- A low velocity layer is interpreted to depths ranging from 14.9 to 17.7 feet bgs, having an average velocity of 1,592 fps. This material was interpreted to consist of clay over clayey sand (Glenbar clay loam), equivalent to very soft rock.

- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 4,089 fps. This material was interpreted to consist of Qy terrace deposits of poorly sorted silt, sand, pebbles, cobbles, and boulders with weak soil development, equivalent to soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 3 below. The overlying two very low and low velocity layers at 132C-03 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 psi whereas the underlying intermediate velocity layer is interpreted to be equivalent to soft rock with an unconfined compressive strength between 435 and 1,450 psi (Table B-1).

2.3.3 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic 132C-04

Seismic refraction survey line 132C-04 (Figures 8 and 11) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 12 and Table 3):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clay (related to Glenbar Clay Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from less than 1.0 foot to 1.1 feet bgs and had an average seismic velocity of 1,000 fps.
- A low velocity layer is interpreted to depths ranging from 7.7 to 13.0 feet bgs, having an average velocity of 1,245 fps. This material was interpreted to consist of clay (related to Glenbar clay loam) with potentially a weakly cemented layer at the base of the velocity layer. This material is interpreted to be equivalent to very soft rock.
- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 2,410 fps. This material was interpreted to consist of clayey sand and possibly Qy terrace deposits of poorly sorted silt, sand, pebbles, cobbles, and boulders. This velocity zone is interpreted to be equivalent to very soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 3 below. All layers interpreted at 132C-04 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 psi (Table B-1).

Table 3
Seismic Survey Line Calculated Depth/Velocity Ranges– 132C-03 & 132C-04
ARPA LDS Geotechnical Service
City of Phoenix, Arizona

Survey Line No.	Depth Range at Shot Point (ft)			Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Excavatability/Rippability
	A	B	C			
132C-03	0 - 1.7	0 - Nil	0 - 2.8	694	Gravel Landscape Coverage Over Dark Brown, Moist, Clay (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	1.7 - 15.1	Nil - 17.7	2.8 - 14.9	1,592	Dark Brown, Moist, Clay Over Dark Brown, Moist Clayey Sand (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	15.1 - 30+	17.7 - 30+	14.9 - 30+	4,089	Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders with Weak Soil Development. Equivalent to Soft Rock.	Moderate
132C-04	0 - 1.1	0 - <1.0	0 - <1.0	1,000	Gravel Landscape Coverage Over Brown to Dark brown, Moist, Clay (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	1.1 - 7.7	<1.0 - 13.0	<1.0 - 11.0	1,245	Brown to Dark brown, Moist, Clay (Glenbar Clay Loam). A Weakly Cemented Layer is Likely Present at the Base of the Layer. Equivalent to Very Soft Rock.	Slight
	7.7 - 30+	13.0 - 30+	11.0 - 30+	2,410	Brown, Moist Clayey Sand, and Possibly Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders . Equivalent to Very Soft Rock.	Slight to Moderate

Based on our interpretations of the seismic data, the conclusions presented regarding the depth to various velocity zones are believed to be reasonable at the location of the seismic survey lines. The conditions characterized by indirect seismic methods along the seismic survey lines probably represent subsurface conditions that could be found within the project site. The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Tables 1 through 3.

Interpreted stratigraphy derived from the seismic survey data along each seismic survey line are depicted in Figures 4, 7, 10, and 12. These figures include the average seismic velocities of the materials encountered along the seismic survey lines, a thickness profile of the different velocity zones, and the calculated velocity zone boundaries.

2.4 Qualitative Rippability / Excavateability: The estimated qualitative rippability/excavateability summarized in Table 4 is based on the interpretations of the seismic survey data, our understanding of the site geological conditions, and our professional experience. There is no guarantee that the seismic refraction survey results (Tables 1 through 3) or the qualitative rippability/excavateability (Table 4) can be duplicated by others. We recommend this information be used with caution and only as guidelines. Because the seismic velocities used to determine qualitative rippability/excavateability may vary from 10 to 20 percent, and due to the variability of the subsurface material, the qualitative rippability/excavateability constraint categories listed in Table 4 may overlap at the transition from one constraint category to the next. Excavation of the low velocity overlying layers at the various seismic survey line locations is expected to be relatively easy.

2.5 Excavation Constraints: The excavation constraints described in this report (Tables 1 through 3, and 4) are, in our opinion, reasonable for the locations where the seismic refraction survey lines were conducted. The ultimate excavateability is dependent on many factors (variably cemented soils, cemented gravel to boulder soil zones, presence of large boulders, bedrock and soil physical properties, excavation methods, size and age of excavation equipment, level of effort applied by the contractor, etc.) and it may not be possible to correlate these factors with the results of the seismic refraction survey conducted for this investigation. The excavation contractor must exercise caution, and assume associated risks, when attempting to extrapolate these data to other areas where seismic surveys have not been conducted.

Table 4
Qualitative Excavateability Relative to Soil/Bedrock Type & P-Wave Velocity
ARPA LDS Geotechnical Services
City of Phoenix, Arizona

Unit	Average Velocity (feet per second)	Excavateability/Rippability Constraints
<p>Low Velocity Gravel Landscape Coverage Over Clayey Sand or Clay (Glenbar Clay Loam or Estrella Loam). Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Potential Boulders. Equivalent to Very Soft Rock.</p>	<p>< 3,000</p>	<p>Slight- Should be excavateable using conventional earthmoving equipment. Marginal excavation conditions could be experienced if caliche-cemented material, cobbles, and or boulders are encountered. Large caliche fragments and boulders could be generated requiring specialized rock-breaking equipment.</p>
<p>Intermediate Velocity Late Quaternary Terrace Deposits (Y) of Well- Sorted Sand and Silt with Local Occurrences of Fine Gravels. Stage I to II Caliche. Equivalent to Very Soft Rock.</p> <p>Holocene Low Terrace Deposits (Qy) of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders with Weak Soil Development. Equivalent to Soft Rock.</p>	<p>3,000 to 6,000</p>	<p>Marginal - Potentially difficult to excavate with low horsepower-low torque conventional equipment where moderately cemented fine grained alluvium deposits are encountered. Large caliche fragments and boulders could require special fragmentation methods such as heavy, high impact energy hydraulic hammers mounted on large track-hoes. Fragmentation could be difficult. Moderate to high horsepower excavation equipment and rippers could improve production where the material is less strongly calichified; however, production could be slow.</p>
<p>High Velocity Late Quaternary (Y) Terrace Deposits and Holocene Low Terrace Deposits (Qy) Equivalent to Very Hard Rock.</p> <p>Note: This Velocity Range Was Not Encountered at the Seismic Survey Line Locations</p>	<p>> 6,000</p>	<p>Severe - Conventional, low horsepower/torque excavation equipment will likely experience refusal. Where allowed, blasting could be used for effective fragmentation. Very hard to extremely hard, calichified terrace deposits with potential boulders is expected to be very difficult to excavate. Possible Stage IV caliche may be locally rippable using a large tractor such as a D-9, D10, or equivalent, with single-shank rippers, a heavy backhoe/trackhoe with heavy hydraulic impact hammers, or a single or multi-tooth ripper bucket such as a “v-raptor” bucket used along joint and fracture planes. Localized cross-ripping could improve production. Large boulder-size rock fragments could be generated that could require secondary fragmentation. Production is expected to be very slow. Blasting is not recommended.</p>

Prospective contractors or others involved with excavation at this site should review this report along with the excavateability performance charts and tables provided by manufacturers of rock and soil excavating equipment. This information can be used as part of their evaluation criteria for selecting equipment that may be used to excavate or fragment the material expected to be encountered at this site. However, the contractors using these data or making interpretations of this information, for any reason, do so at their sole risk.

The qualitative excavateability summarized in Table 4, along with our interpretation of the subsurface materials (Tables 1 through 3) are provided so that a prospective contractor can relate seismic velocities to the subsurface materials they can expect to encounter where excavations may be proposed. Although a backhoe may be able to excavate low velocity material and a heavy, hydraulic impact rock breaker attached to a large track-mounted excavator might be able to fragment moderate to high velocity bedrock, strongly cemented zones, or fractured and jointed bedrock material, there are no guarantees due to the wide range of variables summarized herein that effect equipment suitability and material excavateability. Also, the progress of excavation in soils, cemented with caliche to a rocklike consistency and/or bedrock, where encountered, should be expected to be slow. Appendix B contains tables and charts, from various sources, on the rippability/excavateability of various materials.

No site-specific testing has been conducted at this site by Geological Consultants Inc. to verify the qualitative rippability/excavateability categories (Table 4) nor has any equipment performance evaluations been conducted relative to ripping or excavating site materials or to determine equipment suitability for this site. Therefore, the contractor must exercise caution and assume associated risks if the information provided herein is used by the contractor to assist with the determination of equipment suitability for fragmentation or excavation.

- 2.6 Safety:** We recommend adequate “safety zones” be established and maintained around the proposed pipeline excavations during construction. Additionally, we recommend that excavation cut slopes with vertical heights greater than five feet be examined to assess their stability. This assessment should be conducted by a registered geologist or geotechnical engineer experienced with the evaluation of the pipeline trench cut slope stability.

3.0 GEOPHYSICAL SITE INVESTIGATION

The seismic refraction survey was conducted to indirectly investigate and develop reasonable interpretations of the subsurface conditions.

3.1 Site Specific Seismic Survey

Following the completion of a site reconnaissance to identify the seismic survey line locations, the seismic refraction survey lines (132A-01, 132B-02, 132C-03, and 132C-04) were laid out at the locations depicted in Figures 2, 5, and 8. The seismic survey was conducted to evaluate the soil overburden thickness and where possible, identify and characterize bedrock conditions within the proposed residential site, and to characterize the qualitative excavateability of the soil and bedrock, where encountered.

Three shot points were used along the seismic survey lines to evaluate possible non-horizontal subsurface boundary conditions (buried sloping surfaces, cementation zones, soil-change boundaries, etc.) that could be expected in this type of geological terrain and to improve the accuracy of the seismic wave velocity determinations. Each seismic refraction survey line was run over a total length of 120-feet, including shot point offsets, with the exception of seismic survey line 132B-02 which was run over a total length of 90 feet (including offsets). The length of the seismic survey line was sufficient to achieve adequate depth penetration of at least 30 feet below the existing ground surface. The geometry of the seismic survey lines was set up to identify the subsurface layers or zones that could influence the storm drain excavation proposed at the site.

As with any type of geophysical investigation method, there are limitations to its usefulness and application. Refer to Appendix A for additional information regarding seismic refraction surveys and their limitations.

3.2 Equipment

Travel-time data for the seismic survey was obtained using a Geometrics Inc. Model S12 SmartSeis™ 12-Channel Exploration Seismograph. Seismic wave arrivals are detected with digital grade vertical geophones with a dual hum-bucking coil and a frequency response above 14 Hz natural frequency. Geophones were placed beginning at Station 0 and at 10-foot intervals thereafter to the end of the seismic survey lines. The seismic shock waves are produced by repeated impacts of a 16-pound sledge hammer onto a soft steel striking plate. Hammer impacts (shots) were made at five-foot offsets from each end of the seismic line traverse and at a shot point located at or near the center of the survey line spread. The distance from the impact

locations (shot points) to the geophones and the travel time recorded for each station is stored in the seismographs onboard computer. If the field seismic data plots indicated the possible presence of anomalous subsurface conditions or spurious noise coincident with the hammer impacts, repeated impacts were used to verify the initial data reading or to correct the data. Topographic features, outcrops, and other natural features found along the seismic survey lines that might influence the data interpretations were annotated on the field data plots.

3.3 Results

Interpretations of the seismic survey data obtained at the project site suggest the presence of a distinctive subsurface stratigraphic profile along the seismic survey lines. Seismic velocities, calculated zone thicknesses, and depth to velocity zone boundaries for the interpreted soil types are summarized in Tables 1 through 3. The qualitative rippability/excavateability of the soil units encountered along the seismic survey lines is summarized in Table 4. Seismic velocity profiles and distance-travel time data plots are depicted in Figures 4, 7, 10, and 12 for each seismic survey line. The depth scale depicted on the Y-axis of the velocity layer cross-sections assumes an arbitrary datum elevation of 100.0 feet. The cross-sections may be used to measure the depths to different velocity layer boundaries below the ground surface at any point along the seismic survey lines. The estimated accuracy of the velocity layer boundaries is approximately 20 percent. Figures 3, 6, 9, 11 include photographs taken at the end shot points (A and C) of the seismic survey lines.

4.0 GENERAL LIMITATIONS

The geologic observations, findings, conclusions, and recommendations presented in this report are based on (1) cursory observations of surface conditions and geologic materials where exposed and (2) analysis of the seismic refraction data gathered at the site. The services provided by Geological Consultants Inc. were performed in accordance with generally accepted geological principals and standard practices used by members of the geological profession in this locale at the time of this study.

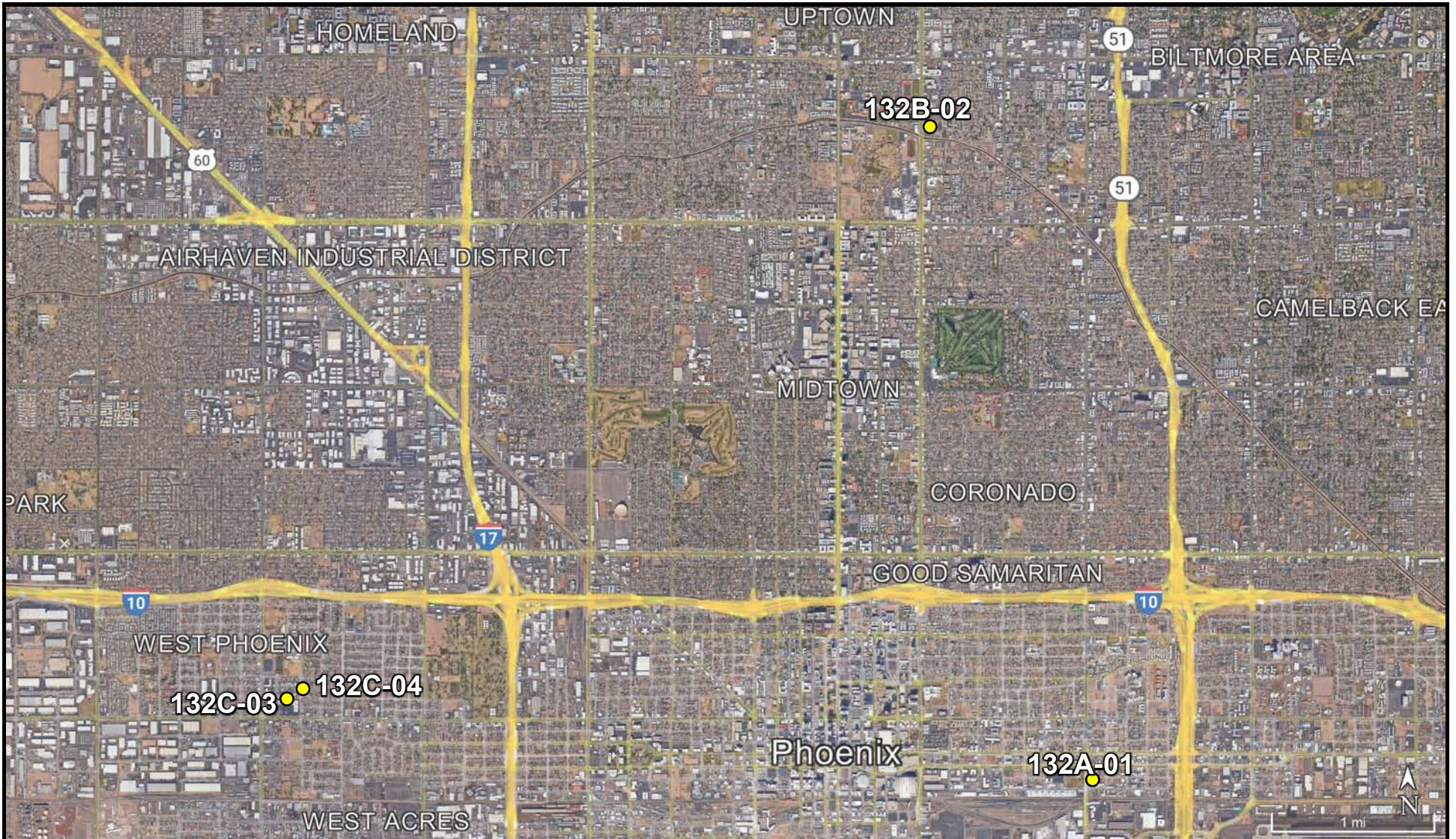
It must be recognized that subsurface geologic conditions may vary from place to place and from those found at locations where measurements or surveys are made by the investigator. Generalized geological and rippability/excavateability recommendations presented in this report are based on the interpretations of the results of this investigation and it may not be possible for others to accurately correlate the geology and excavateability results to test explorations or investigations conducted by others. No warranty or representation, either expressed or implied, is or should be construed regarding geological conditions at locations other than those evaluated as part of this study.

The professional opinions, conclusions and recommendations presented in this report relate only to the project and locations specified in this report. If any changes are made in the project, the conclusions and/or recommendations in this report shall not be considered valid unless the changes are reviewed and the conclusions and recommendations of this study are modified and approved in writing by Geological Consultants Inc.

5.0 BIBLIOGRAPHY

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- AMEC; 2005; consultants report prepared for City of Phoenix entitled “Refraction Seismic Evaluation, Deer Valley Road-7th Street to Cave Creek Road”; COP Project No. ST85100044, AMEC Job No. 5-119-000199, Report No. 2; 2 September 2005.
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FIGURES



EXPLANATION:

132A-01 ● General Seismic Survey Line Location (approx.) and Designation

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
General Location Map
Figure 1**

Basemap modified by GCI (3/20/2024) from Google Maps (2024).

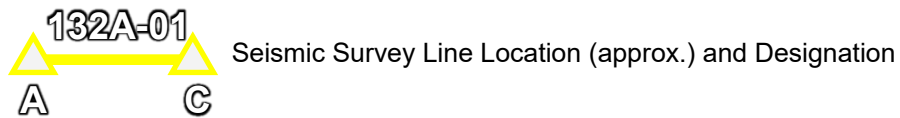


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EXPLANATION:



Basemap modified by GCI(3/20/2024) from Google Maps (2024).

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
132A-01 Seismic Survey Location Map
Figure 2**



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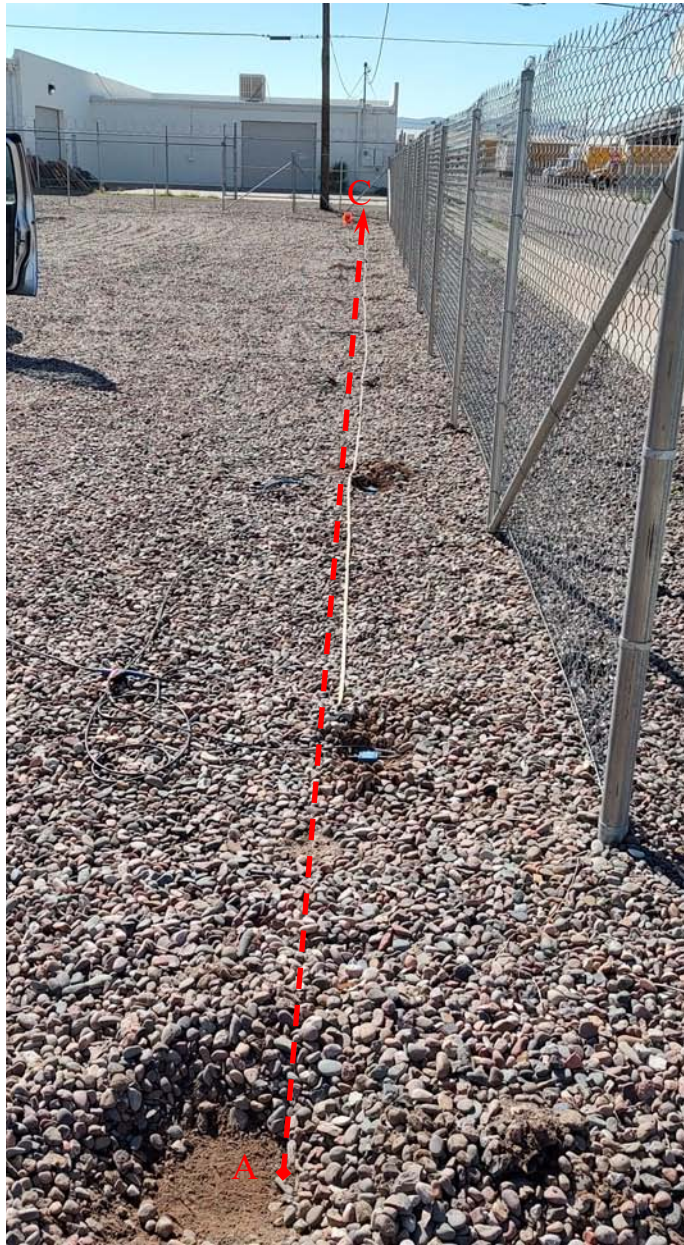


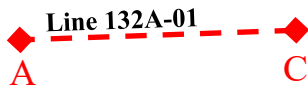
Figure 3; Photo 1: Seismic Survey Line 132A-01 view looking south from Shot Point A toward Shot Point C.



Figure 3; Photo 2: Seismic Survey Line 132A-01 view looking north from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132A-01 taken February 15, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:

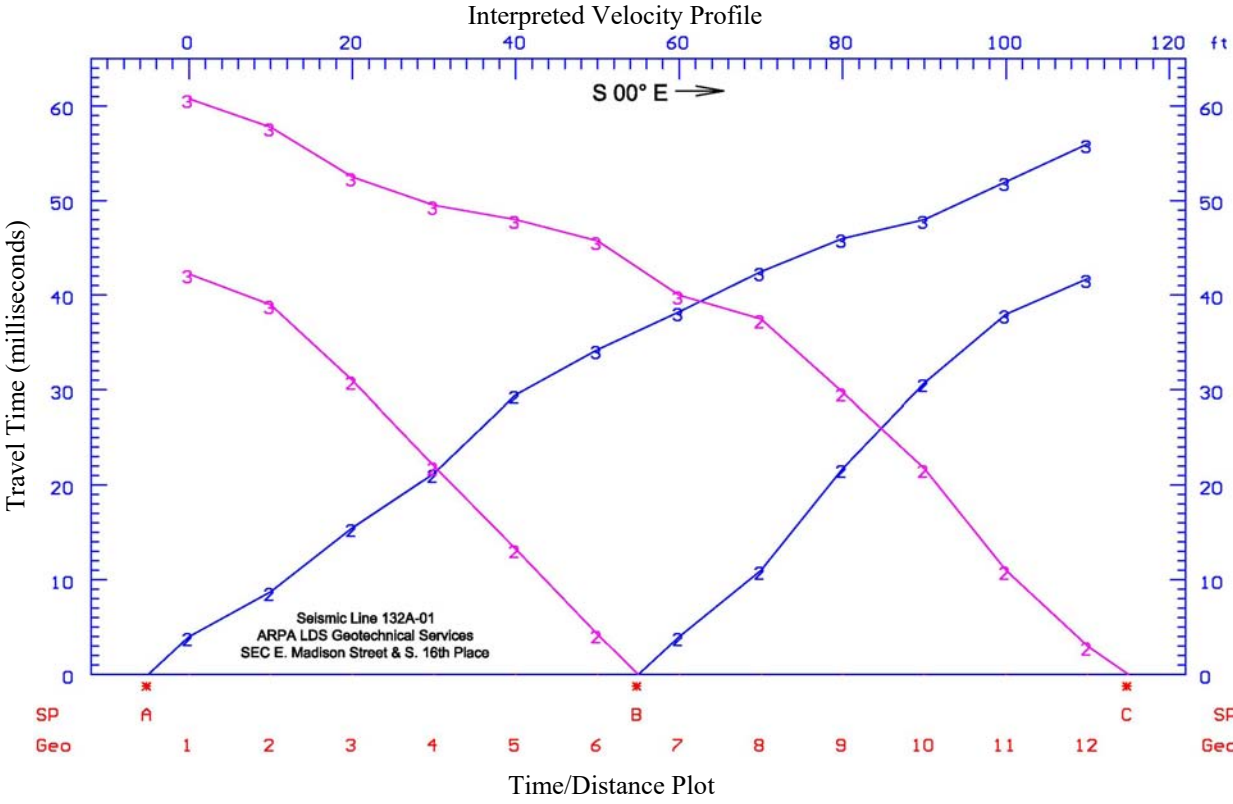
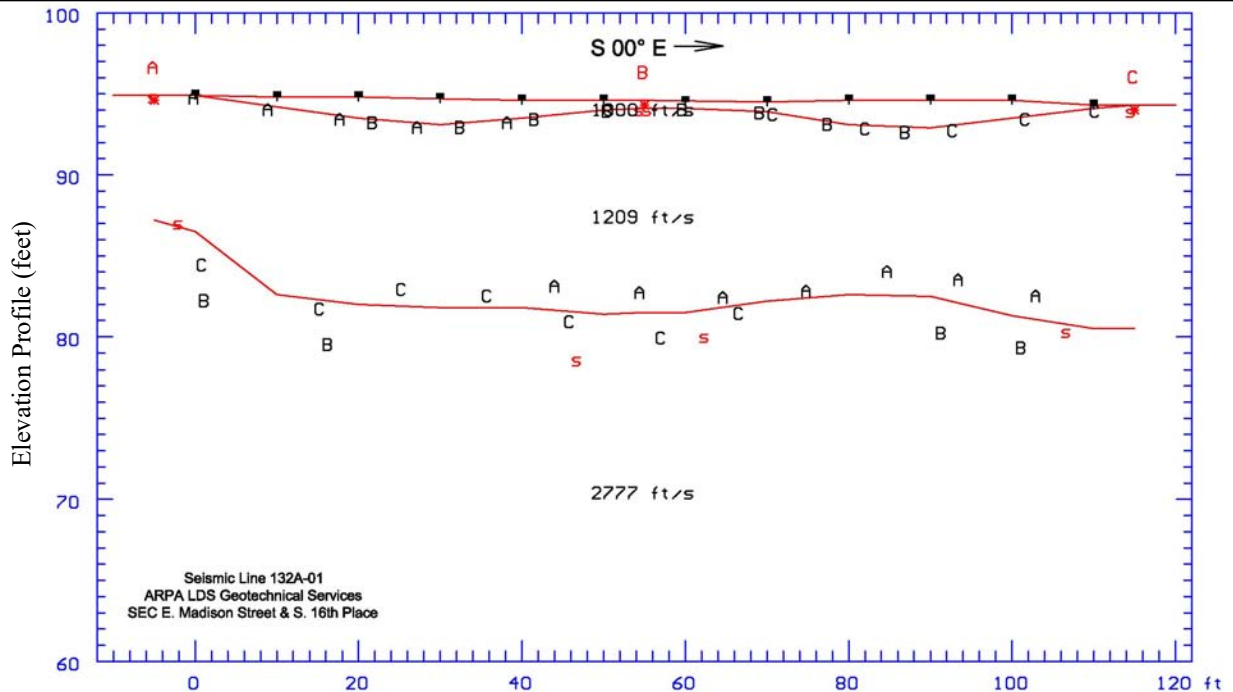


Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 4 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
Seismic Line Photographs—132A-01
Figure 3**



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ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey 132A-01
Velocity Profile & Time-Distance Plot
Figure 4

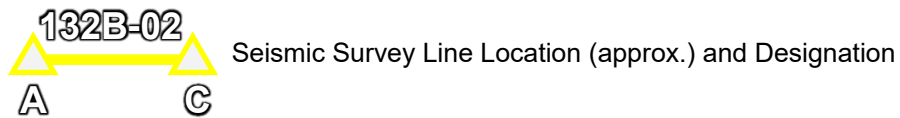
Refer to Figure 2 for seismic survey line location and Figure 3 for photographs of the seismic survey line layout



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EXPLANATION:



Basemap modified by GCI(3/20/2024) from Google Maps (2024).

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Phoenix, Arizona
Seismic Refraction Survey
132B-02 Seismic Survey Location Map
Figure 5



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Figure 6; Photo 1: Seismic Survey Line 132B-02 view looking south from Shot Point A toward Shot Point C.

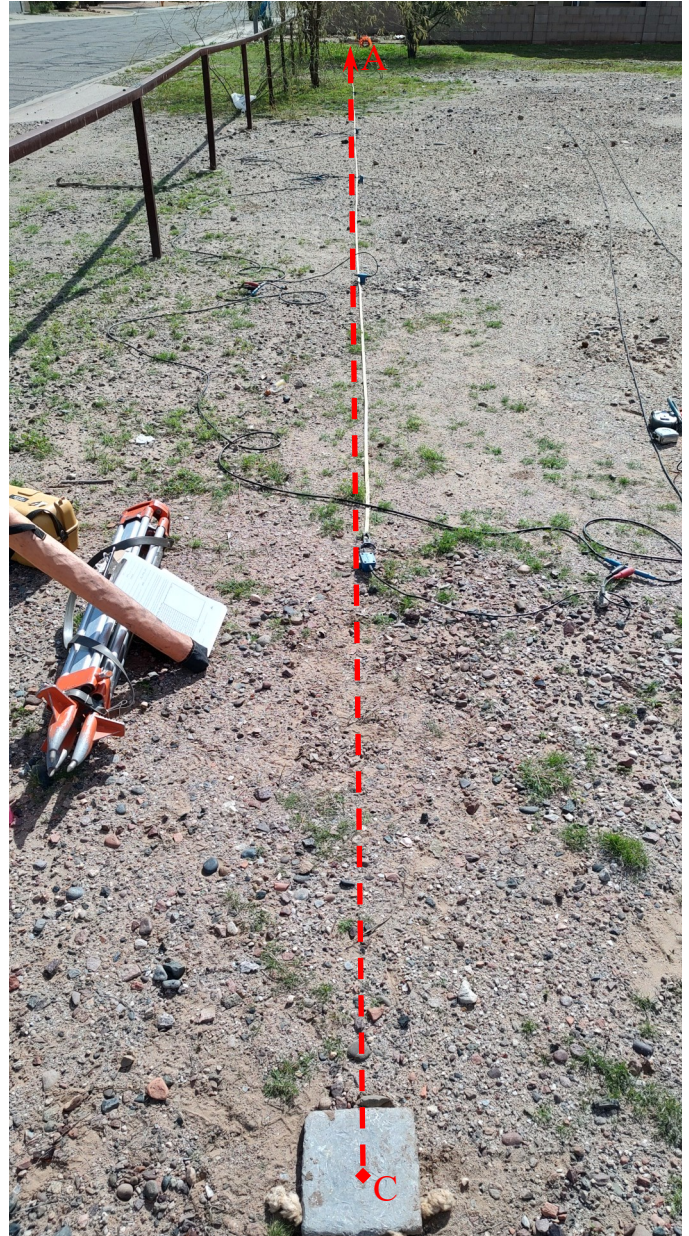
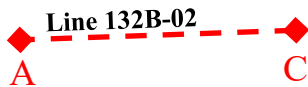


Figure 6; Photo 2: Seismic Survey Line 132B-02 view looking north from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132B-02 taken February 15, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:



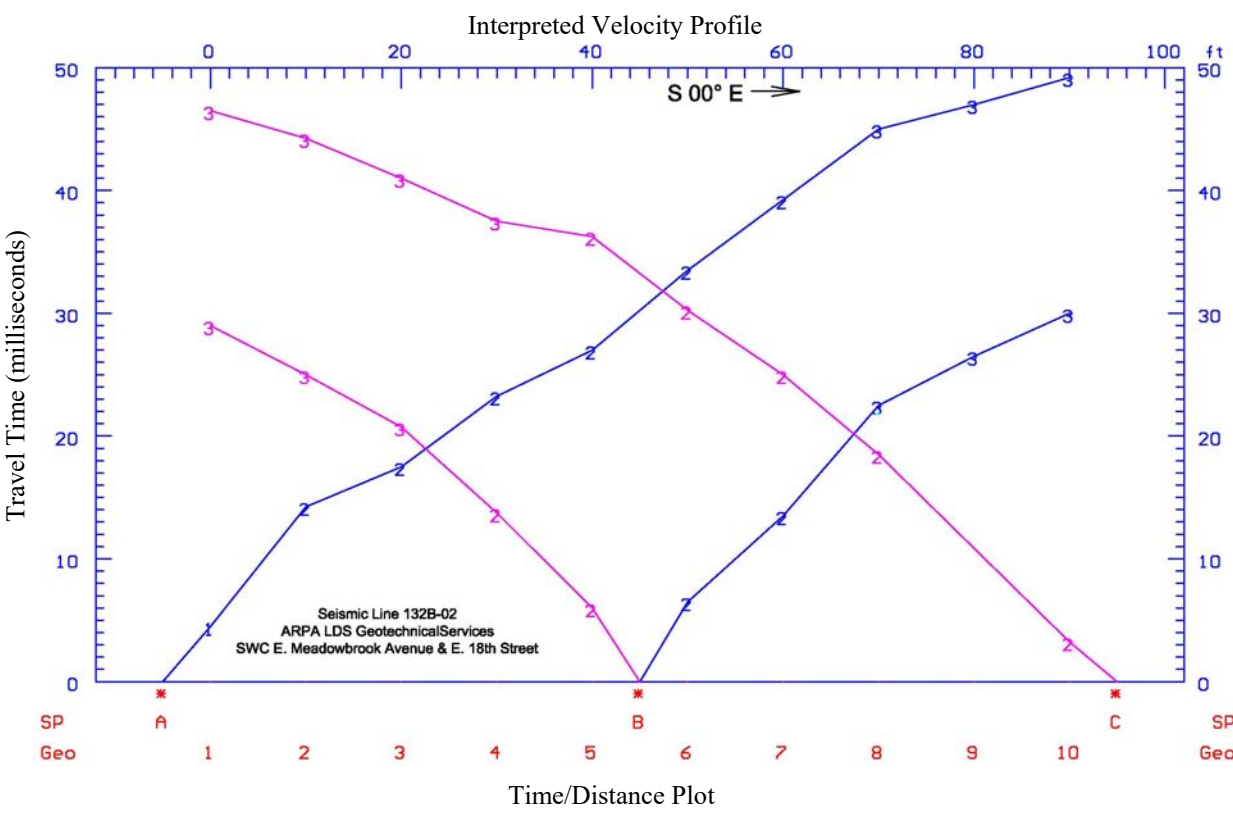
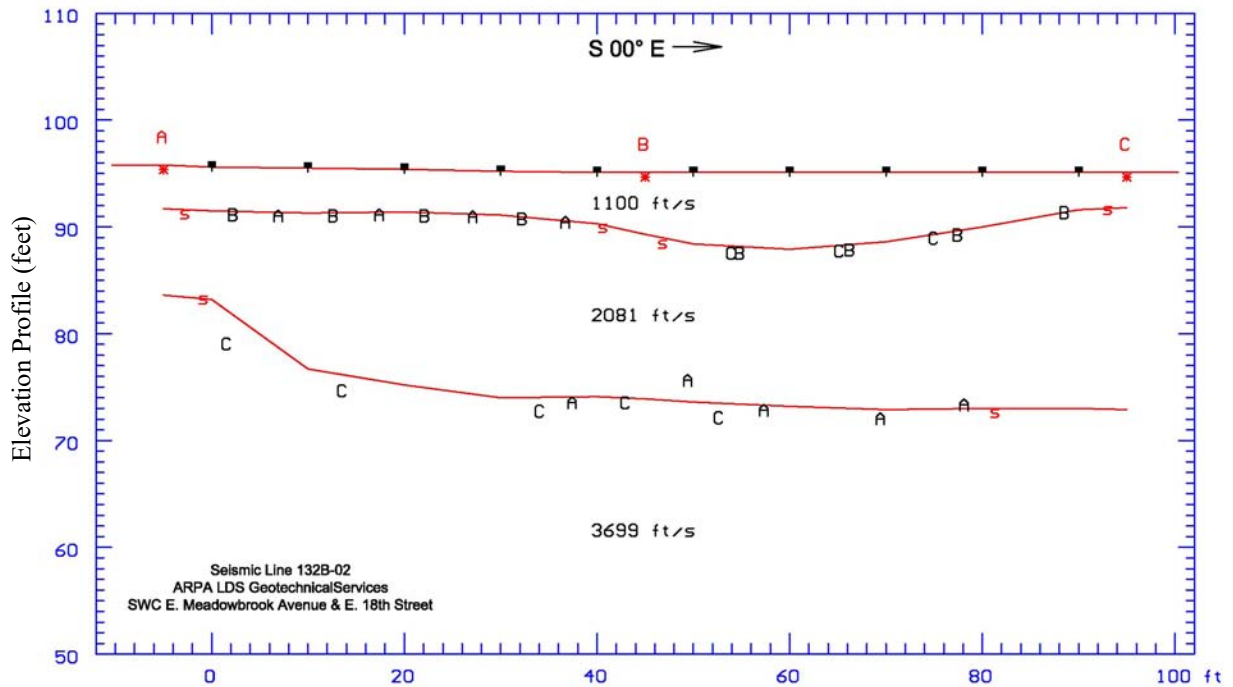
Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 7 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
Seismic Line Photographs—132B-02
Figure 6**



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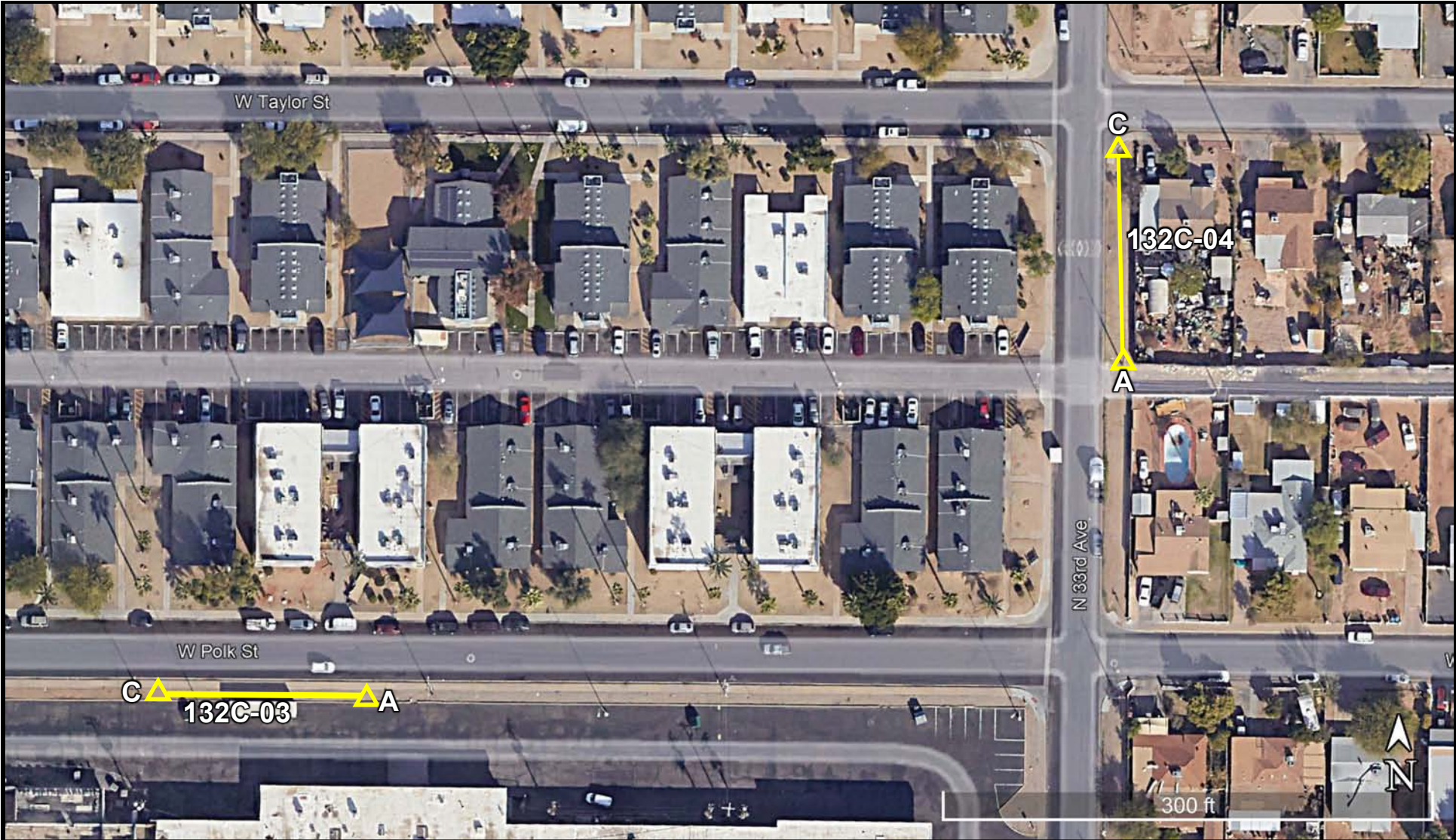


**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey 132B-02
Velocity Profile & Time-Distance Plot
Figure 7**

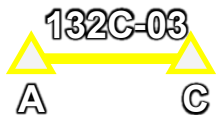
Refer to Figure 5 for seismic survey line location and Figure 6 for photographs of the seismic survey line layout



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EXPLANATION:



Seismic Survey Line Location (approx.) and Designation

ARPA LDS Geotechnical Services
 Phoenix, Arizona
 Seismic Refraction Survey
 132C-03 & 132C-04 Seismic Survey Location Map
 Figure 8

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Basemap modified by GCI(3/20/2024) from Google Maps (2024).



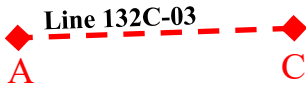
Figure 9; Photo 1: Seismic Survey Line 132C-03 view looking west from Shot Point A toward Shot Point C.



Figure 9; Photo 2: Seismic Survey Line 132C-03 view looking north from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132C-03 taken February 16, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:

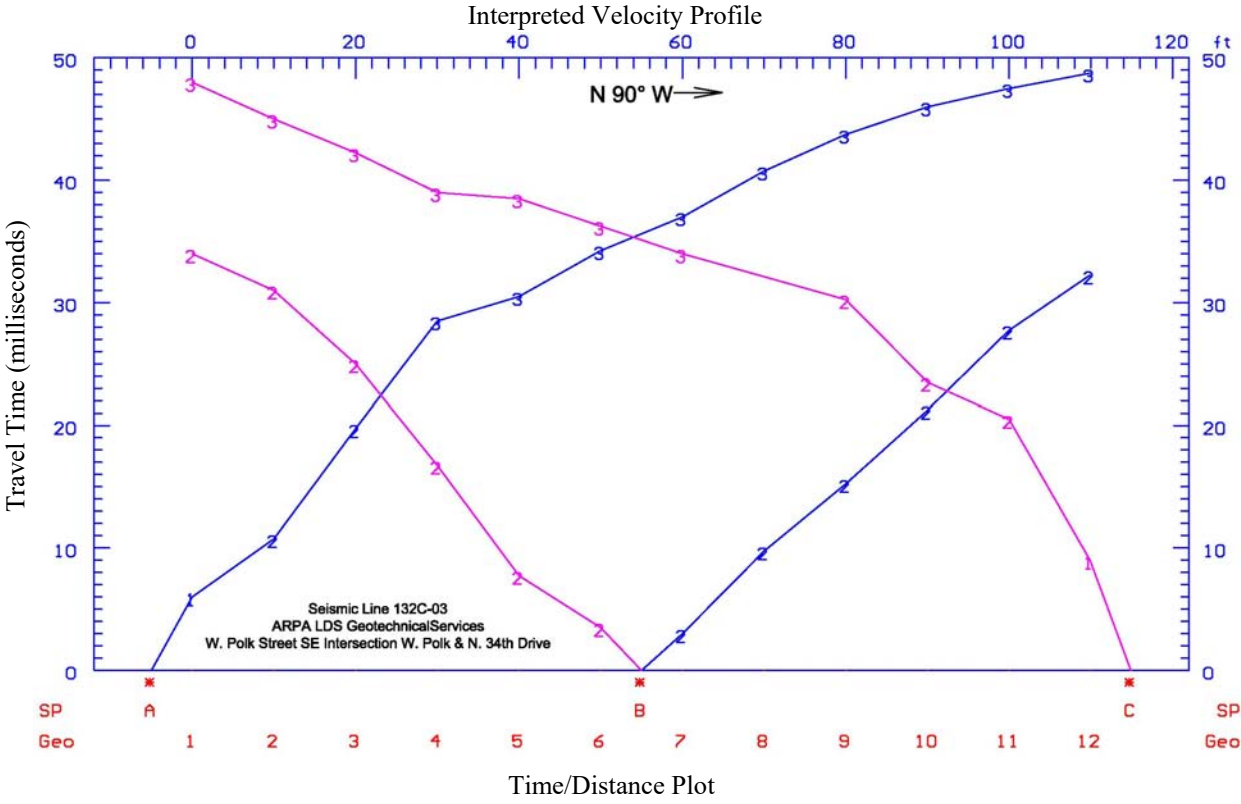
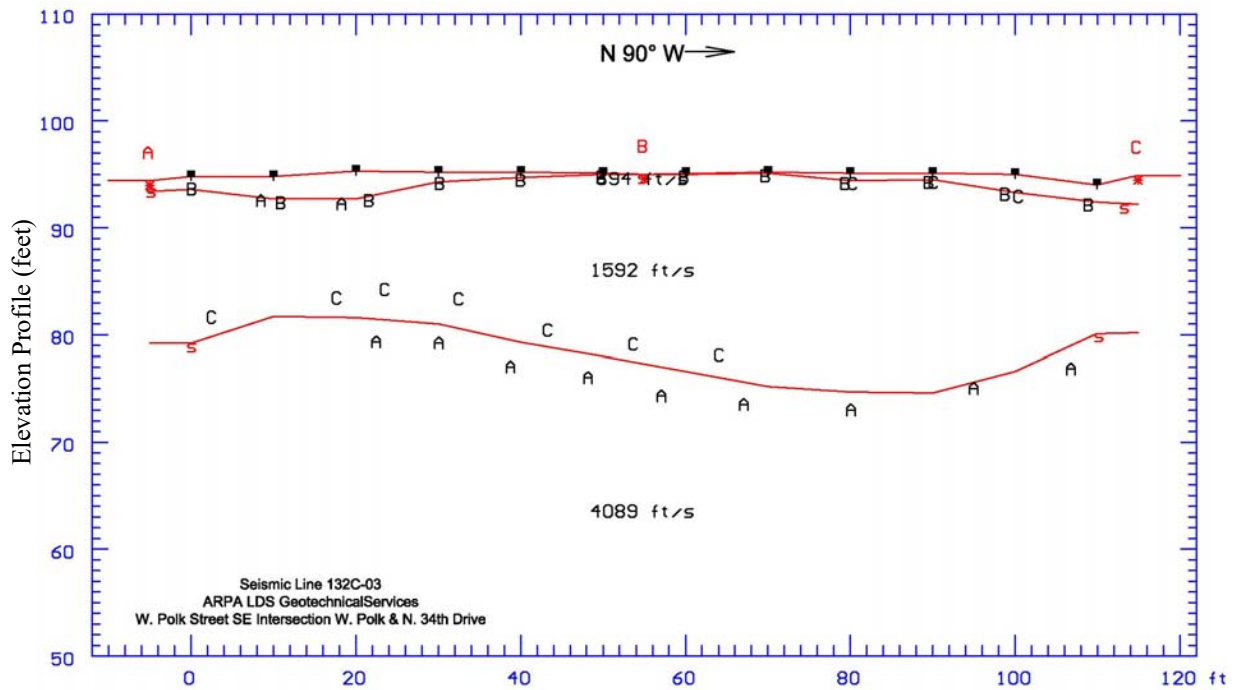


Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 10 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
Seismic Line Photographs—132C-03
Figure 9**



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**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey 132C-03
Velocity Profile & Time-Distance Plot
Figure 10**

Refer to Figure 8 for seismic survey line location and Figure 9 for photographs of the seismic survey line layout



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Figure 11; Photo 1: Seismic Survey Line 132C-04 view looking north from Shot Point A toward Shot Point C.

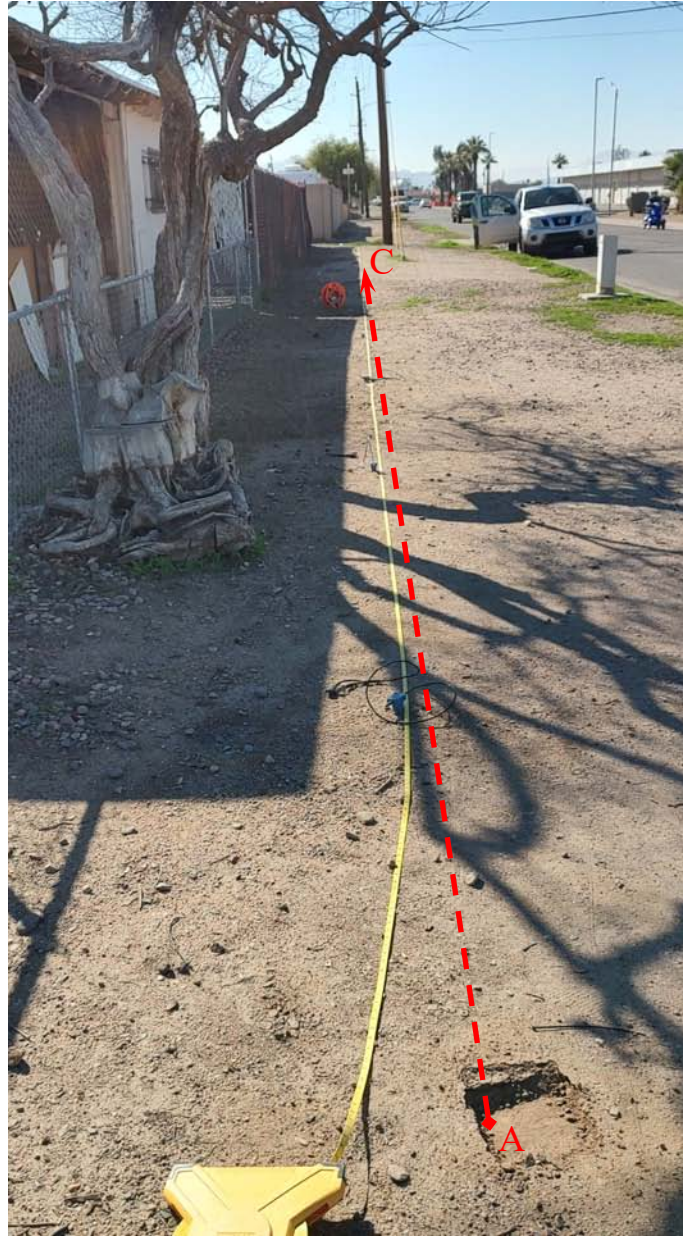
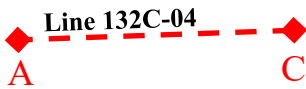


Figure 11; Photo 2: Seismic Survey Line 132C-04 view looking south from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132C-04 taken February 16, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:



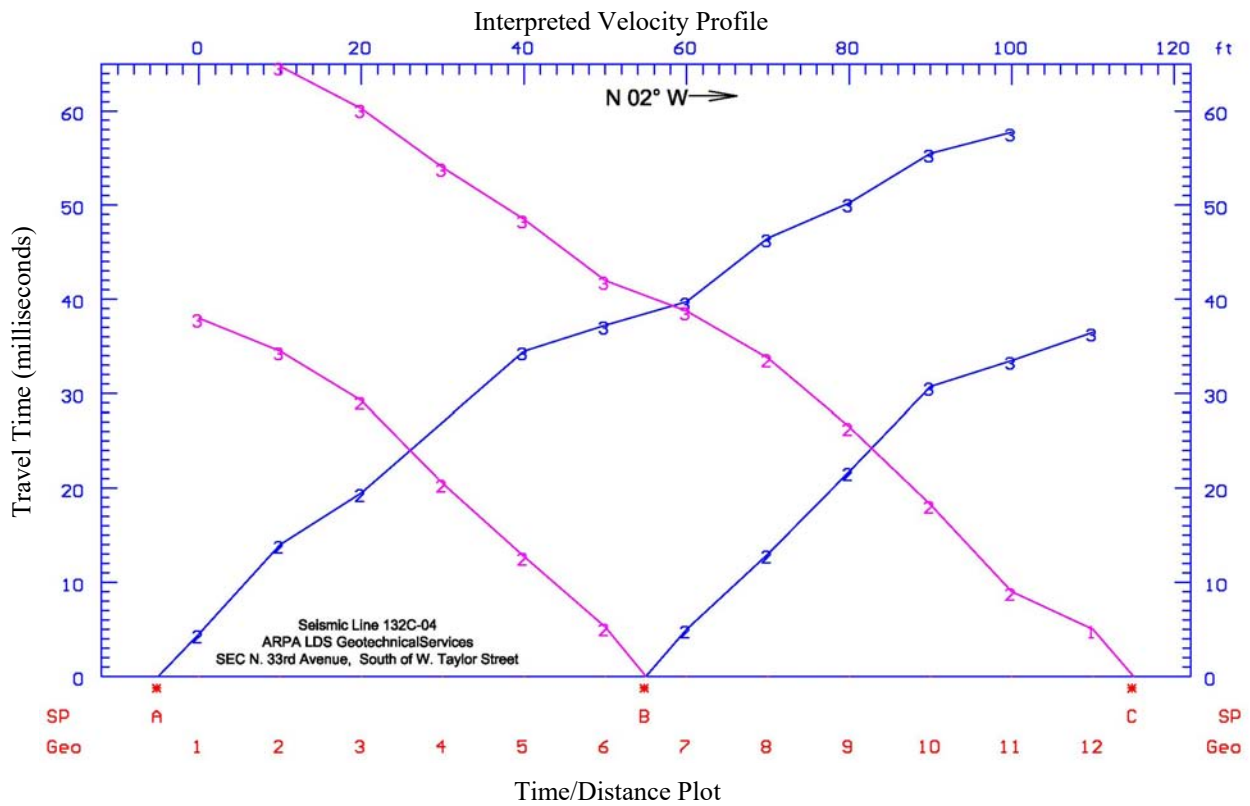
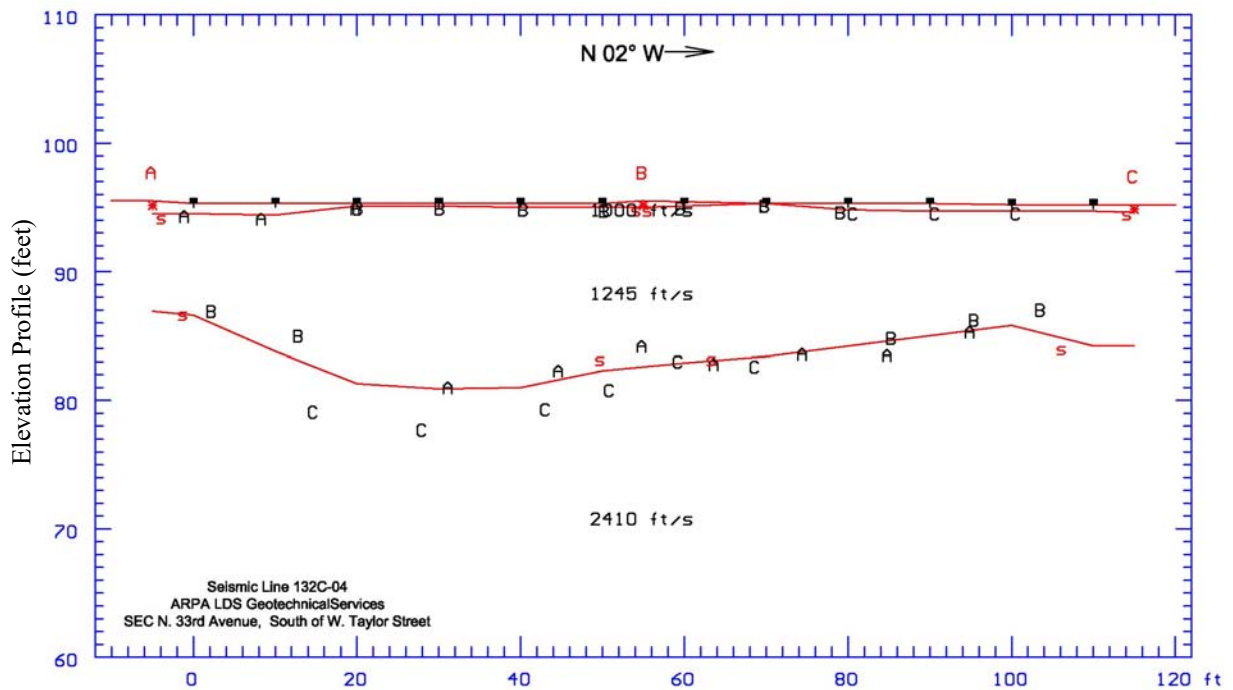
Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 12 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
Seismic Line Photographs—132C-04
Figure 11**



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Phoenix, Arizona
Seismic Refraction Survey 132C-04
Velocity Profile & Time-Distance Plot
Figure 12

Refer to Figure 8 for seismic survey line location and Figure 11 for photographs of the seismic survey line layout



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APPENDIX A

SEISMIC REFRACTION SURVEY

APPENDIX A SEISMIC REFRACTION SURVEY

A.1 GENERAL

In general, seismic wave velocities are related to the hardness, consolidation, and density of the materials through which seismic (shock) waves travel. Seismic velocities of subsurface soils and bedrock can be correlated to some of the physical properties of the material with reasonable levels of confidence. As with rock rippability (ease of excavation) for example, the Caterpillar tractor Company has correlated ranges of seismic velocities in different rock and soil materials to qualitative estimates of rippability for their D-9 tractor with a mounted hydraulic No.9 ripper.

The use of seismic velocities measured in various soils and rock types are considered reasonably conservative for evaluating soil and rock characteristics by "indirect" shallow geophysical seismic methods. Some general correlations are as follows:

- Soil, loose surface material, alluvium and strongly weathered and broken bedrock has velocities ranging from 500 feet per second (fps) to 1,200 fps;
- Moderately hard, slightly to moderately cemented, dense alluvial and colluvial sediments and moderately weathered and broken bedrock range from 1,200 fps to 3,000 fps;
- Very dense, hard, well-cemented soils and moderately competent bedrock range from 3,000 fps to 6,000 fps;
- Sound, relatively homogeneous or tightly jointed bedrock and uniformly, strongly cemented soils (silica hardpan, caliche, calcrete, etc.) have seismic velocities greater than 6,000 fps.

Soils and rock with velocities of less than 3,000 fps can usually be excavated with conventional earth moving equipment. Where materials with velocities in excess of 6,000 fps are found, blasting would normally be required for efficient fragmentation. However, if the rock is thinly bedded, jointed, or fractured, it may be possible to break the rock with heavy ripping using a single shank ripper or large ram-hoe. The resulting fragments will be of a size consistent with the fracture spacing and the progress of the excavation would be very slow. The intermediate material (velocities between 3,000 fps and 6,000 fps) would likely require heavy equipment and possibly the localized use of jack- hammers, ram-hoes, or selective blasting to provide cost-effective excavation.

A.2 DATA COLLECTION

Refraction data were collected along seismic survey lines consisting of 12 geophones spaced 10 feet apart. This geometry provided coverage of about 110 feet along each survey line. Refer to Figures 2, 5, and 8 for the seismic survey line locations. Seismic waves were generated at shot points located at line ends and the center to measure shallow materials (near-surface) seismic velocities. Data were recorded from both line ends so the effect of layer inclination, or dip on velocity boundaries, could be calculated. This geometry provided at least 30 feet, or more, of penetration at most line locations.

A.3 REFRACTION SEISMIC SURVEY LIMITATIONS

The seismic survey data presented in this report are derived from and interpreted from an indirect geophysical investigative technique (seismic refraction surveys) employed at the specific locations indicated and from observations made of the surface geologic conditions exposed at the site. The interpretations made at the specific seismic survey sites are believed to be reasonable based on the information available at the time of this study. The interpretations may not represent, nor are they intended to represent, the subsurface condition at other locations.

Geologic contacts between rock and soil units are approximate, may be either gradual or abrupt, and the calculated depths could vary from 10 to 20 percent or more. Geological and geotechnical information provided others and our experience on similar projects in similar geological terrain were considered in the interpretations of subsurface conditions.

A.4 REFRACTION DATA PROCESSING

Seismic Refraction Interpretation Programs (SIP) computer programs by RIMROCK GEOPHYSICS, were used to analyze seismic data obtained in the field. The programs calculate average velocities of any number of layers assuming the multilayered intervals do not include velocity inversions or "hidden" zones (i.e., high velocity zone over a low velocity zone). Thicknesses of each layer, except for the lowermost layer, are calculated along with the dip (inclination) angle of the layer boundary. The depth below the ground surface to each layer boundary is also provided.

Input data, velocity of each layer and seismic wave arrival times, obtained during the field work are checked by the computer program to assure that they satisfy reciprocity at least within 20 percent. These data are used to develop a meaningful geological model used to interpret subsurface stratigraphic conditions.

APPENDIX B

ROCK HARDNESS & EXCAVATION CHARACTERISTICS

Tables B-1, B-2, and B-3

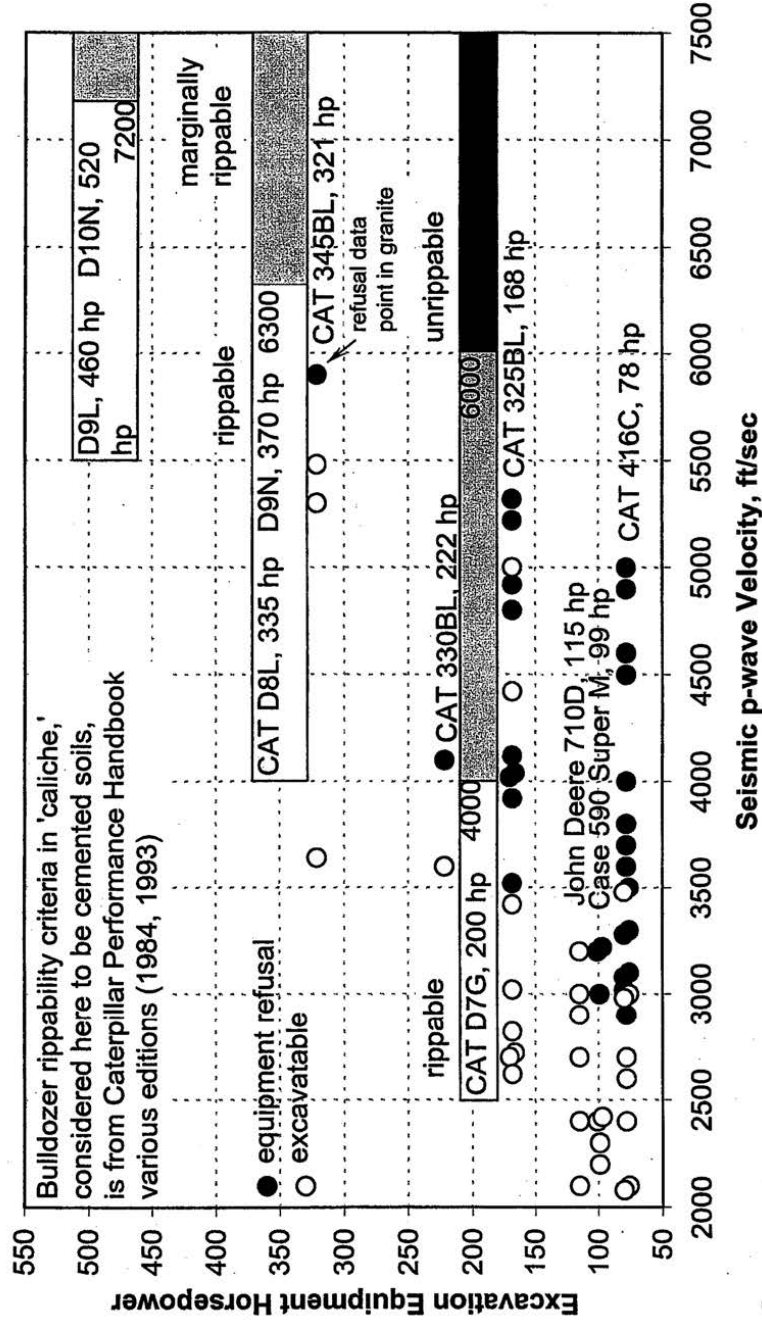
Table B-1
Rock Hardness & Excavation Characteristics⁽¹⁾

Rock Hardness Description	Identification Criteria	Unconfined Compressive Strength		Seismic Compression (P-Wave) Velocity		Excavation Characteristics
		MPa	psi	m/s	f/s	
Very Soft Rock	Material crumbles under firm blows with sharp end of geological pick; can be peeled with a knife; too hard to cut a triaxial sample by hand. SPT will refuse. Pieces up to 3-cm thick can be broken by finger pressure.	1.7 - 3.0	246 - 435	450 - 1,200	1,475 - 3,935	Easy Ripping
Soft Rock	Can just be scraped with a knife; indentations 1-mm to 3-mm show in specimen with firm blows of the pick point; has dull sound under hammer.	3.0 - 10.0	435 - 1,450	1,200 - 1,500	3,935 - 4,920	Hard Ripping
Hard Rock	Cannot be scraped with a knife; hand specimen can be broken with a pick with a single firm blow; rock rings under hammer.	10.0 - 20.0	1,450 - 2,900	1,500 - 1,850	4,920 - 6,070	Very Hard Ripping
Very Hard Rock	Hand specimen breaks with a pick after more than one blow; rock rings under hammer	20.0 - 70.0	2,900 - 10,150	1,850 - 2,150	6,070 - 7,050	Extremely Hard Ripping or Blasting
Extremely Hard Rock	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.	> 70.0	> 10,150	> 2,150	> 7,080	Blasting

Note: (1) Table from Weaver, J.M.; 1975; Geological Factors Significant in the Assessment of Rippability; The Civil Engineer in South Africa (*Die siviele Ingenieur in Suid-Afrika*); Volume 17, Issue 12, December 1975; pp. 313-316.

Table B-2
Typical Excavatability Performance in Cemented Soils⁽²⁾

Figure 1 - Typical Excavatability Performance in Cemented Soils for Various Equipment Completing Test Pits in Salt River Valley Area



Note: (2) From Caterpillar, Inc.; 2013; Caterpillar Performance Handbook, Edition 43; Section 18, Rippers, Seismic Wave Velocity Charts; pp. 18-75 to 18-80.

Table B-3
Excavatability of Materials⁽³⁾

Material & Range of Marginal Rippability by Seismic Velocity (Cat, 1984; 1993)	Typical Bulldozer Used as Ripper (Cat, 1984; 1993)	Equivalent Backhoe (Kirsten, 1982; 1988)
"Caliche"		
4,000 – 6,000 fps	D7G, 200 HP	235
6,300 – 8,600 fps	D8L, 335 HP	245
6,300 – 8,700 fps	D9N, 370 HP	-
7,200 – 10,300 fps	D9L, 460 HP	RH 40
7,200 – 10,300 fps	D10N, 520 HP	-
7,400 – 10,600 fps	D10, 700 HP	-
7,600 – 11,000 fps	D11N, 770 HP	-
Conglomerate		
4,600 – 5,700 fps	D7G, 200 HP	235
7,600 – 9,300 fps	D8L, 335 HP	245
7,600 – 9,300 fps	D9N, 370 HP	-
8,400 – 10,600 fps	D9L, 460 HP	RH 40
8,400 – 10,600 fps	D10N, 520 HP	-
9,000 – 11,000 fps	D10, 700 HP	-
9,300 – 11,500 fps	D11N, 770 HP	-
Granite		
4,300 – 4,800 fps	D7G, 200 HP	235
6,800 – 8,000 fps	D8L, 335 HP	245
6,800 – 8,000 fps	D9N, 370 HP	-
7,300 – 8,400 fps	D9L, 460 HP	RH 40
7,300 – 8,400 fps	D10N, 520 HP	-
7,800 – 9,000 fps	D10, 700 HP	-
8,100 – 9,500 fps	D11N, 770 HP	-
Schist		
4,300 – 5,300 fps	D7G, 200 HP	235
7,200 – 9,000 fps	D8L, 335 HP	245
7,200 – 9,000 fps	D9N, 370 HP	-
7,700 – 9,500 fps	D9L, 460 HP	RH 40
7,700 – 9,500 fps	D10N, 520 HP	-
8,000 – 10,000 fps	D10, 700 HP	-
8,300 – 10,500 fps	D11N, 770 HP	-

Note: Bulldozer and backhoe power are presented by Kirsten (1982, 1988) as a measure of equivalent performance for excavation. The Caterpillar D6D bulldozer and 225 backhoe and D4E/D5B bulldozer and 215 backhoe are considered equivalent. Seismic velocities below marginal indicate that the material is rippable. Seismic velocities above marginal indicate that the material is non-rippable. All velocities are approximate and represent a typical range. See the Caterpillar Performance Handbook (Caterpillar, 1984, 1993 or current edition) for details on use of this information. Different model configurations include variations in weight and horsepower.

From AMEC, 2005

Note: (3) From AMEC; 2005; consultants report prepared for City of Phoenix entitled "Refraction Seismic Evaluation, Deer Valley Road-7th Street to Cave Creek Road"; COP Project No. ST85100044, AMEC Job No. 5-119-000199, Report No. 2; 2 September 2005.

GEOTECHNICAL EXPLORATION REPORT
ARPA LDS GEOTECHNICAL SERVICES
TAYLOR STREET AND 33RD AVENUE
PHOENIX, ARIZONA

Prepared for:
City of Phoenix Street Transportation
Department
1034 East Madison Street
Phoenix, Arizona



Prepared by:
ATEK Engineering Consultants, LLC
111 South Weber Drive, Suite 1
Chandler, Arizona 85226



ATEK Project # 230190-2

March 26, 2024

March 26, 2024
ATEK Project #230190-2

Rob Duvall, Materials Supervisor
City of Phoenix Streets Transportation Department
1034 East Madison Street
Phoenix, Arizona 85034

Regarding: Geotechnical Exploration Report

Project: ARPA LDS Geotechnical Servies
ST83140116
Taylor Street and 33rd Avenue
Phoenix, Arizona

Dear Mr. Duvall:

ATEK Engineering Consultants, LLC is pleased to present the attached Geotechnical Exploration Report for the ARPA LDS Geotechnical Servies (ST83140116) located on Taylor Street and 33rd Avenue in Phoenix, Arizona. The purpose of our study was to explore and evaluate the subsurface conditions at the proposed site to develop geotechnical engineering recommendations for project design and construction.

Based on our findings, the site is considered suitable for the proposed construction, provided geotechnical recommendations presented in the attached report are followed. Specific recommendations regarding the geotechnical aspects of the project design and construction are presented in the attached report. The recommendations contained within this report are dependent on the provisions provided in the Limitations and Recommended Additional Services sections of this report.

We appreciate the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned.

Sincerely,
ATEK Engineering Consultants, LLC

A handwritten signature in blue ink, appearing to read "Armando Ortega".

Armando Ortega, P.E.
Principal Geotechnical Engineer



Antonio Lopez, P.E.
Geotechnical Group Manager

Distribution: (1) Addresses (Electronic Copy)

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TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1.	Project Description.....	1
1.2.	Purpose.....	1
1.3.	Scope of Services	1
2.	FIELD EXPLORATION.....	2
2.1.	General.....	2
2.2.	Soil Test Borings	2
2.3.	Seismic Refraction Survey	3
3.	LABORATORY TESTING.....	3
4.	GENERAL SITE CONDITIONS	4
4.1.	Geologic Setting	4
4.2.	Surface Conditions.....	4
4.2.1.	Pavement Profile	5
4.3.	Subsurface Conditions	5
4.4.	Groundwater Conditions.....	6
4.5.	Geologic Hazards	6
4.5.1.	Liquefaction Potential	6
4.6.	Seismic Considerations.....	6
4.7.	Earth Fissures and Land Subsidence	7
5.	ENGINEERING ANALYSES AND RECOMMENDATIONS	7
5.1.	Earthwork.....	7
5.2.	Excavation	8
5.2.1.	Trench Backfill.....	8
5.2.2.	Temporary Excavations	9
5.2.3.	Pavement Site Preparation and Grading	10
5.2.4.	Borrow Requirements	10
5.3.	Design Values for Buried Pipes	11
5.3.1.	Soil Loads on Buried Flexible Pipes	11
5.3.2.	Design Values for Buried Flexible Pipes	11
5.3.3.	Flexible Pipe Trench Width Recommendations	13
5.3.4.	Flexible Pipe Construction Considerations.....	14
5.3.5.	Soil Loads on Buried Rigid Pipes.....	14
5.3.6.	Live Loads on Buried Conduits.....	15
5.4.	Moisture Protection	17
5.5.	Corrosion Potential.....	17
5.5.1.	10-point System.....	17
5.5.1.1.	Electrical Resistivity	18
5.5.1.2.	Oxidation-Reduction (Redox) Potential	19
5.5.1.3.	Sulfides	19
5.5.1.4.	Moisture	19
5.5.2.	Concrete Corrosion.....	20



5.6. Pavement Areas.....	20
6. CLOSURE.....	21
6.1. Limitations.....	21
6.2. Recommended Additional Services.....	22

- APPENDIX A - Site Location Map
- APPENDIX B - Sample Location Plan
- APPENDIX C - Field Study and Boring Logs
- APPENDIX D - Laboratory Test
- APPENDIX E - Seismic Refraction Survey



1. INTRODUCTION

This report presents the results of our geotechnical exploration for the ARPA LDS Geotechnical Services located on Taylor Street and 33rd Avenue in Phoenix, Arizona. A Site Location Map is presented in **Appendix A** of this report. The following sections of this report describe our understanding of the project and our scope of services.

1.1. Project Description

The project consists of storm drain improvements at Taylor Street and 33rd Avenue in Phoenix, Arizona. The storm drain improvements start at Polk Street from 35th Avenue to 33rd Avenue, continues north on 33rd Avenue to approximately Taylor Street. The length of the 30-inch storm drainpipe is approximately 1,630 linear feet.

1.2. Purpose

The purpose of this geotechnical study was to evaluate the general surface and subsurface conditions at the site, and to present recommendations related to geotechnical aspects of design and construction of the proposed project.

1.3. Scope of Services

Our study included a site reconnaissance, subsurface exploration, soil sampling, field and laboratory testing, engineering analyses, and preparation of this report. This report presents geotechnical recommendations for design and construction of proposed structures. The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the “Limitations” section of this report.

2. FIELD EXPLORATION

2.1. General

Prior to the start of drilling, the Arizona 811 was contacted to locate existing utilities at the boring locations. In addition, the City of Phoenix Street Transportation Department Right-of-Way Management was contacted to obtain TRACS permit (C-23-020208 and C-23-020207). The field exploration was performed on January 25, 2024. Three soil borings were drilled to depths of twenty (20) feet below existing grade. The soil test borings were drilled using a truck mounted CME-55 power drill rig equipped with 7 and ¼-inch outside diameter hollow stem augers. The borings were located in the field at the approximate locations shown on the Sample Location Plan included in **Appendix B** of this report. Upon completion of the borings, the boreholes were backfilled using ½ sack aggregate base slurry. Aggregate base slurry was mixed and placed on site by American Materials.

2.2. Soil Test Borings

Disturbed and relatively undisturbed samples were taken at the direction of the field engineer during drilling operations. Relatively undisturbed samples of the subsurface materials were obtained using a California sampler with a 2.5-inch inside diameter and a 3.0-inch outside diameter. Disturbed samples were obtained using a Standard Penetration/Split Spoon Sampler (SPT) with a 1.5-inch inside diameter and 2.0-inch outside diameter. The California and the SPT samplers were driven 12 and 18 inches, respectively, using a 140-pound hammer falling 30 inches, and blow counts for successive 6-inch penetration intervals were recorded. After the sampler was withdrawn from the borehole, the samples were removed, sealed to minimize moisture loss, and submitted to the laboratory.

Soil classifications made in the field from auger cuttings and samples were re-evaluated in the laboratory after further examination and testing. The soils were

classified in accordance with the Unified Soil Classification System presented in **Appendix C**.

Sample classifications, blow counts recorded during sampling, and other related information, were recorded on the soil boring logs. The boring logs are presented in **Appendix C**. The information presented on the logs are a combination of factual and interpretive information. Lines delineating subsurface strata and group symbols are based on field observations made at the time of the field study. Actual subsurface lines delineating subsurface strata may be gradual and vary.

2.3. Seismic Refraction Survey

Two seismic refraction survey lines were completed on Polk Street between 33rd Avenue and 34th Drive, and 33rd Avenue between Polk Street and Taylor Street as part of the Subsurface Investigation. The seismic refraction survey line was completed to obtain site subsurface conditions. The results may be used as guide to qualitatively assess the relative ease of excavation of the site soils and bedrock like material, and provide a strength estimate of the material encountered. Seismic velocities, calculated zone thickness and depth to velocity zone boundaries for each interpreted bedrock or soil types are depicted in Figures 8 through 12 presented in **Appendix E**. The results of the seismic refraction survey should be used with caution and only used as guidelines.

3. LABORATORY TESTING

Selected soil samples from the borings were tested in the laboratory for classification purposes and to evaluate their engineering properties. The laboratory tests included:

- Gradation;
- Atterberg limits;
- Moisture content;
- Undisturbed ring density;
- Standard Proctor;

- Swell potential of soil;
- pH tests;
- Resistivity tests;
- Sulfide content;
- Redox potential;
- Sulfate content;
- And chloride content.

A brief description of each test performed on the soil samples and the results are presented in **Appendix D** of this report.

4. GENERAL SITE CONDITIONS

4.1. Geologic Setting

The study area falls within the Sonoran Desert of the Basin and Range Physiographic Province. The Basin and Range is characterized by its broad and low elevation valleys perimeter by long mountain ranges. The site elevation is approximately 1078 feet above sea level and generally, drainage flows through intermittent streams and dry washes that connect to the Gila or Salt River. The project is located near west phoenix, approximately 0.6-miles south of Interstate 10 and approximately 1.35-miles west of Interstate 17. The surficial soils within the project bounds are mapped as Holocene surficial deposits (Qy)¹ and consists of unconsolidated deposits associated with fluvial systems. This unit consists of fine-grained and well sorted sediments on alluvial plains. This unit also includes gravelly channels, channels and alluvial fan deposits in the middle and upper piedmonts².

4.2. Surface Conditions

The project is in west Phoenix within Quarter Section Q11-21 in Arizona. The storm drain alignment is on Polk Street from 35th Avenue to 33rd Avenue, 33rd Avenue from

¹ Reynolds, S.J., and Skotnicki, S.J., 1993, [Geologic map of the Phoenix South 30' x 60' quadrangle, central Arizona](#): Arizona Geological Survey, Open-File Report OFR 93-18, scale 1:100,000

² Horton, J.D., C.A. San Juan, and D.B Stoesser, 2017, The State Geologic Map Compilation (SGMC) geodatabase of the conterminous United States: U.S. Geological Survey Data series 1052, doi: 10.3133/ds1052

Polk Street to Taylor Street. These roads are bounded by concrete curb and gutter. The properties surrounding the site are generally developed as commercial and residential properties.

4.2.1. Pavement Profile

The pavement section was measured at each of the soil test boring locations. A summary of the thickness of the pavement sections encountered at each location is tabulated below.

BORING NUMBER	ROADWAY	OFFSET	AC THICKNESS (IN)	ABC THICKNESS (IN)
B-4	WB Polk St	200' E of 35 th Ave	7.0	12.0
B-5	WB Polk St	180' W of 33 rd Ave	5.0	10.5
B-6	NB 33 rd Ave	200' N of Polk St	4.0	8.0

4.3. Subsurface Conditions

As indicated by the exploratory borings, in general the subgrade soils under the pavement consist of Gravelly Lean Clay with Sand (CL) and Sandy Lean Clay (CL) with low to medium plasticity. These soils were found to have a relative firmness ranging from moderately firm to firm. The underlying subsurface soils encountered during our field exploration consisted of Gravelly Lean Clay with Sand (CL), Sandy Lean Clay (CL) Silty Sand (SM), Clayey Sand (SC), and Lean Clay with Sand (CL). These soils were found to have a relative firmness of firm to very firm with low to medium plasticity and relative density of medium dense with no plasticity. For additional information see Boring Logs presented in **Appendix C**.

4.4. Groundwater Conditions

Groundwater was not encountered within the soil test borings. Based on a review of published groundwater data maintained by Arizona Department of Water Resources anticipated depth to groundwater is approximately 137.5 feet below the existing ground surface elevation (Site ID 332703112073801). It is anticipated that groundwater will not be a factor in design or construction of the planned improvements. It should be noted that soil moisture conditions within the area may vary depending on rainfall and/or runoff conditions not apparent at the time of our field study.

4.5. Geologic Hazards

4.5.1. Liquefaction Potential

Based on the site soils and groundwater conditions encountered at the project site during this study, the preliminary potential for soil liquefaction is considered to be negligible.

4.6. Seismic Considerations

Probabilistic earthquake ground motion values were obtained using the U.S. Seismic Design Maps Web Application by USGS which uses 2009 AASHTO Guide Specifications for LRFD Seismic Bridge Design (USGS, 2014). Interpolated, probabilistic ground motion values of Peak Ground Acceleration (PGA) on bedrock for a seven-percent probability of exceedance in 75 years were obtained for the project area by latitude and longitude and are presented in the following Table. The site-adjusted values account for amplification of peak ground acceleration and spectral response values from the bedrock contact to the ground surface, using site coefficients for peak ground and spectral accelerations for a Site Class D for stiff soil profile with average SPT N-values between 15 and 50, based on Table 3.10.3.1-1 - Site Class Definition of AASHTO (2012).

Description	PGA	Spectral Acceleration (SA)	
	7% PE in 75 years (RP = ~1,000 years)	7% PE	
		0.2 sec SA ⁽²⁾	1.0 sec SA ⁽³⁾
Bedrock Contact Values Latitude 33.453273° Longitude -112.130778° (midpoint of project alignment) ⁽¹⁾	0.051	0.115	0.039
Site-adjusted Values ⁽⁴⁾	1.6	1.6	2.4
Notes: (1) Values are for a stiff soil profile with average SPT N-values equal to or greater than 15 and equal to or less than 50, based on Table 3.10.3.1-1 of AASHTO (2019). (RP) Return Period (2) Spectral acceleration at 0.2 second period (PGA) Peak Ground Acceleration (3) Spectral acceleration at 1.0 second period (PE) Probability of Exceedance (4) Site-adjusted values based on application of site coefficients for Site Class D.			

4.7. Earth Fissures and Land Subsidence

The project site is located in an area without documented earthen fissures and in an area without a measured land subsidence (Earth Fissure Map of the Luke Study Area: Maricopa County, Arizona by Arizona Geological Survey dated June 2019 and Total Land Subsidence in Western Metropolitan Phoenix, Maricopa County between April 28, 2022, and May 5, 2023, prepared by Arizona Department of Water Resources.

5. ENGINEERING ANALYSES AND RECOMMENDATIONS

5.1. Earthwork

The following sections present earthwork recommendations based on our understanding of the project, the finding of our field exploration, results of the laboratory test and engineering analysis. Material larger than six (6) inches in diameter should not be used in subgrade for pavements or concrete flatwork per MAG section 301.3.

5.2. Excavation

The field sampling and exploration was performed using a truck-mounted drill rig with 7 and ¼-inch outside diameter hollow stem augers. In addition, two seismic refraction line was performed along portions of the new storm drain alignment. We present the following general comments regarding ease of excavation with the understanding that they are opinions based on the test borings and seismic refraction lines. The project consultant and contractor should become familiar with this report including boring logs and the results of the attached seismic refraction survey to evaluate potential hard dig conditions. **Please note that excavation characteristics are best evaluated by performing test excavations with the size and type of equipment the contractor plans on using at the site, which was not conducted as part of this study.**

It is anticipated that shallow excavations less than 20-feet in the site soils can most likely be accomplished by conventional earth moving equipment in good operating condition. Seismic wave velocities are generally related to hardness/density and can be correlated to physical properties of the subsurface conditions, such as rippability or ease of excavation. The seismic velocities ranged from approximately 700 to 4,089 feet per second, which indicates slight to moderate qualitative excavatability/rippability. Cohesionless soils was encountered at a depth of 15-feet below existing grade. Cohesionless soils are prone to sloughing and caving, these should be considered during trench excavations. Please refer to Section 4 and the boring logs presented in **Appendix C** and results of the Seismic Refraction Study presented in **Appendix E** of this report for more information.

5.2.1. Trench Backfill

Trench backfill, pipe bedding material, and compaction shall be as per City of Phoenix Standard Detail “Trench Backfill & Surface Replacement” Detail Number P1200 (dated 07/01/2015) and 2015 CITY OF PHOENIX SUPPLEMENT TO THE 2015 EDITION MARICOPA

ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION “SECTION 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION” (dated December 10, 2020) and MAG UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION “SECTION 601 TRENCH EXCAVATION, BACKFILLING AND COMPACTION” (dated January, 2020).

5.2.2. Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Generally, Construction site safety is solely the responsibility of the Contractor, who shall also be responsible for the means, methods, and sequencing of construction operations. We are providing the information below strictly as a service to our client. **Under no circumstances should the information be interpreted that ATEK is assuming responsibility for construction site safety or the Contractor’s activities; such responsibility is not being implied and should not be inferred.**

Excavations and Slopes

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced; and, if not followed, could result in substantial penalties to the Owner, Contractor, and/or earthwork subcontractor and/or utility subcontractors.

Near-surface soils encountered during our field study consisted predominantly of silty clayey sands. In our opinion, these soils would be considered a Type C soil when applying OSHA regulations. For this soils type OSHA recommends a maximum slope

inclination of 1½(h):1(v) or flatter for excavations 20 feet or less in depth. Steeper cut slopes may be utilized for excavations less than five (5) feet deep depending on the strength, moisture content, and homogeneity of the soils as observed in the field. Flatter slopes and/or trench shields may be required if loose, cohesionless soils and/or water are encountered along the slope face.

Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within one-third the slope height from the top of any excavation. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation. Shoring, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Arizona.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water should be collected and disposed of outside the construction limits.

5.2.3. Pavement Site Preparation and Grading

Pavement replacement should be in accordance with Standard Detail P1200, "Trench Backfill & Surface Replacement" (dated 07/01/2015) of the 2015 CITY OF PHOENIX SUPPLEMENT TO THE 2015 MAG UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION.

5.2.4. Borrow Requirements

There is no designated source for borrow on this project. Borrow shall be as specified in MAG Section 210.

5.3. Design Values for Buried Pipes

The following sections provide design information relative to flexible and rigid pipes. The recommendations provided within the following sections are based on the pipe being installed by open cut excavations.

5.3.1. Soil Loads on Buried Flexible Pipes

The pipe loading pressure for flexible pipes such as PVC, HDPE, or welded steel may be determined by calculating the soil overburden pressure, adding the live load pressures and multiplying by the pressure transfer coefficient C_p . The coefficient C_p typically varies from 0.65 to 2.0 depending on the type and degree of compaction of the bedding and initial backfill materials. The value of C_p may be determined from the pipe manufacturers or may be conservatively estimated as $C_p = 2.0$. For aggregate base or clean washed sand bedding and initial backfill materials compacted as recommended in this report, a C_p value of 0.80 is recommended for design.

5.3.2. Design Values for Buried Flexible Pipes

Flexible pipes typically derive part of their resistance to ring deflection from the initial backfill and trench wall soils. Evaluation of ring deflection of buried pipes under soil and live loads may be determined using the Iowa Formula. The elastic modulus of the soils surrounding the pipe, or E' , may be evaluated by knowing the trench width, the pipe diameter, the elastic modulus of the initial backfill (E'_b), and the elastic modulus of the native trench wall soils (E'_n - also termed Constrained Modulus). Recommendations for pipe design using the Iowa Formula are presented in the following table.

The following table presents recommended E'_b values for use in the Iowa Formula for proposed initial backfill materials placed and compacted in accordance with our recommendations. value of E'_b is a lateral modulus of subgrade reaction for the

initial backfill material. For E'b values at depths between the intervals presented below, the E'b value between data points may be determined by linear interpolation.

The recommended E'b values presented in the following table apply to aggregate base or graded sand bedding and initial backfill material along the sides of the pipe at the recommended level of compaction. These values are applicable for pipe design where the initial backfill width is at least 2 times the pipe diameter (D) on each side of the pipe (trench width of 5D).

E'b Values for Design of Buried Flexible Pipes

Soil Type	Depth to Springline	Recommended E'b (psi)
Pipe Bedding and Initial Backfill (aggregate base or graded sand)	5	1000
	10	1500
	15	1600
<i>Notes: 1. The above design values are based on "Evaluation of the Modulus of Soil Reaction, E', and its Variation With Depth," by Hartley & Duncan, dated June 1982.</i> 2. Based on providing at least 2 pipe diameters of backfill on each side of pipes.		

Where the zone of backfill beside the pipe is less than 2D, the E'b values presented above may not be applicable and the constrained soil modulus E'n will affect flexible pipe design. The actual lateral soil modulus at the pipe depth will lie somewhere between E'b and E'n depending on the trench width.

Based on the field and laboratory data obtained along the pipeline alignments, we recommend an E'n value of 3,000 psi (AWWA M45, 1996) be used for design of flexible pipes. This value is applicable to the undisturbed native soils encountered at the site. For trench widths less than 5D, the design E' may be calculated by multiplying E'b by the Soil Support Combining Factors (Sc) presented in the following table, where Bd is the trench width at pipe springline and D is the diameter of the pipe.

$$\text{Design } E' = S_c(E'b)$$

**Sc Values For Design of Buried Flexible Pipes
 (Soil Support Combining Factor)**

E'n/E'b	Bd /D 1.5	Bd /D 2.0	Bd /D 2.5	Bd /D 3.0	Bd /D 4.0	Bd /D 5.0
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
≥5.0	2.00	1.60	1.40	1.25	1.10	1.00

Source: "AWWA M45," 1996.

5.3.3. Flexible Pipe Trench Width Recommendations

According to ASTM D 2321, "Standard Practice for Underground Installation of Thermoplastic Pipes for Sewers and other Gravity-Flow Applications", the minimum trench width for flexible pipes should be the greater of 16 inches greater than the pipe diameter or 1.25 times the pipe diameter plus 12 inches. For flexible pipes, the trench width should be kept to a minimum to reduce the soil loading on the pipes. Wider trenches will generally impart higher soil loads on buried flexible pipes. Where granular pipe zone backfill is used, the trench should be wide enough to accommodate compaction equipment and shoring along the sides of the pipe. Care should be taken during installation of the pipe zone backfill around the haunches of the pipe (i.e., from the bottom of the pipe to springline) such that voids are eliminated and the backfill material is firm and unyielding. Lateral restraint against ring deflection for the pipes will be provided by the stiffness of the pipe zone backfill material and/or the trench wall soils.

5.3.4. Flexible Pipe Construction Considerations

Flexible pipes require uniform support from bedding materials especially in haunch areas to prevent overloading. The pipeline designers should evaluate the proximity of adjacent pipelines, excavations, and their related effects on the proposed construction. If proper trench wall support cannot be provided in a portion of the pipe trench, we recommend consideration be given to the use of lean concrete or Controlled Low Strength Material (CLSM) initial backfill around the pipes.

5.3.5. Soil Loads on Buried Rigid Pipes

Soil loads on buried rigid pipes such as concrete or clay pipes can be analyzed using the Marston's Formula as follows:

$$W_c = C_d \gamma B_d^2$$

C_d = Load Coefficient based on $K\mu'$

γ = Moist unit weight of backfill material (pcf)

B_d = Width of trench at top of pipe (ft)

The coefficient C_d is dependent on the backfill type, which is dependent on the pipe manufacture's recommendation or local municipality requirements, the trench width, and pipe installation depth. Where the ratio of the backfill depth to trench width at the top of the pipe (H/B_d) is at least 1, and where trench width, at top of pipe, is no greater than 3 times the pipe diameter, the value of C_d may be determined using the following formula for load coefficient, C_d :

$$C_d = \frac{1 - e^{-2K\mu' (H / B_d)}}{2K\mu'}$$

K = Active earth pressure coefficient

μ' = Friction coefficient between fill material and sides of trench

H = Backfill height above the pipe crown

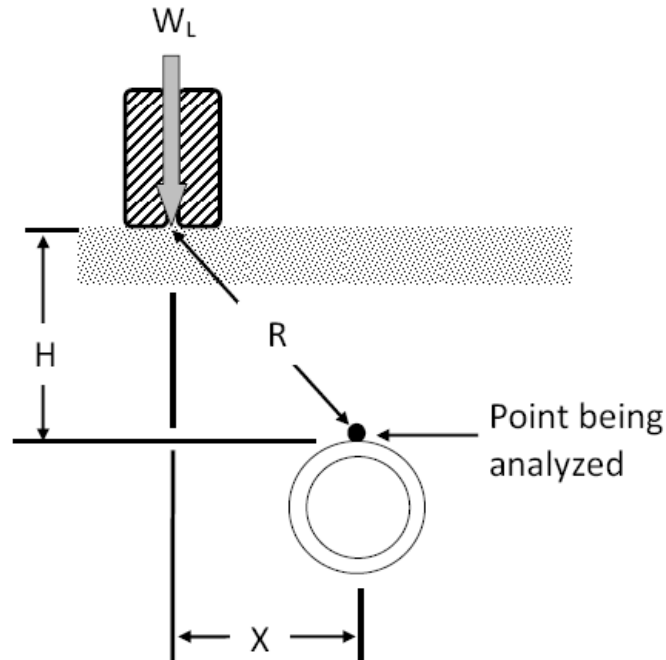
The product $K\mu'$ is the above referenced equation is dependent on the backfill type, degree of compaction, and moisture content. The following table provides estimates for the $K\mu'$ product based on various soil types.

Soil Type	$K\mu'$
Clay (CL,CH)	0.12
Silt (ML)	0.13
Silty Sand (SM)	0.15
Well and Poorly Graded 'Clean' Sands (SW, SP)	0.165
Sandy Gravels and Cobbles (GW, GP, GM, GC)	0.18
Source: ASCE (1982)	

Based on soils encountered during our field study, we recommend using a $K\mu'$ value of 0.13 for design and a wet soil unit weigh, γ , equal to 115 pcf for soil backfill material.

5.3.6. Live Loads on Buried Conduits

Live loads on buried conduits due to vehicular loads may be determined as presented below:



$$P_L = \frac{3I_f W_L H^3}{2\pi R^5}$$

Where:

- P_L = live load soil pressure from a concentrated surface load, psf
- I_f = impact factor, dimensionless (See Table below)
- W_L = live load, lbs
- H = height of fill above the top of the pipe, ft
- R = distance from the point of load application to top of pipe, ft

Height of Cover , H (ft)	Impact Factor, I_f
0 to 1 ft	1.3
1 ft, 1 in to 2 ft	1.2
2 ft, 1 in to 3 ft	1.1
Over 3 ft	1.0

Source: ASCE Manual No. 60 / WEF MOP No. FD-5, 2007

5.4. Moisture Protection

Soil support values reduce with an increase of moisture content. Therefore, positive drainage is essential to the successful performance of any structure. Good surface and subsurface drainage should be established during and after construction to prevent the soils below or adjacent to the structural areas and utility trenches from becoming wet.

Infiltration of water into utility or foundation excavations must be prevented during construction. The drainage design must route all storm and sprinkler water away from the structural areas in a positive manner. All water should be diverted away from areas where it could penetrate the ground surface near the structural areas. Watering of plants should be avoided adjacent to the buildings. Desert-type landscaping is advisable near the structural areas. Plants, which require more water, should be located and drained away from the structural areas.

5.5. Corrosion Potential

5.5.1. 10-point System

The 10-point soil evaluation includes the following soil tests: resistivity, pH, oxidation-reduction (redox) potential, sulfides, and moisture. For each of these tests, results are categorized according to their contribution to corrosivity. The test results are assigned point values based on Table A.1 found in Appendix A of the American National Standard for Polyethylene Encasement For Ductile-Iron Pipes Systems (ANSI/AWWA C105/A21.5-99), dated 1999. The above referenced corrosion testing is applicable to carbon steel pipe. A sum of points greater than or equal to 10, is considered corrosive to ductile iron pipes and carbon steel pipe and protection against exterior corrosion should be provided. The sum of points of the site soils sampled is 11 (greater than 10), hence, the site soils be considered corrosive to high carbon steel and protection against exterior corrosion should be provided. Corrosivity testing was performed on selected samples, and it is tabulated below.

Sample Location	pH	Resistivity (Ohm-cm)	Redox Potential (mV)	Free Sulfide
Bulk Sample B-5, 10.0' - 15.0'	8.8	900	215	Negative
Bulk Sample B-6, 5.0' - 10.0'	8.2	1,080	230	Negative
Average	8.5	990	223	Negative

5.5.1.1. Electrical Resistivity

Electrical Resistivity of a soil is a measure of resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. As a soil's resistivity decreases, its corrosivity increases.

A commonly accepted correlation between soil resistivity and corrosivity towards ferrous metals is shown in the following table.

<u>Resistivity (ohm-cm)</u>	<u>Corrosivity Classification</u>
0 to 1,000	Severely corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately corrosive
Over 10,000	Mildly corrosive

Resistivity test results indicate ten (10) points, and the pH test results indicates three (3) points in the 10-point soil evaluation for the reservoir location.

Based on the average laboratory tests as shown above, the soil should be considered "severely corrosive." It should be noted that these corrosion conditions are for the soils at submerged moisture conditions. Resistivity at drier moisture contents would be less corrosive than the results of the test.

The pH values of the samples tested were neutral. In most cases, pH is not a significant factor in corrosion in the near-neutral pH range (5<pH<9).

Estimated life for various gage galvanized CMP, based on Figure 6.7 of the Handbook of Steel Drainage & Highway Construction Products published by American Iron and Steel Institute Fourth Edition, 1993, is tabulated below. Details of the laboratory test results are presented in the **Appendix C** of this report.

Sample Location	Design Life (yrs)		
	16 Gage	14 Gage	12 Gage
Bulk Sample B-5	62	80	111
Bulk Sample B-6	67	87	120

5.5.1.2. Oxidation-Reduction (Redox) Potential

The redox potential of a soil is significant in assessing corrosion potential because the most common sulfate-reducing bacteria can live only in anaerobic conditions. A negative redox potential indicates that anaerobic conditions present in which sulfate reducers can live. The average redox potential of site soils is 223 mV and results in zero points in the 10-point soil evaluation.

5.5.1.3. Sulfides

A positive sulfides reaction reveals a potential problem caused by sulfate reducing bacteria. A negative sulfides reaction was observed from the soil sample analyzed and results in zero points in the 10-point soil evaluation.

5.5.1.4. Moisture

The prevailing moisture condition of the soil is important to all soil corrosion. The specific moisture content of the soil is not necessary but rather the drainage characteristics and moisture condition. A conservative classification of the site soils is fair drainage and generally moist which results in one (1) point in the 10-point soil evaluation.

5.5.2. Concrete Corrosion

Selected samples of the near-surface soils encountered at the site were subjected to chemical analysis for the purpose of corrosion assessment. The samples were tested for soluble sulfates, and soluble chlorides. The samples were tested in general accordance with Arizona Test Methods 733, and 736 for soluble sulfates, and soluble chlorides, respectively. The test results are provided in **Appendix C**.

Based on provisions of American Concrete Institute (ACI) 318 Section 4.3, Table 4.3.1, Requirements for Concrete Exposed to Sulfate-Containing Solutions a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. Based on the laboratory results, sulfate contents of the site soils tested indicate a negligible corrosion potential to concrete.

Based on the laboratory result of the sample collected for this project, chloride contents of the site soils tested indicate negligible corrosion potential.

5.6. Pavement Areas

Pavement replacement should be in accordance to the City of Phoenix Supplemental Standard Detail “Trench Backfill & Surface Replacement” Detail Number P1200 (dated 07/01/2015) and 2015 CITY OF PHOENIX SUPPLEMENT TO THE 2015 EDITION MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION “SECTION 336 PAVEMENT MATCHING AND SURFACING REPLACEMENT” (dated December 10, 2020).

6. CLOSURE

6.1. Limitations

Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar localities. No warranty is expressed or implied.

The recommendations contained in this report are based on our field exploration, laboratory test results, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the test borings excavated during the field subsurface exploration. It is anticipated that some variations in the soil conditions will exist on-site. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

It is the Client's responsibility to see that all parties to the project including the designer, contractor, subcontractor, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

This report is for the exclusive purpose of providing Geotechnical Engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed the site geology and the possible presence of geologic hazards.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off-site), or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify ATEK of such intended use. Based on the intended use of this report, ATEK may require that additional work be performed and that an updated report be issued.

6.2. Recommended Additional Services

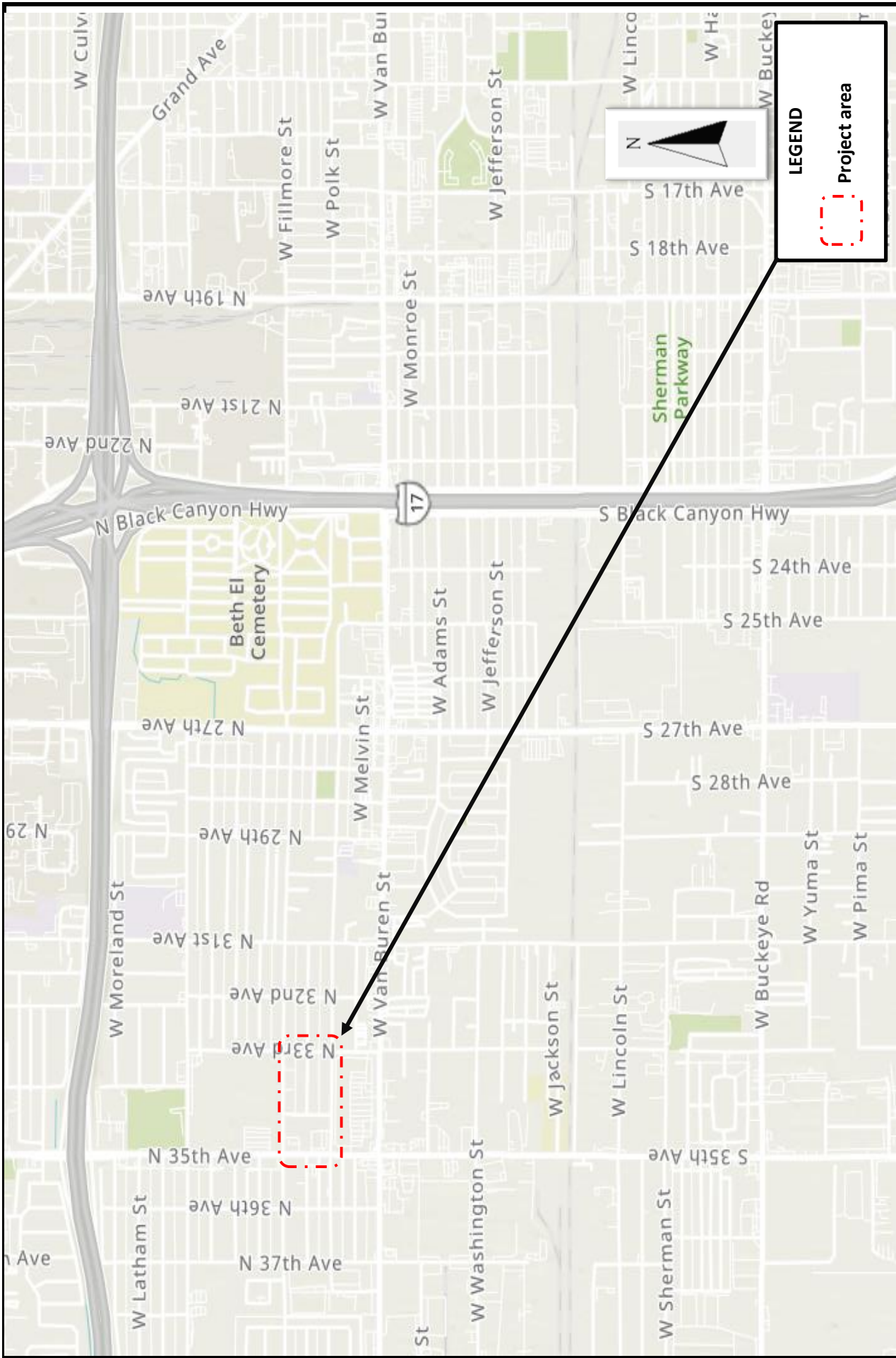
The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be performed during the construction. These tests and observations should be performed by the Geotechnical Engineer's representative and should include, but not limited to the following:

- Observe and document that any existing surficial vegetation and other deleterious materials have been removed from the site as required in site preparation section.
- Approve any material used as import to document that it meets the requirements outlined above before placement.
- Monitor the backfill procedures.
- Perform field density tests, as needed, to verify compaction compliance. The representative should monitor the progress of compaction and filling operations.
- Keep records of on-site activities and progress.

Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Construction testing, including field and laboratory evaluation of fill and backfill

materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

APPENDIX A
Site Location Map



Legend

Project area

111 South Weber Drive, Suite 1
Chandler, AZ 85226

Site Location Map - Sheet 1 of 1

ARPA LDS Geotechnical Services
Phoenix, Arizona

Project #:	230190
Date:	2/8/2024
Drawn by:	M Mendoza

ST83140116 Taylor St and 33rd Ave

Basemap provided by ArcGIS

APPENDIX B
Sample Location Plan



LEGEND

 Boring Location

 Seismic Line

atek
ENGINEERING CONSULTANTS
111 South Weber Drive, Suite 1
Chandler, AZ 85226

Boring Location Plan - Sheet 2 of 3	
Project #:	230190
Date:	2/8/2024
Drawn by:	M Mendoza
ARPA LDS Geotechnical Services Phoenix, Arizona	

ST83140116 Taylor St and 33rd Ave

Basemap provided by Google Earth

APPENDIX C
FIELD STUDY AND BORING LOGS

APPENDIX C FIELD STUDY

BORINGS

The subsurface conditions at the site were explored on January 25, 2024, by drilling soil borings using a truck mounted CME drill rig with 7 and a ¼-inch outside diameter hollow stem auger. The locations of soil test borings performed for this study are shown in **Appendix B** of this report.

The locations of borings were located by visual sighting and pacing from existing site features and, therefore, should be considered approximate. Actual boring locations may vary from those indicated in **Appendix B**.

Our field engineer maintained a log of the excavations; visually classified soils encountered according to the Unified Soil Classification System (USCS) (see USCS Table); and obtained samples of the subsurface materials.

SAMPLING PROCEDURES

Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance, and returned to our laboratory for further testing. After borings were completed, they were backfilled with the excavated soils.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Unified Soil Classification System - C1
Log Key - C2
Charts and Definitions - C3
Terminology Used to Describe Soils - C4
Logs of Soil Borings

UNIFIED SOIL CLASSIFICATION SYSTEM

	MAJOR DIVISIONS	USCS SYMBOL	TYPICAL DESCRIPTIONS				
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LESS THAN 5% PASSING NO. 200 SIEVE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;">GW</td> <td>WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES</td> </tr> <tr> <td style="text-align: center;">GP</td> <td>POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES</td> </tr> </table>	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES				
		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES				
		GRAVELS WITH OVER 12% PASSING NO. 200 SIEVE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;">GM</td> <td>SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES</td> </tr> <tr> <td style="text-align: center;">GC</td> <td>CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES</td> </tr> </table>	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES					
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES					
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LESS THAN 5% PASSING NO. 200 SIEVE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;">SW</td> <td>WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES</td> </tr> <tr> <td style="text-align: center;">SP</td> <td>POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES</td> </tr> </table>	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES	SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES				
SP		POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES					
SANDS WITH OVER 12% PASSING NO. 200 SIEVE		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;">SM</td> <td>SILTY SANDS, SAND-GRAVEL-SILT MIXTURES</td> </tr> <tr> <td style="text-align: center;">SC</td> <td>CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES</td> </tr> </table>	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES	SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES	
SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES						
SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES						
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)	ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY				
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS				
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY				
	SILTS AND CLAYS (Liquid limit greater than 50)	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT				
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS				
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY				

Note: Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing No. 200 sieve require dual USCS symbols. (See KEY A-3 if provided)



UNIFIED SOIL CLASSIFICATION SYSTEM

ARPA LDS Geotechnical Services
 City of Phoenix Streets Transportation Department
 Phoenix, Arizona












KEY

C-1

Drafted By: M Mendoza
 Date: February, 2024


Project Number:
 230190

LOG SYMBOLS

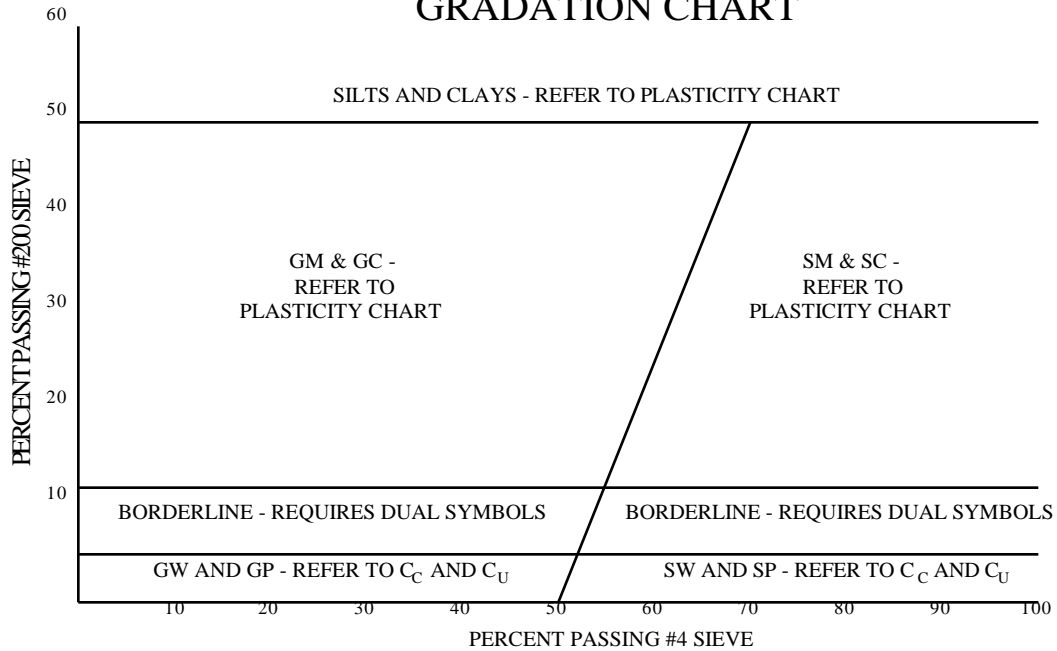
 <p>BULK / GRAB SAMPLE</p>	 <p>NON-STANDARD PENETRATION SPLIT SPOON SAMPLER (1.5-inch O.D. X 0.9-inch I.D.)</p>
 <p>MODIFIED CALIFORNIA SAMPLER (2 inch inside diameter)</p>	 <p>BDBGM SIZE CORE BARREL (1.65-inch I.D.)</p>
 <p>GRAB SAMPLE</p>	 <p>BW44 SIZE CORE BARREL (1.75-inch I.D.)</p>
 <p>STANDARD PENETRATION SPLIT SPOON SAMPLER (2.0-inch O.D. X 1.4-inch I.D.)</p>	 <p>HQ-3 SIZE CORE BARREL (2.4-inch I.D.)</p>
 <p>SHELBY TUBE (3 inch outside diameter)</p>	
 <p>WATER LEVEL (level after completion)</p>	
 <p>WATER LEVEL (level where first encountered)</p>	

GENERAL NOTES

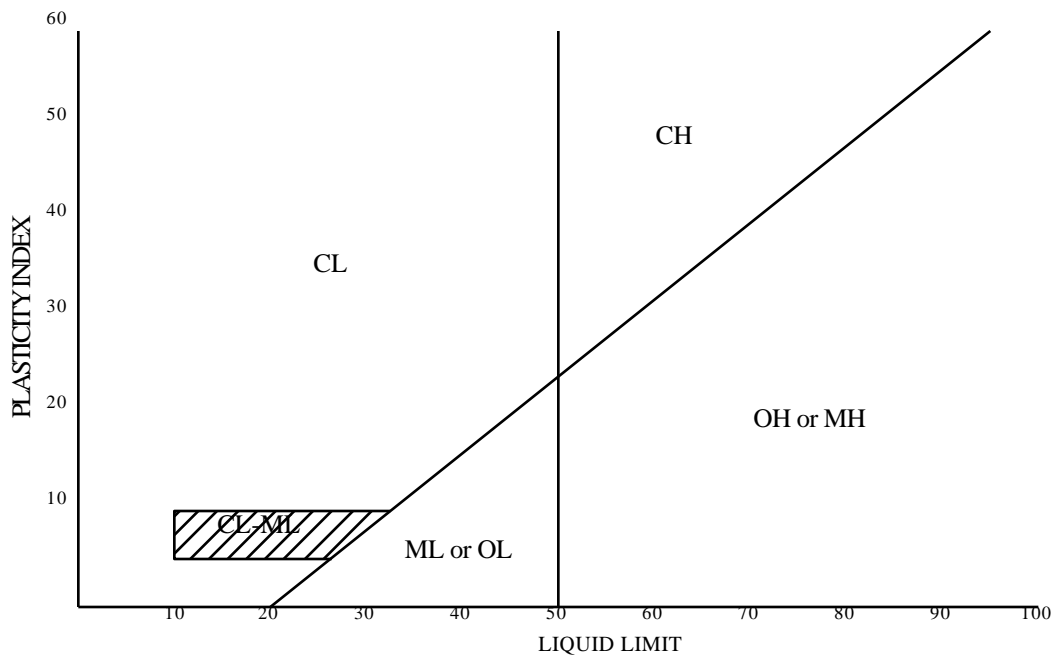
1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
3. Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
4. In general, the Unified Soil Classification designations presented on the logs were based on visual classification in the field, modified where appropriate by visual classifications in the office, and/or laboratory gradation and index testing.
5. NA = Not Analyzed

		LOG KEY ARPA LDS Geotechnical Services City of Phoenix Streets Transportation Department Phoenix, Arizona	KEY C-2
Drafted By: M Mendoza	Project Number: 230190		
Date: February, 2024			

GRADATION CHART



PLASTICITY CHART



DEFINITIONS OF SOIL FRACTIONS

SOIL FRACTION	PARTICLE SIZE RANGE
Boulders	Greater than 300mm (12in.)
Cobbles	300mm to 75mm (12in. to 3in.)
Coarse Gravel	75mm to 19mm (3in. to 3/4in.)
Fine Gravel	19mm (3/4in.) to No. 4 sieve
Coarse Sand	No. 4 sieve to No. 10 sieve
Medium Sand	No. 10 sieve to No. 40 sieve
Fine Sand	No. 40 sieve to No. 200 sieve
Fines	less than No. 200 sieve



CHARTS & DEFINITIONS

ARPA LDS Geotechnical Services
City of Phoenix Streets Transportation Department
Phoenix, Arizona

KEY

C-3

Drafted By: M Mendoza

Project Number:

Date: February, 2024

230190

**TERMINOLOGY USED ON THE BORING LOGS TO DESCRIBE
THE FIRMNESS, DENSITY, OR CONSISTENCY OF SOILS**

The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1 3/8" I.D. samplers.

1. Terms for description of partially saturated and/or cemented soils including clays, cemented granular materials, silts and silty and clayey granular soils.

N	Relative Firmness
0 - 4	Very soft
5 - 8	soft
9 - 15	Moderately firm
16 - 30	Firm
31 - 50	Very firm
51+	Hard

2. Terms for description of cohesionless, uncemented sands and sand-gravel mixtures.

N	Relative Density
0 - 4	Very loose
5 - 10	Loose
11 - 30	Medium dense
31 - 50	Dense
51+	Very dense

3. Terms for description of clays which are saturated or near saturation.

N	Relative Consistency
0 - 2	Very soft
3 - 4	soft
5 - 8	Moderately stiff
9 - 15	Stiff
16 - 30	Very Stiff
31+	Hard



TERMINOLOGY USED TO DESCRIBE SOILS

ARPA LDS Geotechnical Services
City of Phoenix Streets Transportation Department
Phoenix, Arizona

KEY

C-4

Drafted By: M Mendoza

Project Number:

Date: February, 2024

230190

Project Name: ARPA LDS Geotechnical Services			Client: COP Streets Transportation Department		
Borehole Location: See Location Plan				Sheet <u>1</u> of <u>1</u>	
Borehole Number: B-4			Driller: Southlands		Logger: Marilyn Mendoza
Drilling Equipment: CME-55		Borehole Diameter (in.): 7.25 HSA		Date Started: 01/25/2024	Date Finished: 01/25/2024

Elevation (ft)								Notes:				
DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
0.6								AC		Asphaltic Concrete (Approx. thickness 7.0-inches)		
1.6						37	18	ABC		Aggregate Base Course (Approx. thickness 12.0-inches)		
1.6			5-14					CL		GRAVELLY LEAN CLAY WITH SAND (CL), 26% fine graded gravel, 7% coarse to fine grained sand, 67% fines, firm, medium plasticity, dark brown, moist, no cementation, no reaction to HCl		
4-5			4-5							Moderately firm		
10			15-22	17.4	106.6					Very firm, weak reaction to HCl		
15			4-5-8					SM		SILTY SAND (SM), medium dense, nonplastic, dark brown, moist, no cementation, weak reaction to HCl		
20			8-18-25					CL		SANDY LEAN CLAY (CL), very firm, low plasticity, dark brown, slightly moist, no cementation, no reaction to HCl		

Bottom of auger @ 20.0 feet bgs
 Bottom of sampler @ 21.5 feet bgs.
 No groundwater encountered.

230190 SITE 1 - COPY.GPJ 3-18-24 G Lopez ATEK BORING (W/REMARKS-SH#-SAME FIG#)

Sampler Types: Split Spoon Shelby Bulk Sample Grab Sample Penetrometer Vane Shear California	Operation Types: Hand Auger ODEX Auger Hollow Stem Bullnose Core Barrel Excavated Pit	WATER LEVEL OBSERVATIONS			
		While Drilling ∇ N/A ft Upon Completion of Drilling ∇ N/A ft		Time After Drilling N/A N/A Depth To Water (ft) N/A N/A	
Remarks: Not Encountered					

ATEK Project Number: 230190		LOG OF EXPLORATORY BORING B-4	Fig. 4
---------------------------------------	--	--------------------------------------	--------

Project Name: ARPA LDS Geotechnical Services Client: COP Streets Transportation Department

Borehole Location: See Location Plan Sheet 1 of 1

Borehole Number: B-5 Driller: Southlands Logger: Marilyn Mendoza

Drilling Equipment: CME-55 Borehole Diameter (in.): 7.25 HSA Date Started: 01/25/2024 Date Finished: 01/25/2024

Elevation (ft)										Notes:		
DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
			SPT			LL	PI	-200 (%)				
0.4									AC	Asphaltic Concrete (Approx. thickness 5.0-inches)	0.4	
1.3									ABC	Aggregate Base Course (Approx. thickness 10.5-inches)	1.3	
			6-9	12.3		29	13	54	CL	GRAVELLY LEAN CLAY WITH SAND (CL), 27% fine graded gravel, 19% coarse to fine grained sand, 54% fines, moderately firm, low plasticity, dark brown, slightly moist, no cementation, weak reaction to HCl		Swell Potential of Soil=6.0%
			6-12	14.8	93.9					Firm		
			8-15-17	12.8					SC	CLAYEY SAND (SC), very firm, low plasticity, dark brown, slightly moist, no cementation, moderate reaction to HCl		
			8-14-15						CL	LEAN CLAY WITH SAND (CL), firm, low to medium plasticity, brown, slightly moist, no cementation, no reaction to HCl		
			13-26-50/1"							Hard, dark brown	21.1	

Bottom of auger @ 20.0 feet bgs
 Bottom of sampler @ 21.1 feet bgs.
 No groundwater encountered.

Sampler Types:		Split Spoon		Penetrometer
		Shelby		Vane Shear
		Bulk Sample		California
		Grab Sample		

Operation Types:		Auger Hollow Stem
		Bullnose
		Core Barrel
		Excavated Pit

WATER LEVEL OBSERVATIONS				
While Drilling	∇	N/A	ft	Upon Completion of Drilling
Time After Drilling		N/A		∇ N/A ft
Depth To Water (ft)		N/A		N/A
Remarks: Not Encountered				

230190 SITE 1 - COPY.GPJ 3-18-24 G Lopez ATEK BORING (W/REMARKS-SH#-SAME FIG#)

Revised 10-14-11 (MAT)

Project Name: ARPA LDS Geotechnical Services			Client: COP Streets Transportation Department		
Borehole Location: See Location Plan				Sheet <u>1</u> of <u>1</u>	
Borehole Number: B-6			Driller: Southlands		Logger: Marilyn Mendoza
Drilling Equipment: CME-55		Borehole Diameter (in.): 7.25 HSA		Date Started: 01/25/2024	Date Finished: 01/25/2024

Elevation (ft)								Notes:				
DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
0.33								AC	Asphaltic Concrete (Approx. thickness 4.0-inches)	0.33		
1.33								ABC	Aggregate Base Course (Approx. thickness 8.0-inches)	1.33		
5			5-7	18.2	89.9			CL	SANDY LEAN CLAY (CL), moderately firm, medium plasticity, dark brown, moist, no cementation, weak reaction to HCl			
6-8			6-8	16.9		33	18	76	1% fine graded gravel, 23% coarse to fine grained sand, 76% fines, slightly moist			
10			7-12-17					CL	LEAN CLAY WITH SAND (CL), firm, medium plasticity, dark brown, slightly moist, weak cementation, strong reaction to HCl	10		
15			6-7-9					CL	SANDY LEAN CLAY (CL), firm, low plasticity, brown, slightly moist, no cementation, weak reaction to HCl	15		
20			24-50/2"					SC	CLAYEY SAND (SC), hard, low plasticity, brown, slightly moist, no cementation, moderate reaction to HCl	20.7		

Bottom of auger @ 20.0 feet bgs
 Bottom of sampler @ 20.7 feet bgs.
 No groundwater encountered.

230190 SITE 1 - COPY.GPJ 3-18-24 G Lopez ATEK BORING (W/REMARKS-SH#-SAME FIG#)

Sampler Types: Split Spoon Shelby Bulk Sample Grab Sample Penetrometer Vane Shear California	Operation Types: Hand Auger ODEX Auger Hollow Stem Bullnose Core Barrel Excavated Pit	WATER LEVEL OBSERVATIONS			
		While Drilling ∇ N/A ft Upon Completion of Drilling ∇ N/A ft Time After Drilling N/A N/A N/A N/A Depth To Water (ft) N/A N/A N/A N/A		Remarks: Not Encountered	

Revised 10-14-11 (MAT)

APPENDIX D
Laboratory Test

APPENDIX D LABORATORY TESTING

LABORATORY TESTS

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils, which may affect the Geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below.

Sieve Analysis

Sieve analyses were performed to evaluate the gradation characteristics of the material and to aid in soil classification. Tests were performed in general accordance with ASTM Test Method C 136 and D 2487.

Atterberg Limits

Atterberg Limits tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Tests were performed in general accordance with ASTM Test Method D 4318.

Moisture Content

Moisture content tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading. Moisture content was evaluated in general accordance with ASTM Test Method D 2216.

Undisturbed Ring Density

Undisturbed ring density tests were performed on ring samples to evaluate the in-situ density and moisture content of the site soils. Test procedures were in general accordance with ASTM Test Method D 2937.

pH and Resistivity

pH and resistivity tests were performed on the bulk soil sample to evaluate the site soil corrosion potential. Test procedure was in general accordance with Arizona Test Method 236.

Standard Proctor

Standard Proctor tests were performed on bulk soil samples to evaluate the maximum dry density and optimum moisture of the site soils. Test procedures were in general accordance with ASTM Test Method D 698A.

Swell Test

Swell test was performed on bulk soil samples to evaluate the expansion potential of the site soils. Test procedures were in general accordance with ASTM Test Method D 4829.

Sulfate Content

Sulfate content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 733.

Chloride Content

Chloride content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 736.



PROJECT: ARPA LDS Geotechnical Services
LOCATION: Phoenix, AZ
SAMPLE DATE: 1/25/2024

PROJECT: 230190
WORK ORDER: 2400021
REVIEWED BY: A Lopez

MOISTURE CONTENT OF SOIL -- ASTM D 2216

LAB #	SAMPLE SOURCE	MOISTURE		
		WET WEIGHT (g)	DRY WEIGHT (g)	MOISTURE CONTENT
9	Bulk, B-5 @ 10.0'-15.0'	498.1	441.7	12.8%
8	Bulk, B-5 @ 1.0'-5.0'	488.6	435.0	12.3%
15	Bulk, B-6 @ 5.0'-10.0'	390.9	334.5	16.9%



PROJECT: ARPA LDS Geotechnical Services
 LOCATION: Phoenix, AZ
 DATE SAMPLED: 1/25/2024

PROJECT NO: 230190
 WORK ORDER NO: 2400021
 REVIEWED BY: A Lopez

MECHANICAL SIEVE ANALYSIS
 GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

Location & Depth	COBBLES				GRAVEL						SAND						Silt or Clay		
	6"	4"	3"	2"	Coarse			Fine			Coarse		Medium		Fine		#100	#200	Lab #
					1 1/2"	1"	3/4"	1/2"	3/8"	1/4"	#4	#8	#10	#16	#30	#40			

PERCENT PASSING BY WEIGHT

Bulk B-4 @ 1.0'-5.0'	37	19	18	100	100	100	100	100	96	87	83	78	74	72	72	71	71	70	70	67	1
Bulk, B-6 @ 5.0'-10.0'	33	15	18	100	100	100	100	100	100	100	100	100	99	98	98	96	95	93	85	76	15

This is a summarized report of the referenced procedures and does not include all reporting requirements. Additional data can be provided at client's request.

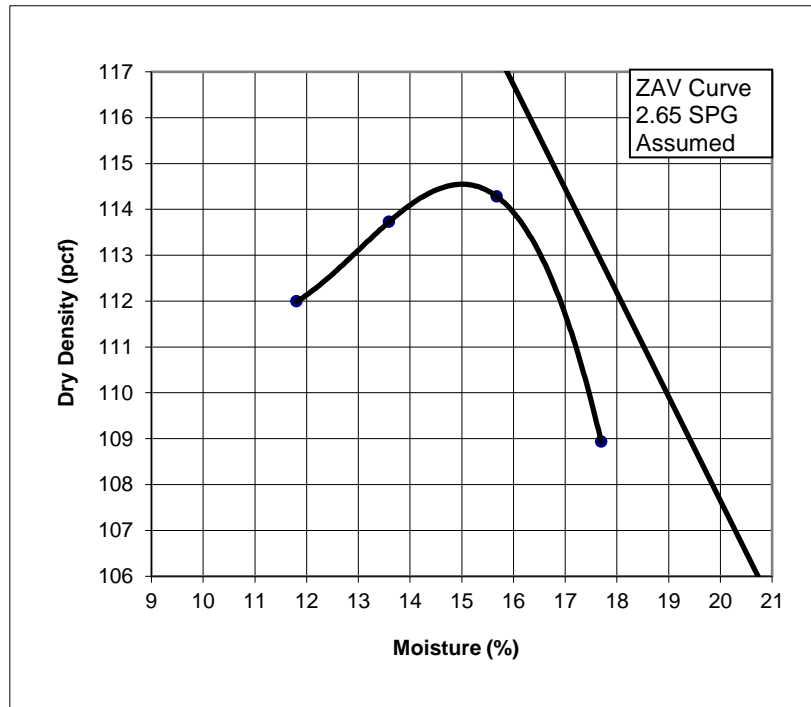
PROJECT: AROA LDS Geotechnical Services
LOCATION: Phoenix, AZ
MATERIAL: Native
SAMPLE SOURCE: Bulk, B-5 @ 1.0'-5.0'

PROJECT NO: 230190
WORK ORDER NO: 2400021
LAB NO: 8
SAMPLE DATE: 1/25/2024

**LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING
 STANDARD EFFORT (12,400ft-lb-ft/cu.ft) (ASTM D698A)
 SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)
 LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ASTM D4318) (DRY PREP)**

Maximum dry density:
 Optimum moisture (%):

English (pcf)	Metric (kg / cu.m.)	Rock Correction
114.5	1835	123.8
15.0	15.0	11.2



SIEVE SIZE	PERCENT PASSING
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	100
1 1/4 in / 32 mm	100
1 in / 25 mm	99
3/4 in / 19 mm	97
1/2 in / 12.5 mm	91
3/8 in / 9.5 mm	85
1/4 in / 6.4 mm	77
#4, 4.75mm	73
#8, 2.36mm	69
#10, 2.00mm	68
#16, 1.18mm	66
#30, 0.60mm	63
#40, .425mm	61
#50, .300mm	60
#100, .150mm	57
#200, .075mm	54

LL: 29
 PL: 16
 PI: 13

USCS: CL
 AASHTO: A-6(4)

NOTES:

AASHTO Description: Clayey soils

- The zero air void curve represents a specific gravity of: 2.65 assumed, (also used in the 'Rock Correction Calculation)
- This is a summarized report of the referenced procedures and does not include all reporting requirements. Additional data can be provided at clients request.
- The "Rock Correction" is based on the sieve performed for this sample

Reviewed by: A Lopez



Project: ARPA LDS Geotechnical Services
Location: Phoenix, AZ
Client: COP Streets Transportation Services
Material: Native
Sample Source: See Below

Project Number: 230190
Work Order Number: 2400021
Lab Number: See Below
Date Sampled: 01/25/24

Swell Potential of Soil ASTM D4546

Sample Number	Sample Source	Swell (%)	Target Compaction (%)	Actual Compaction (%)	Target Moisture (%)	Actual Moisture (%)
8	Bulk, B-5 @ 1.0'-5.0'	6.0	95.0	95.6	11.9	11.8

Note: Ring Samples were subjected to a 144 psf surcharge.



PROJECT: ARPA LDS Geotechnical Services
LOCATION: Phoenix, AZ
SAMPLE DATE: 1/25/2024

PROJECT: 230190
WORK ORDER: 2400021
REVIEWED BY: A Lopez

DENSITY OF SOIL IN PLACE BY THE DRIVE-CYLINDER METHOD -- ASTM D 2937

LAB #	SAMPLE SOURCE	MOISTURE			# OF RINGS	WET WEIGHT + RINGS (g)	WEIGHT OF RINGS (g)	DRY DENSITY (pcf)
		WET WEIGHT (g)	DRY WEIGHT (g)	MOISTURE CONTENT				
5	Ring, B-4 @ 10.0'-11.0'	907.3	772.5	17.4%	6	1171.3	264.0	106.6
10	Ring, B-5 @ 2.5'-3.5'	781.0	680.5	14.8%	6	1046.5	265.5	93.9
16	Ring, B-6 @ 2.5'-3.5'	641.5	542.6	18.2%	5	869.0	227.5	89.9

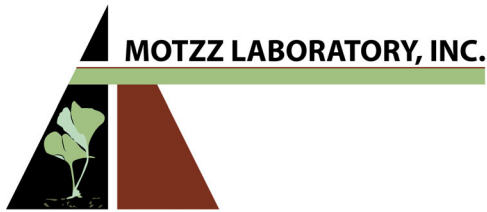


Project: ARPA LDS Geotechnical Services
Location: Phoenix, AZ
Client: COP Street Transportation Department
Material: See Below
Sample Source: See Below

Project Number: 230190
Work Order Number: 2400021
Lab Number: See Below
Date Sampled: 01/25/24

pH & Resistivity (AZ 236)

Sample Number	Sample Source	Resistivity (Ohm-cm)	pH
2	Bulk, B-5 @ 15.0'-10.0'	900	8.8
15	Bulk, B-6 @ 5.0'-10.0'	1,080	8.2



Report: 949546
 Reported: 2/10/2024
 Received: 2/1/2024
 PO: 2400021

Laboratory Analysis Report

Atek Engineering Consultants
 Antonio Lopez
 111 South Weber Dr Suite 1
 Chandler, AZ 85226

Project: 230190

Lab Number	Sample ID
949546-1	9) Bulk, B-5 (10.0-15.0')

Test Parameter

<i>Test</i>	<i>Method</i>	<i>Result</i>	<i>Units</i>
Free Sulfide	Sodium Azide	Negative	
Redox Potential	ASTM G200-09	215	(Eo) mV

Lab Number	Sample ID
949546-2	8) Bulk, B-5 (1.0-5.0')

Test Parameter

<i>Test</i>	<i>Method</i>	<i>Result</i>	<i>Units</i>
Sulfate	ARIZ 733b	9	ppm
Chloride	ARIZ 736b	24	ppm

Lab Number	Sample ID
949546-3	15) Bulk, B-6 (5.0-10.0')

Test Parameter

<i>Test</i>	<i>Method</i>	<i>Result</i>	<i>Units</i>
Free Sulfide	Sodium Azide	Negative	
Redox Potential	ASTM G200-09	230	(Eo) mV

APPENDIX E
Geological Consultants Seismic Refraction Survey

Report Prepared for:

ATEK Engineering Consultants
111 South Weber Drive, Suite 1
Chandler, AZ 85226

Prepared for: Mr. Antonio Lopez, P.E.
Project Manager

ATEK Project No. 230190
City of Phoenix Project No. ST83140131

Report Prepared by:

Geological Consultants Inc.
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Phoenix, Arizona 85021

Prepared by:



Nicole Marin
Associate Geoscientist

Reviewed by:



Kenneth M. Euge, R.G.
Principal Geologist



SEISMIC REFRACTION SURVEY

**ARPA LDS GEOTECHNICAL SERVICES
STORM DRAIN PROJECTS: SOUTH 16TH PLACE & EAST MADISON STREET;
NORTH 8TH STREET AND EAST MEADOWBROOK AVENUE;
WEST POLK STREET & NORTH 33RD AVENUE
CITY OF PHOENIX, ARIZONA**

GCI Project No. 2023-132

March 22, 2024

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	CONCLUSIONS AND RECOMMENDATIONS	3
2.1	132A-01 Results	3
2.1.1	132A-01 Site Geology	3
2.1.2	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132A-01	3
2.2	132B-02 Results	5
2.2.1	132B-02 Site Geology	5
2.2.2	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132B-02	5
2.3	132C-03 & 132C-04 Results	7
2.3.1	132C-03 & 132C-04 Site Geology	7
2.3.2	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132C-03	7
2.3.3	Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132C-04	8
2.4	Qualitative Rippability / Excavateability	10
2.5	Excavation Constraints	10
2.6	Safety	12
3.0	GEOPHYSICAL SITE INVESTIGATION	13
3.1	Site Specific Seismic Survey	13
3.2	Equipment	13
3.3	Results	14
4.0	GENERAL LIMITATIONS	15
5.0	BIBLIOGRAPHY	16

TABLES

Table Number	Title	
1	Seismic Survey Line Calculated Depth/Velocity Ranges– 132A-01	4
2	Seismic Survey Line Calculated Depth/Velocity Ranges– 132B-02	6
3	Seismic Survey Line Calculated Depth/Velocity Ranges– 132C-03 & 132C-04 .	9
4	Qualitative Excavateability Relative to Soil/Bedrock Type & P-Wave Velocity 11	

FIGURES

Figure Number	Title
1	General Location Map
2	132A-01 Seismic Survey Location Map
3	Seismic Line Photographs– 132A-01
4	Seismic Refraction Survey 132A-01 Velocity Cross-Section & Time-Distance Plot
5	132B-02 Seismic Survey Location Map
6	Seismic Line Photographs– 132B-02
7	Seismic Refraction Survey 132B-02 Velocity Cross-Section & Time-Distance Plot
8	132C-03 & 132C-04 Seismic Survey Location Map
9	Seismic Line Photographs– 132C-03
10	Seismic Refraction Survey 132C-03 Velocity Cross-Section & Time-Distance Plot
11	Seismic Line Photographs– 132C-04
12	Seismic Refraction Survey 132C-04 Velocity Cross-Section & Time-Distance Plot

APPENDICES

APPENDIX A - SEISMIC REFRACTION SURVEY

A.1	GENERAL	A-1
A.2	SEISMIC REFRACTION SURVEY LIMITATION	A-2
A.3	DATA COLLECTION	A-2
A.4	REFRACTION DATA PROCESSING	A-2

APPENDIX B - EXCAVATEABILITY AND RIPPABILITY CHARTS

Table B-1	Rock Hardness and Excavation Characteristics
Table B-2	Typical Excavatability Performance in Cemented Soils
Table B-3	Excavateability of Materials, Caterpillar Rippability Charts

(ii)



SEISMIC REFRACTION SURVEY

ARPA LDS GEOTECHNICAL SERVICES STORM DRAIN PROJECTS: SOUTH 16TH PLACE & EAST MADISON STREET; NORTH 8TH STREET AND EAST MEADOWBROOK AVENUE; WEST POLK STREET & NORTH 33RD AVENUE CITY OF PHOENIX, ARIZONA

1.0 INTRODUCTION

This report presents the results of a seismic refraction geophysical field investigation and analysis to assess general subsurface conditions for the proposed storm drain projects for the City of Phoenix (Figure 1). Four seismic refraction survey lines were laid out at select sites including:

- 132A-01 located parallel to and east of South 16th Place, south of East Madison Street (Figure 2),
- 132B-02 located parallel to and west of North 8th Street, south of East Meadowbrook Avenue (Figure 5),
- 132C-03 located south of and adjacent to West Polk Street between North 34th Drive and North 33rd Avenue, and 132C-04 located parallel to and east of North 33rd Avenue, south of West Taylor Street (Figure 8).

The specific seismic survey line locations were selected following discussions with Mr. Antonio Lopez, Project Manager with ATEK Arizona, and a reconnaissance of the project site conducted by Mr. Kenneth M. Euge, Sr., R.G. of Geological Consultants Inc. prior to running the seismic survey lines. This report is provided to supplement the geotechnical investigation being conducted by ATEK.

Seismic survey line data are used to develop reasonable interpretations of subsurface conditions within specified areas of the project site. The objectives of the seismic refraction geophysical surveys are to provide, by indirect means, a higher level of confidence to indirectly evaluate subsurface soil conditions and, if present, soil cemented with caliche to a rocklike consistency that may underlie the proposed storm drain alignments at the subject sites.

The general requirements for this project were defined by Mr. Lopez. Field work for the seismic refraction survey lines was completed on February 15 and 16, 2024.

The Scope of Work performed to accomplish the objectives of this study included:

- Mobilization and demobilization of personnel and equipment to and from the job site.
- Completion of four shallow seismic refraction survey lines and preliminary field analysis of survey results. Figures 2, 5, and 8 depict the locations of the seismic refraction survey lines.
- A rough position survey using a hand-held GPS receiver to locate the seismic lines relative to the site topography and cultural features observed at the site.
- Computer analysis of field data and interpretation of results to complete the assessment of the materials present, their relative quality and their excavateability.
- Preparation of this report to document the seismic refraction survey, and our findings, interpretations, conclusions, and recommendations.

The results of the seismic refraction survey may also be used to qualitatively assess the relative ease of excavation of the site soils and bedrock-like material and to estimate the strength of the material encountered along the seismic survey lines. The effective penetration depth along the seismic refraction survey lines is estimated to be at least 30 feet below the ground surface. Velocity, thickness, and depth computations of different horizons, or zones, are provided to generally characterize site materials within the depth of interest expected at the project site. No direct subsurface explorations, such as test pits, were made by Geological Consultants Inc. as part of this seismic refraction survey. However boring logs were provided by ATEK at locations near the seismic refraction survey lines.

2.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the cursory site reconnaissance, the seismic survey, and the data interpretations, the following conclusions and recommendations are provided:

2.1 132A-01 Results

2.1.1 132A-01 Site Geology

Seismic survey line 132A-01 is within Holocene low terrace and alluvial fan deposits (Qy) consisting of poorly sorted silt, sand, pebbles, cobbles and boulders with weak soil development (Reynolds, 1993). However, the upper fifteen feet are likely predominantly clayey sands and clay as indicated by the adjacent ATEK boring B-2 drilled 35 feet west of the seismic line (across from station 42.5 feet measured from the north end of the line). According to the boring log, the upper five feet of the material is characterized by dark brown, moist, clayey sands with no cementation. This material is underlain by dark brown, moist clay to about 10 feet. The auger refused at 15 feet on cobbles which may potentially be related to the Holocene low terrace deposits.

The National Resources Conservation Service (NRCS) characterizes the area as Glenbar clay loam. These soils consist of well-drained soils on flood plains and alluvial fans of the Salt River and have slopes of 0 to 1 percent. They form in mixed alluvium from basic and acidic igneous rocks. In a representative profile, the material varies from light brown clay loam to light yellowish-brown clay loam to about four feet, underlain to a depth of five feet or more by yellowish-brown heavy silt loam. The lower portion of the profile contains a few fine threads or veins of lime. Additionally, these soils are moderately alkaline and are calcareous throughout (Adams, 1974).

2.1.2 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic Line 132A-01

Seismic refraction survey line 132A-01 (Figures 2 and 3) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 4 and Table 1):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clayey sand (Glenbar Clay Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from nil to 1.0 feet below the ground surface (bgs) and had an average seismic velocity of 1,000 feet per second (fps).

- A low velocity layer is interpreted to depths ranging from 13.4 to 17.6 feet bgs, having an average velocity of 1,209 fps. This material was interpreted to consist of clayey sand over clay (related to Glenbar clay loam), equivalent to very soft rock.
- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 2,777 fps. This material was interpreted to consist of Qy terrace deposits of poorly sorted silt, sand, pebbles, cobbles, and boulders with weak soil development, equivalent to very soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 1 below. All layers at 132A-01 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 pounds per square inch (psi) (Table B-1).

Table 1
Seismic Survey Line Calculated Depth/Velocity Ranges– 132A-01
ARPA LDS Geotechnical Service
City of Phoenix, Arizona

Survey Line No.	Depth Range at Shot Point (ft)			Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Excavatability/Rippability
	A	B	C			
132A-01	0 - Nil	0 - 1.0	0 - Nil	1,000	Gravel Landscape Coverage Over Clayey Sand (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	Nil - 17.6	1.0 - 13.4	Nil - 13.7	1,209	Clayey Sand Over Clay (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	17.6 - 30+	13.4 - 30+	13.7 - 30+	2,777	Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders with Weak Soil Development. Equivalent to Very Soft Rock.	Slight to Moderate

2.2 132B-02 Results

2.2.1 132B-02 Site Geology

Seismic line 132B-02 is within latest Quaternary (Holocene to latest Pleistocene) age deposits (Y) including large terraces of major drainages. Surfaces are primarily underlain by well-sorted sand and silt with local occurrences of fine gravels and may be very slightly but abundantly dissected by active gullies and washes. These deposits are typically fine-grained and smooth in appearance and may contain Stage I to II calcic horizons (Demsey, 1988). The caliche content is consistent with the ATEK boring log for B-8 near the seismic survey line, which indicated variable calcium carbonate content within clay deposits and moderate caliche mottling and cementation below ten feet depth. The late Quaternary terrace deposits may be present at depth.

According to the NRCS, the area is mapped as Estrella loam. This material consists of well-drained soils on flood plains and alluvial fans of the Salt River with slopes of 0 to 1 percent. They formed in recent alluvium over old alluvial material derived from a mixture of basic and acidic igneous rock. In a representative profile, the surface layer and the upper part of the underlying material are light brown loam. This is underlain from a depth of about two feet to a depth of five feet or more by light reddish-brown or reddish-brown clay loam. These soils are moderately alkaline and are calcareous throughout. Permeability is moderately slope and available water capacity is high (Adams, 1974).

2.2.2 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic 132B-02

Seismic refraction survey line 132B-02 (Figures 5 and 6) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 7 and Table 2):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clay (Estrella Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from 3.3 to 6.0 feet bgs and had an average seismic velocity of 1,100 fps.
- A low velocity layer is interpreted to depths ranging from 12.3 to 22.2 feet bgs, having an average velocity of 2,081 fps, equivalent to very soft rock. This material is interpreted to consist of Estrella Loam clay with variable calcium carbonate content and moderate caliche mottling below 10.0 feet depth.

- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 3,699 fps. This material was interpreted to consist of late Quaternary terrace deposits (Y) characterized by well-sorted sand with silt and local occurrences of fine gravels. Additionally, this material may have Stage I to II caliche cementation. However, this material still falls within the velocity range that is equivalent to very soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 2 blow. All layers at 132B-02 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 psi (Table B-1).

Table 2
Seismic Survey Line Calculated Depth/Velocity Ranges– 132B-02
ARPA LDS Geotechnical Service
City of Phoenix, Arizona

Survey Line No.	Depth Range at Shot Point (ft)			Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Excavatability/Rippability
	A	B	C			
132B-02	0 - 4.2	0 - 6.0	0 - 3.3	1,100	Gravel Landscape Coverage Over Clay (Estrella Loam). Equivalent to Very Soft Rock.	Slight
	4.2 - 12.3	6.0 - 21.3	3.3 - 22.2	2,081	Clay (Estrella Loam) with Variable Calcium Carbonate Content and Moderate Caliche Mottling and Cementation Below 10.0 Feet Depth. Equivalent to Very Soft Rock.	Slight to Moderate
	12.3 - 30+	21.3 - 30+	22.2 - 30+	3,699	Late Quaternary Terrace Deposits (Y) Well-Sorted Sand and Silt with Local Occurrences of Fine Gravels. Stage I to II Caliche. Equivalent to Very Soft Rock.	Moderate

2.3 132C-03 & 132C-04 Results

2.3.1 132C-03 & 132C-04 Site Geology

Similar to seismic survey line 132A-01, seismic survey lines 132C-03 and 132C-04 are within Holocene low terrace and alluvial fan deposits (Qy) consisting of poorly sorted silt, sand, pebbles, cobbles and boulders with weak soil development (Reynolds, 1993). However, according to the NRCS, the area is mapped as Glenbar clay loam (similar to at 132A-01), which consists of moderately alkaline, calcareous, clay to silt loam with a few fine threads or veins of lime at depth– see Section 2.1.1 for further description (Adams, 1974).

The nearby ATEK boring B-5 was drilled about 260 feet east of the east end of seismic survey line 132C-03, and north of West Polk Street (on the opposite side of the road as the survey line). Within the upper ten feet, the material is characterized as dark brown, moist, clay with no cementation. This material is underlain by dark brown, moist clayey sand to about 14 feet, underlain by clay and possibly terrace deposits.

Boring B-6 was drilled adjacent to seismic survey line 132C-04, west of North 33rd Avenue. The upper material here is characterized as brown to dark brown, moist, clay to a depth of about 20 feet. A weakly cemented layer may be present at around 10 feet depth. This material is underlain by brown, moist clayey sand, and possibly terrace deposits.

2.3.2 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic 132C-03

Seismic refraction survey line 132C-03 (Figures 8 and 9) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 10 and Table 3):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clay (related to Glenbar Clay Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from nil to 2.8 feet bgs and had an average seismic velocity of 694 fps.
- A low velocity layer is interpreted to depths ranging from 14.9 to 17.7 feet bgs, having an average velocity of 1,592 fps. This material was interpreted to consist of clay over clayey sand (Glenbar clay loam), equivalent to very soft rock.

- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 4,089 fps. This material was interpreted to consist of Qy terrace deposits of poorly sorted silt, sand, pebbles, cobbles, and boulders with weak soil development, equivalent to soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 3 below. The overlying two very low and low velocity layers at 132C-03 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 psi whereas the underlying intermediate velocity layer is interpreted to be equivalent to soft rock with an unconfined compressive strength between 435 and 1,450 psi (Table B-1).

2.3.3 Interpreted Subsurface Geology and Estimated Rock Strength along Seismic 132C-04

Seismic refraction survey line 132C-04 (Figures 8 and 11) is expected to be underlain by the following stratigraphy based on our interpretations of the geologic mapping and the seismic refraction survey data (Figure 12 and Table 3):

- The overlying very low velocity layer is expected to consist of gravel landscape coverage over clay (related to Glenbar Clay Loam) that is equivalent to very soft rock. This material was interpreted to depths ranging from less than 1.0 foot to 1.1 feet bgs and had an average seismic velocity of 1,000 fps.
- A low velocity layer is interpreted to depths ranging from 7.7 to 13.0 feet bgs, having an average velocity of 1,245 fps. This material was interpreted to consist of clay (related to Glenbar clay loam) with potentially a weakly cemented layer at the base of the velocity layer. This material is interpreted to be equivalent to very soft rock.
- An intermediate velocity zone was interpreted to the full depth of the analysis (30+ feet) and had an average seismic velocity of 2,410 fps. This material was interpreted to consist of clayey sand and possibly Qy terrace deposits of poorly sorted silt, sand, pebbles, cobbles, and boulders. This velocity zone is interpreted to be equivalent to very soft rock.

The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Table 3 below. All layers interpreted at 132C-04 are interpreted to be equivalent to very soft rock with unconfined compressive strengths between 246 and 435 psi (Table B-1).

Table 3
Seismic Survey Line Calculated Depth/Velocity Ranges– 132C-03 & 132C-04
ARPA LDS Geotechnical Service
City of Phoenix, Arizona

Survey Line No.	Depth Range at Shot Point (ft)			Average Seismic Velocity (ft/sec)	Interpreted Geologic Description	Qualitative Excavatability/Rippability
	A	B	C			
132C-03	0 - 1.7	0 - Nil	0 - 2.8	694	Gravel Landscape Coverage Over Dark Brown, Moist, Clay (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	1.7 - 15.1	Nil - 17.7	2.8 - 14.9	1,592	Dark Brown, Moist, Clay Over Dark Brown, Moist Clayey Sand (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	15.1 - 30+	17.7 - 30+	14.9 - 30+	4,089	Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders with Weak Soil Development. Equivalent to Soft Rock.	Moderate
132C-04	0 - 1.1	0 - <1.0	0 - <1.0	1,000	Gravel Landscape Coverage Over Brown to Dark brown, Moist, Clay (Glenbar Clay Loam). Equivalent to Very Soft Rock.	Slight
	1.1 - 7.7	<1.0 - 13.0	<1.0 - 11.0	1,245	Brown to Dark brown, Moist, Clay (Glenbar Clay Loam). A Weakly Cemented Layer is Likely Present at the Base of the Layer. Equivalent to Very Soft Rock.	Slight
	7.7 - 30+	13.0 - 30+	11.0 - 30+	2,410	Brown, Moist Clayey Sand, and Possibly Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders . Equivalent to Very Soft Rock.	Slight to Moderate

Based on our interpretations of the seismic data, the conclusions presented regarding the depth to various velocity zones are believed to be reasonable at the location of the seismic survey lines. The conditions characterized by indirect seismic methods along the seismic survey lines probably represent subsurface conditions that could be found within the project site. The calculated depth/velocity ranges, as well as our interpretations of the geologic materials represented by the calculated seismic velocities are summarized in Tables 1 through 3.

Interpreted stratigraphy derived from the seismic survey data along each seismic survey line are depicted in Figures 4, 7, 10, and 12. These figures include the average seismic velocities of the materials encountered along the seismic survey lines, a thickness profile of the different velocity zones, and the calculated velocity zone boundaries.

2.4 Qualitative Rippability / Excavateability: The estimated qualitative rippability/excavateability summarized in Table 4 is based on the interpretations of the seismic survey data, our understanding of the site geological conditions, and our professional experience. There is no guarantee that the seismic refraction survey results (Tables 1 through 3) or the qualitative rippability/excavateability (Table 4) can be duplicated by others. We recommend this information be used with caution and only as guidelines. Because the seismic velocities used to determine qualitative rippability/excavateability may vary from 10 to 20 percent, and due to the variability of the subsurface material, the qualitative rippability/excavateability constraint categories listed in Table 4 may overlap at the transition from one constraint category to the next. Excavation of the low velocity overlying layers at the various seismic survey line locations is expected to be relatively easy.

2.5 Excavation Constraints: The excavation constraints described in this report (Tables 1 through 3, and 4) are, in our opinion, reasonable for the locations where the seismic refraction survey lines were conducted. The ultimate excavateability is dependent on many factors (variably cemented soils, cemented gravel to boulder soil zones, presence of large boulders, bedrock and soil physical properties, excavation methods, size and age of excavation equipment, level of effort applied by the contractor, etc.) and it may not be possible to correlate these factors with the results of the seismic refraction survey conducted for this investigation. The excavation contractor must exercise caution, and assume associated risks, when attempting to extrapolate these data to other areas where seismic surveys have not been conducted.

Table 4
Qualitative Excavateability Relative to Soil/Bedrock Type & P-Wave Velocity
ARPA LDS Geotechnical Services
City of Phoenix, Arizona

Unit	Average Velocity (feet per second)	Excavateability/Rippability Constraints
<p>Low Velocity Gravel Landscape Coverage Over Clayey Sand or Clay (Glenbar Clay Loam or Estrella Loam). Qy Terrace Deposits of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Potential Boulders. Equivalent to Very Soft Rock.</p>	<p>< 3,000</p>	<p>Slight- Should be excavateable using conventional earthmoving equipment. Marginal excavation conditions could be experienced if caliche-cemented material, cobbles, and or boulders are encountered. Large caliche fragments and boulders could be generated requiring specialized rock-breaking equipment.</p>
<p>Intermediate Velocity Late Quaternary Terrace Deposits (Y) of Well- Sorted Sand and Silt with Local Occurrences of Fine Gravels. Stage I to II Caliche. Equivalent to Very Soft Rock.</p> <p>Holocene Low Terrace Deposits (Qy) of Poorly Sorted Silt, Sand, Pebbles, Cobbles and Boulders with Weak Soil Development. Equivalent to Soft Rock.</p>	<p>3,000 to 6,000</p>	<p>Marginal - Potentially difficult to excavate with low horsepower-low torque conventional equipment where moderately cemented fine grained alluvium deposits are encountered. Large caliche fragments and boulders could require special fragmentation methods such as heavy, high impact energy hydraulic hammers mounted on large track-hoes. Fragmentation could be difficult. Moderate to high horsepower excavation equipment and rippers could improve production where the material is less strongly calichified; however, production could be slow.</p>
<p>High Velocity Late Quaternary (Y) Terrace Deposits and Holocene Low Terrace Deposits (Qy) Equivalent to Very Hard Rock.</p> <p>Note: This Velocity Range Was Not Encountered at the Seismic Survey Line Locations</p>	<p>> 6,000</p>	<p>Severe - Conventional, low horsepower/torque excavation equipment will likely experience refusal. Where allowed, blasting could be used for effective fragmentation. Very hard to extremely hard, calichified terrace deposits with potential boulders is expected to be very difficult to excavate. Possible Stage IV caliche may be locally rippable using a large tractor such as a D-9, D10, or equivalent, with single-shank rippers, a heavy backhoe/trackhoe with heavy hydraulic impact hammers, or a single or multi-tooth ripper bucket such as a “v-raptor” bucket used along joint and fracture planes. Localized cross-ripping could improve production. Large boulder-size rock fragments could be generated that could require secondary fragmentation. Production is expected to be very slow. Blasting is not recommended.</p>

Prospective contractors or others involved with excavation at this site should review this report along with the excavateability performance charts and tables provided by manufacturers of rock and soil excavating equipment. This information can be used as part of their evaluation criteria for selecting equipment that may be used to excavate or fragment the material expected to be encountered at this site. However, the contractors using these data or making interpretations of this information, for any reason, do so at their sole risk.

The qualitative excavateability summarized in Table 4, along with our interpretation of the subsurface materials (Tables 1 through 3) are provided so that a prospective contractor can relate seismic velocities to the subsurface materials they can expect to encounter where excavations may be proposed. Although a backhoe may be able to excavate low velocity material and a heavy, hydraulic impact rock breaker attached to a large track-mounted excavator might be able to fragment moderate to high velocity bedrock, strongly cemented zones, or fractured and jointed bedrock material, there are no guarantees due to the wide range of variables summarized herein that effect equipment suitability and material excavateability. Also, the progress of excavation in soils, cemented with caliche to a rocklike consistency and/or bedrock, where encountered, should be expected to be slow. Appendix B contains tables and charts, from various sources, on the rippability/excavateability of various materials.

No site-specific testing has been conducted at this site by Geological Consultants Inc. to verify the qualitative rippability/excavateability categories (Table 4) nor has any equipment performance evaluations been conducted relative to ripping or excavating site materials or to determine equipment suitability for this site. Therefore, the contractor must exercise caution and assume associated risks if the information provided herein is used by the contractor to assist with the determination of equipment suitability for fragmentation or excavation.

- 2.6 Safety:** We recommend adequate “safety zones” be established and maintained around the proposed pipeline excavations during construction. Additionally, we recommend that excavation cut slopes with vertical heights greater than five feet be examined to assess their stability. This assessment should be conducted by a registered geologist or geotechnical engineer experienced with the evaluation of the pipeline trench cut slope stability.

3.0 GEOPHYSICAL SITE INVESTIGATION

The seismic refraction survey was conducted to indirectly investigate and develop reasonable interpretations of the subsurface conditions.

3.1 Site Specific Seismic Survey

Following the completion of a site reconnaissance to identify the seismic survey line locations, the seismic refraction survey lines (132A-01, 132B-02, 132C-03, and 132C-04) were laid out at the locations depicted in Figures 2, 5, and 8. The seismic survey was conducted to evaluate the soil overburden thickness and where possible, identify and characterize bedrock conditions within the proposed residential site, and to characterize the qualitative excavateability of the soil and bedrock, where encountered.

Three shot points were used along the seismic survey lines to evaluate possible non-horizontal subsurface boundary conditions (buried sloping surfaces, cementation zones, soil-change boundaries, etc.) that could be expected in this type of geological terrain and to improve the accuracy of the seismic wave velocity determinations. Each seismic refraction survey line was run over a total length of 120-feet, including shot point offsets, with the exception of seismic survey line 132B-02 which was run over a total length of 90 feet (including offsets). The length of the seismic survey line was sufficient to achieve adequate depth penetration of at least 30 feet below the existing ground surface. The geometry of the seismic survey lines was set up to identify the subsurface layers or zones that could influence the storm drain excavation proposed at the site.

As with any type of geophysical investigation method, there are limitations to its usefulness and application. Refer to Appendix A for additional information regarding seismic refraction surveys and their limitations.

3.2 Equipment

Travel-time data for the seismic survey was obtained using a Geometrics Inc. Model S12 SmartSeis™ 12-Channel Exploration Seismograph. Seismic wave arrivals are detected with digital grade vertical geophones with a dual hum-bucking coil and a frequency response above 14 Hz natural frequency. Geophones were placed beginning at Station 0 and at 10-foot intervals thereafter to the end of the seismic survey lines. The seismic shock waves are produced by repeated impacts of a 16-pound sledge hammer onto a soft steel striking plate. Hammer impacts (shots) were made at five-foot offsets from each end of the seismic line traverse and at a shot point located at or near the center of the survey line spread. The distance from the impact

locations (shot points) to the geophones and the travel time recorded for each station is stored in the seismographs onboard computer. If the field seismic data plots indicated the possible presence of anomalous subsurface conditions or spurious noise coincident with the hammer impacts, repeated impacts were used to verify the initial data reading or to correct the data. Topographic features, outcrops, and other natural features found along the seismic survey lines that might influence the data interpretations were annotated on the field data plots.

3.3 Results

Interpretations of the seismic survey data obtained at the project site suggest the presence of a distinctive subsurface stratigraphic profile along the seismic survey lines. Seismic velocities, calculated zone thicknesses, and depth to velocity zone boundaries for the interpreted soil types are summarized in Tables 1 through 3. The qualitative rippability/excavateability of the soil units encountered along the seismic survey lines is summarized in Table 4. Seismic velocity profiles and distance-travel time data plots are depicted in Figures 4, 7, 10, and 12 for each seismic survey line. The depth scale depicted on the Y-axis of the velocity layer cross-sections assumes an arbitrary datum elevation of 100.0 feet. The cross-sections may be used to measure the depths to different velocity layer boundaries below the ground surface at any point along the seismic survey lines. The estimated accuracy of the velocity layer boundaries is approximately 20 percent. Figures 3, 6, 9, 11 include photographs taken at the end shot points (A and C) of the seismic survey lines.

4.0 GENERAL LIMITATIONS

The geologic observations, findings, conclusions, and recommendations presented in this report are based on (1) cursory observations of surface conditions and geologic materials where exposed and (2) analysis of the seismic refraction data gathered at the site. The services provided by Geological Consultants Inc. were performed in accordance with generally accepted geological principals and standard practices used by members of the geological profession in this locale at the time of this study.

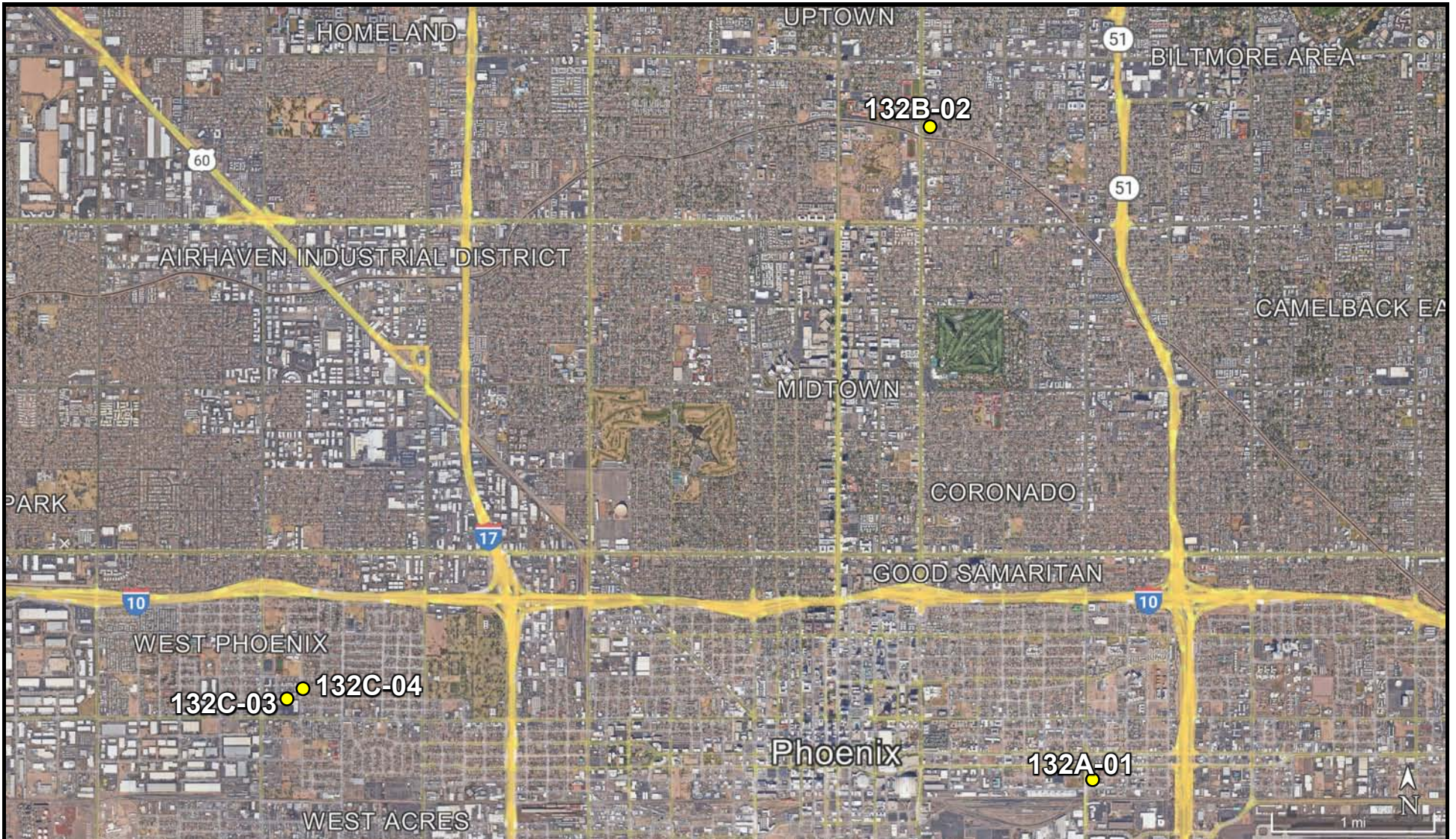
It must be recognized that subsurface geologic conditions may vary from place to place and from those found at locations where measurements or surveys are made by the investigator. Generalized geological and rippability/excavateability recommendations presented in this report are based on the interpretations of the results of this investigation and it may not be possible for others to accurately correlate the geology and excavateability results to test explorations or investigations conducted by others. No warranty or representation, either expressed or implied, is or should be construed regarding geological conditions at locations other than those evaluated as part of this study.

The professional opinions, conclusions and recommendations presented in this report relate only to the project and locations specified in this report. If any changes are made in the project, the conclusions and/or recommendations in this report shall not be considered valid unless the changes are reviewed and the conclusions and recommendations of this study are modified and approved in writing by Geological Consultants Inc.

5.0 BIBLIOGRAPHY

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FIGURES



EXPLANATION:

132A-01 ● General Seismic Survey Line Location (approx.) and Designation

**ARPA LDS Geotechnical Services
Phoenix, Arizona
Seismic Refraction Survey
General Location Map
Figure 1**

Basemap modified by GCI (3/20/2024) from Google Maps (2024).

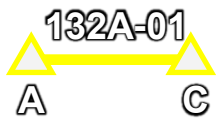


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EXPLANATION:



Seismic Survey Line Location (approx.) and Designation

**ARPA LDS Geotechnical Services
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Seismic Refraction Survey
132A-01 Seismic Survey Location Map
Figure 2**

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Basemap modified by GCI(3/20/2024) from Google Maps (2024).



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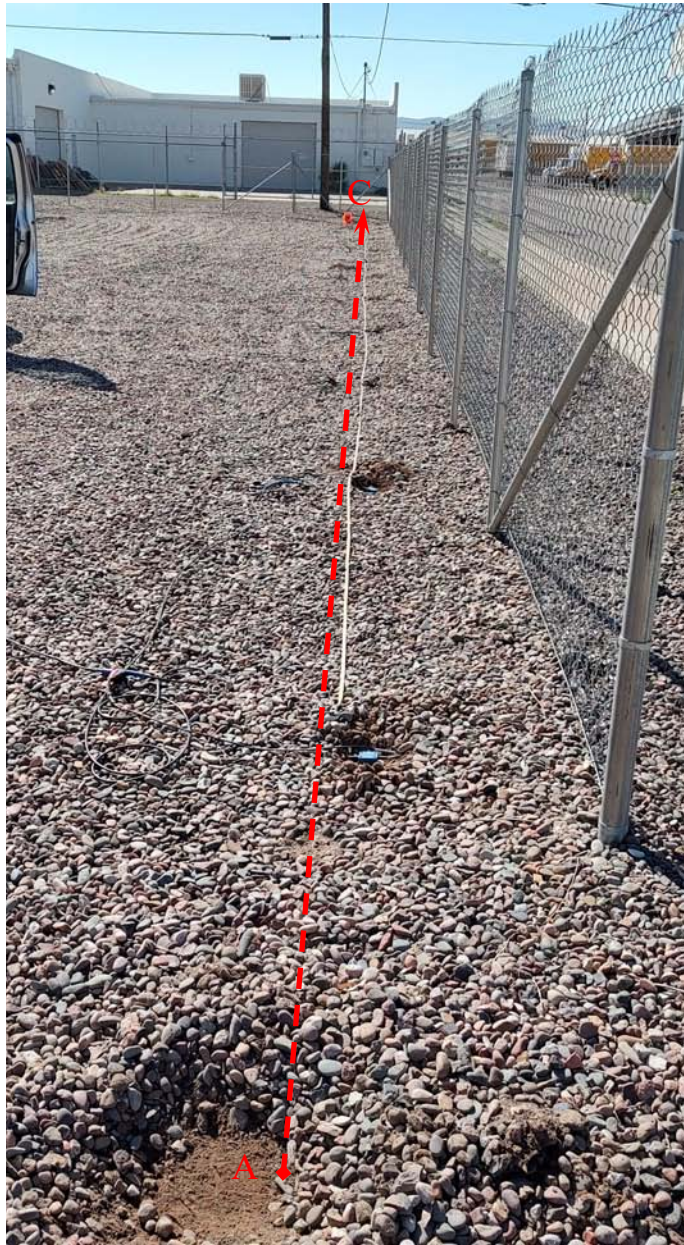


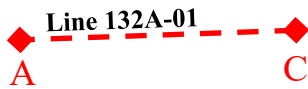
Figure 3; Photo 1: Seismic Survey Line 132A-01 view looking south from Shot Point A toward Shot Point C.



Figure 3; Photo 2: Seismic Survey Line 132A-01 view looking north from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132A-01 taken February 15, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:

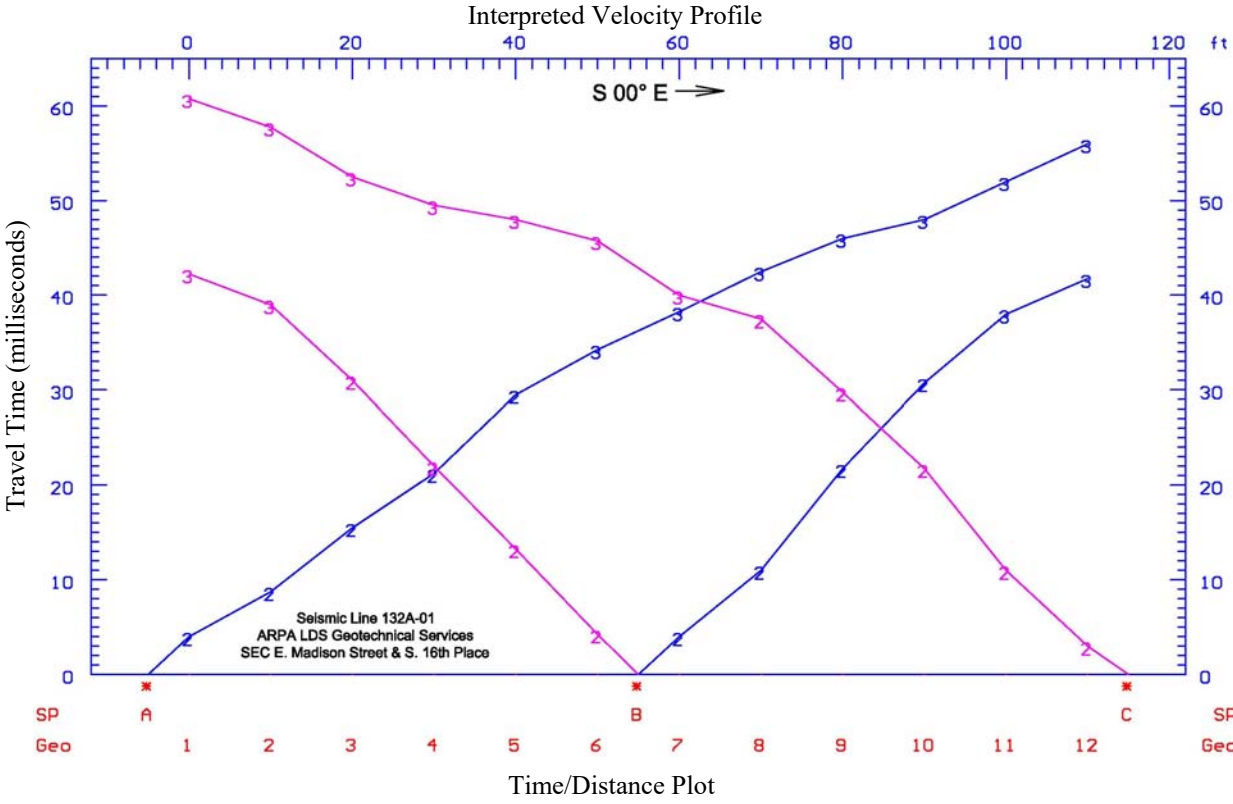
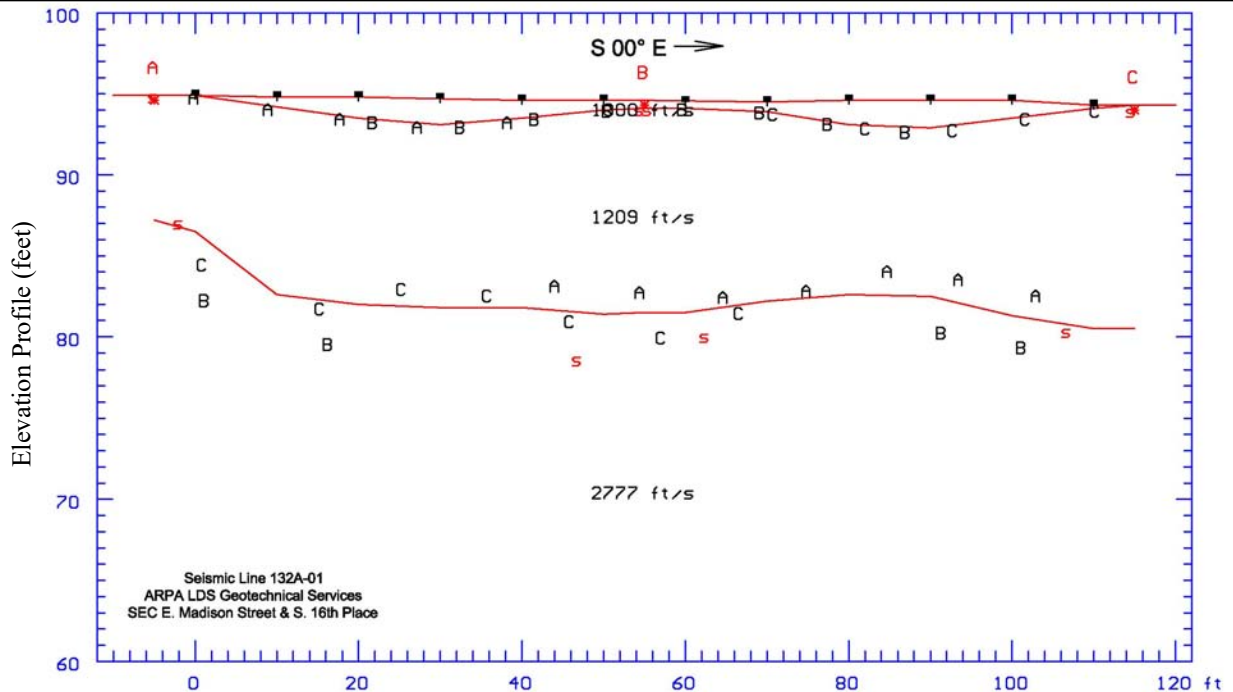


Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 4 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

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Phoenix, Arizona
Seismic Refraction Survey
Seismic Line Photographs—132A-01
Figure 3**



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**ARPA LDS Geotechnical Services
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Seismic Refraction Survey 132A-01
Velocity Profile & Time-Distance Plot
Figure 4**

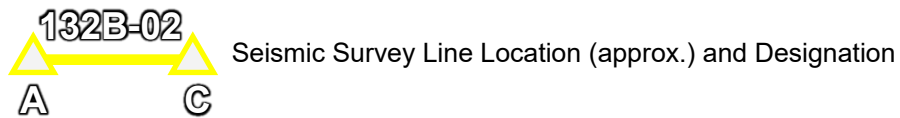
Refer to Figure 2 for seismic survey line location and Figure 3 for photographs of the seismic survey line layout



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EXPLANATION:



Basemap modified by GCI(3/20/2024) from Google Maps (2024).

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Seismic Refraction Survey
132B-02 Seismic Survey Location Map
Figure 5**



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Figure 6; Photo 1: Seismic Survey Line 132B-02 view looking south from Shot Point A toward Shot Point C.

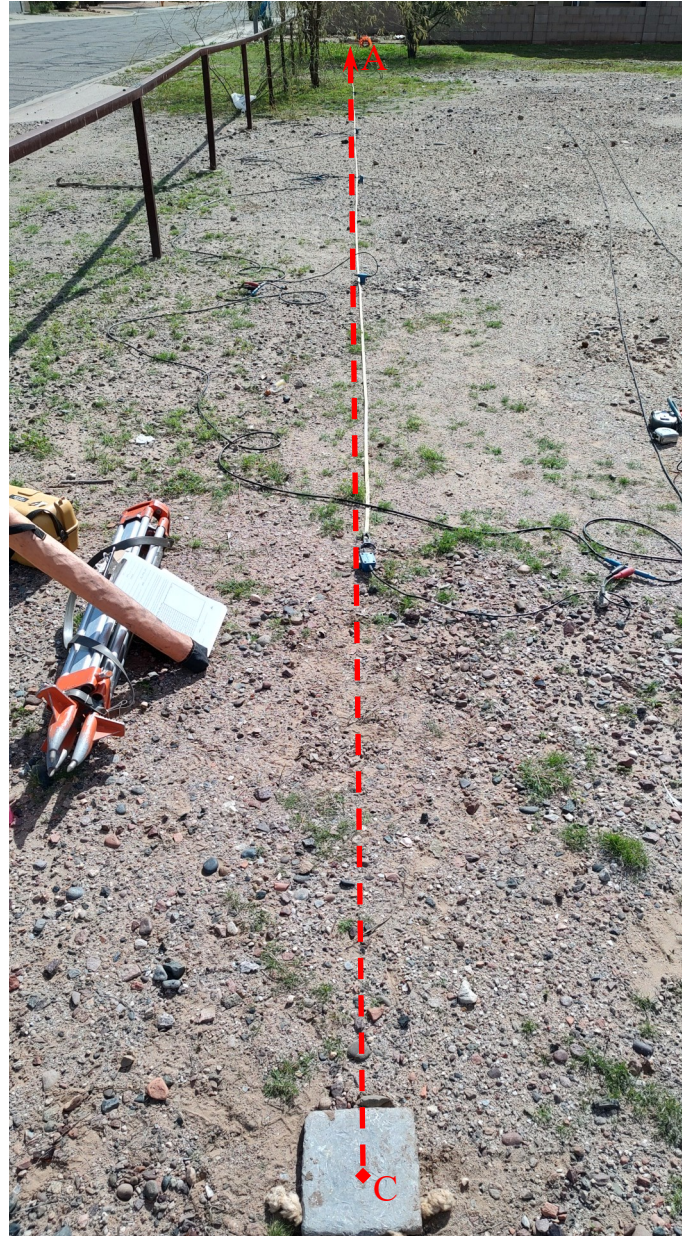
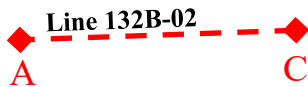


Figure 6; Photo 2: Seismic Survey Line 132B-02 view looking north from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132B-02 taken February 15, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:

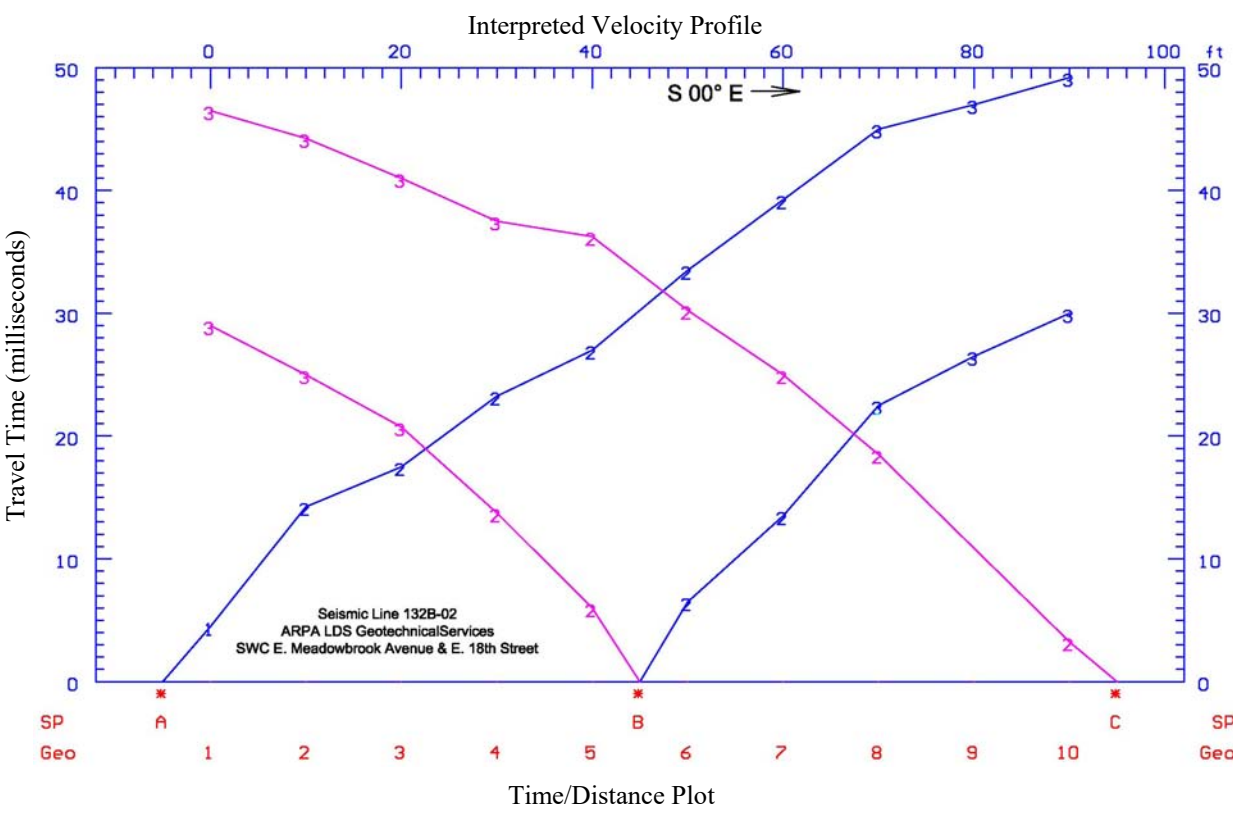
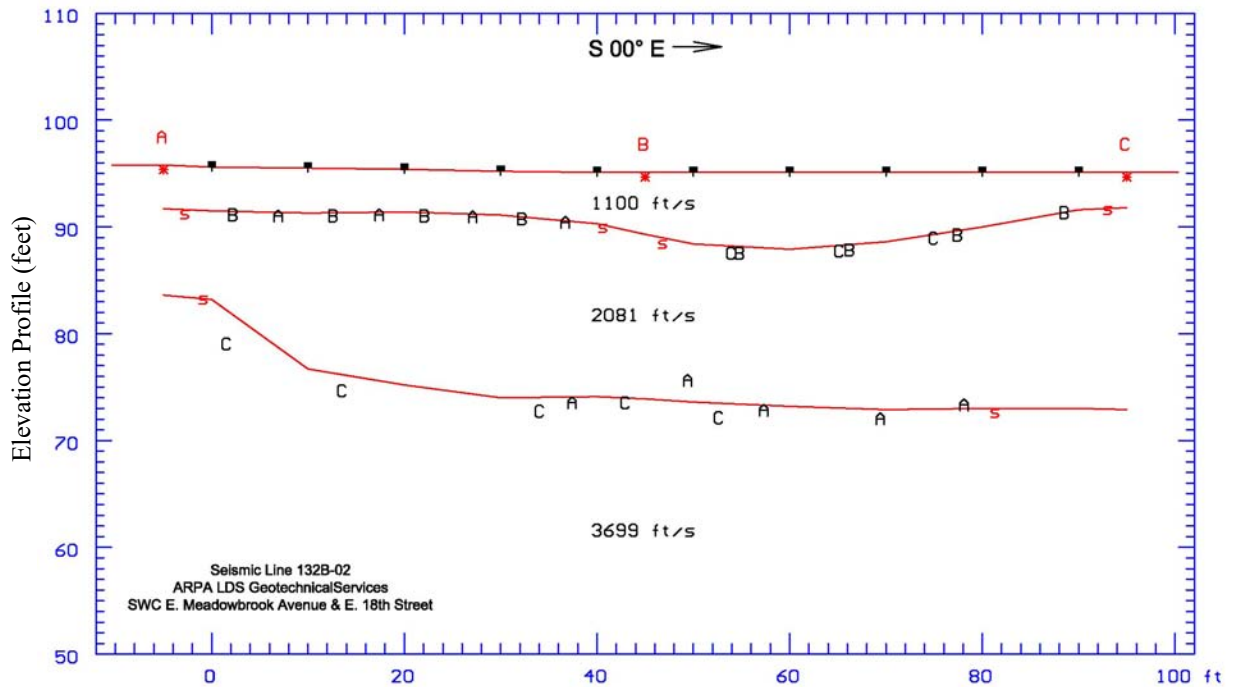


Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 7 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

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Seismic Refraction Survey
Seismic Line Photographs—132B-02
Figure 6**



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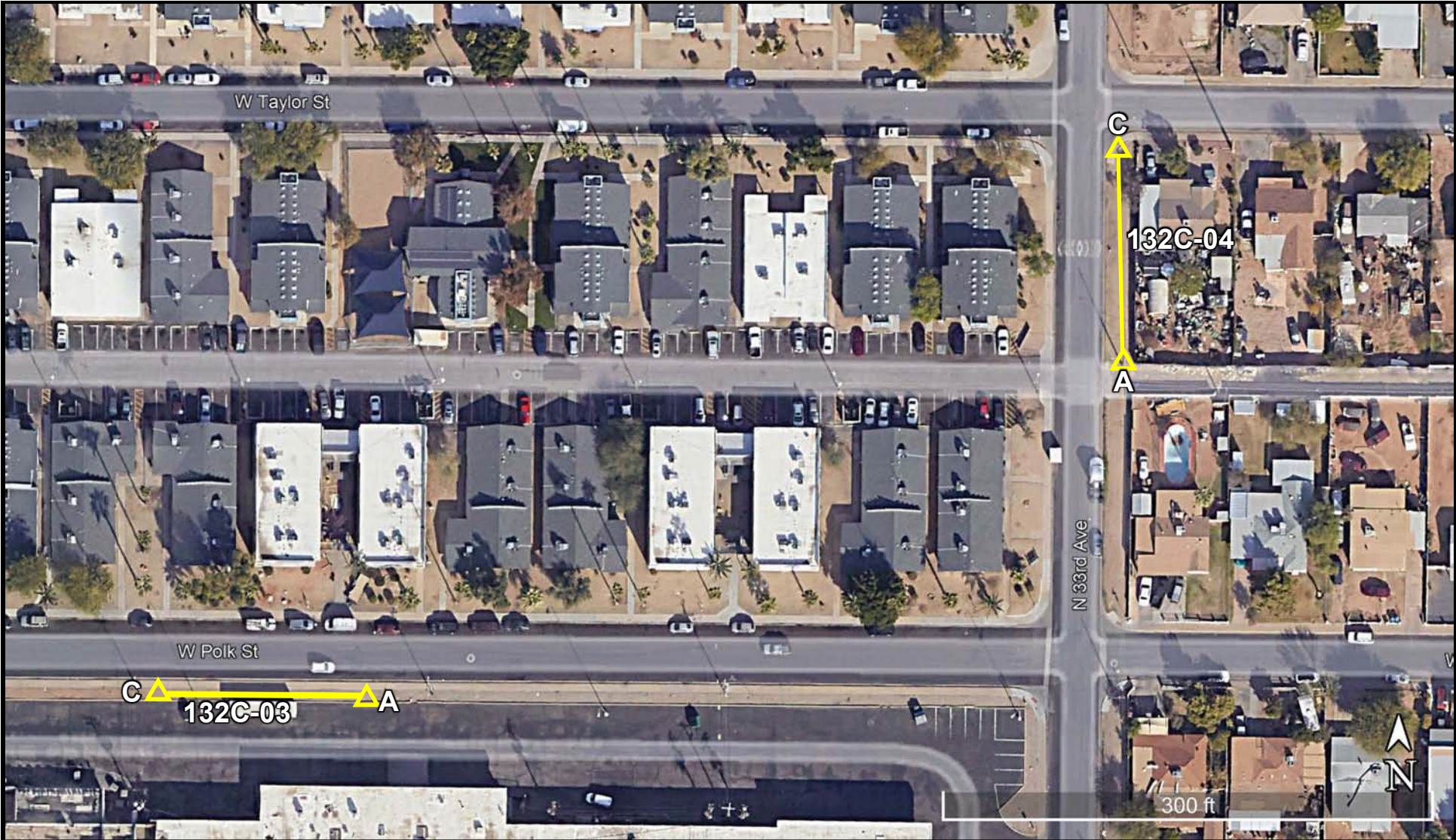


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Seismic Refraction Survey 132B-02
Velocity Profile & Time-Distance Plot
Figure 7

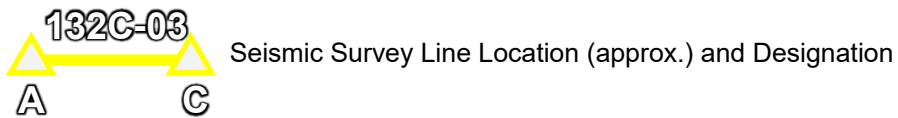
Refer to Figure 5 for seismic survey line location and Figure 6 for photographs of the seismic survey line layout



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EXPLANATION:



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 132C-03 & 132C-04 Seismic Survey Location Map
 Figure 8

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Basemap modified by GCI(3/20/2024) from Google Maps (2024).



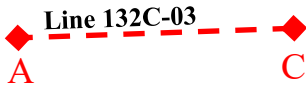
Figure 9; Photo 1: Seismic Survey Line 132C-03 view looking west from Shot Point A toward Shot Point C.



Figure 9; Photo 2: Seismic Survey Line 132C-03 view looking north from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132C-03 taken February 16, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:

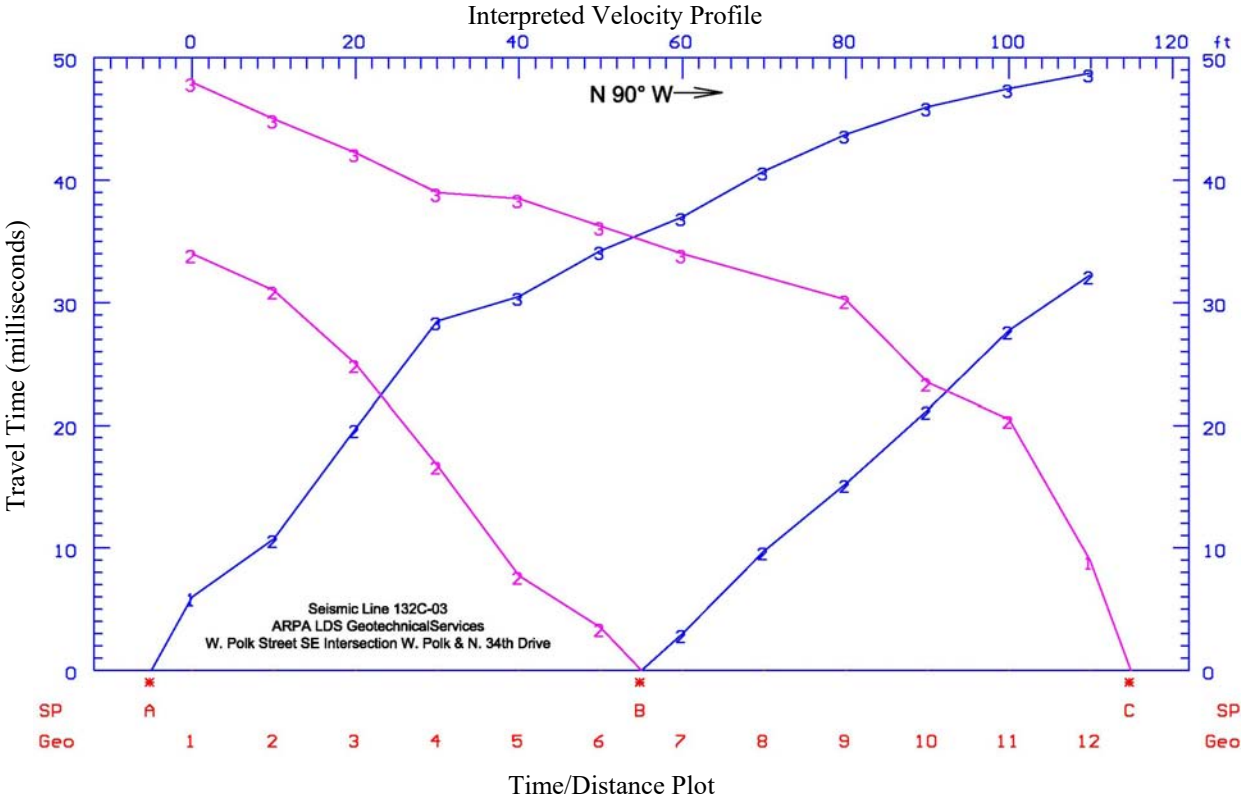
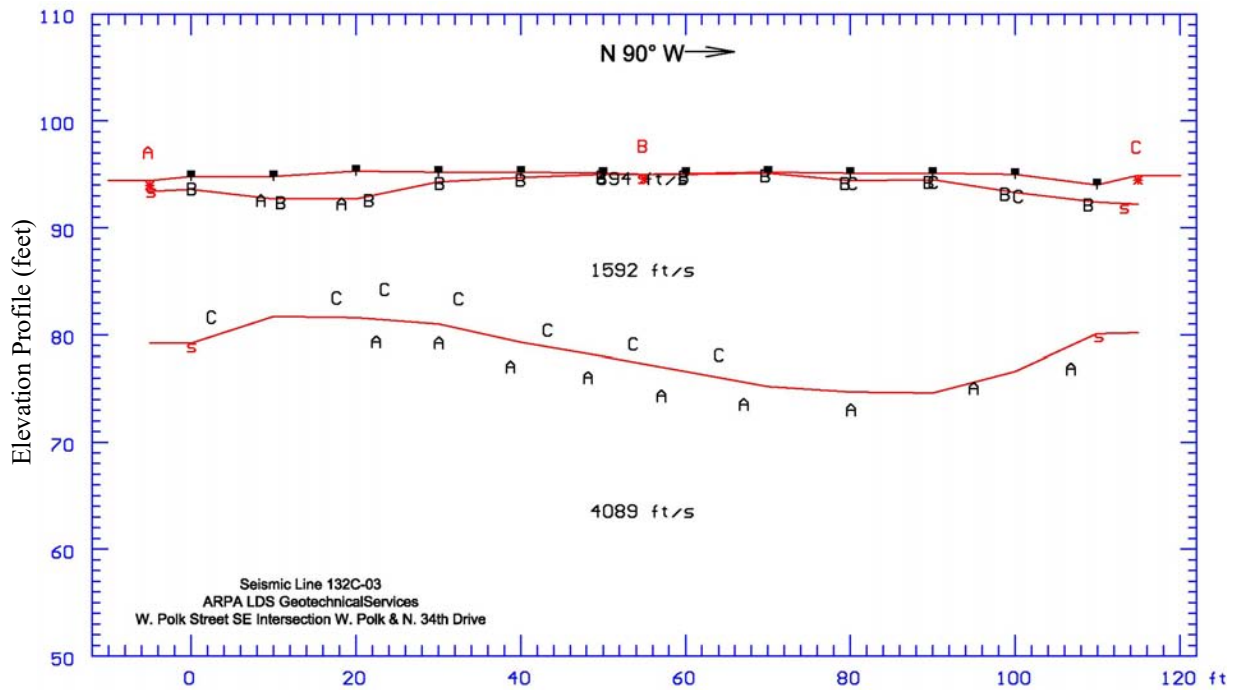


Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 10 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

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Seismic Line Photographs—132C-03
Figure 9**



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Seismic Refraction Survey 132C-03
Velocity Profile & Time-Distance Plot
Figure 10

Refer to Figure 8 for seismic survey line location and Figure 9 for photographs of the seismic survey line layout



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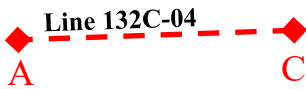
Figure 11; Photo 1: Seismic Survey Line 132C-04 view looking north from Shot Point A toward Shot Point C.



Figure 11; Photo 2: Seismic Survey Line 132C-04 view looking south from Shot Point C toward Shot Point A.

Photographs of seismic survey line 132C-04 taken February 16, 2024 by K. Euge, R.G.; Geological Consultants Inc. Project No. 2023-132.

Explanation:



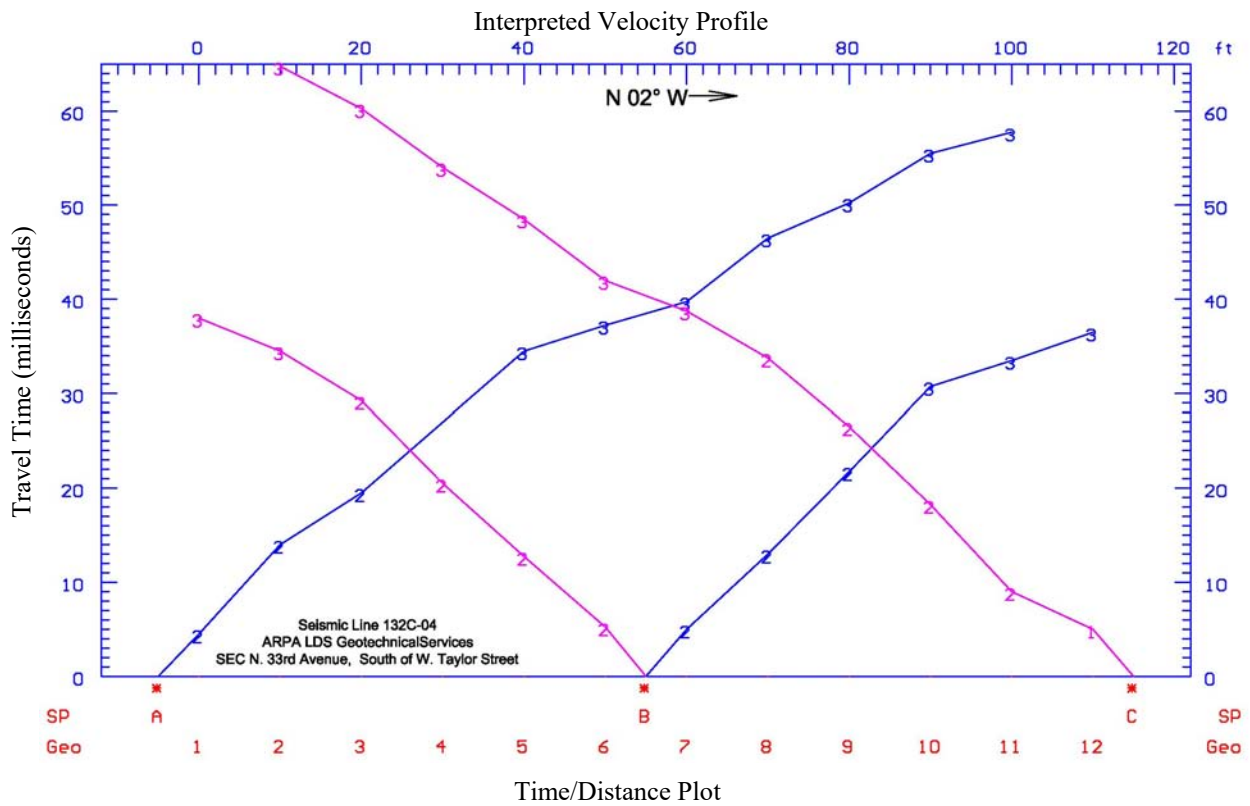
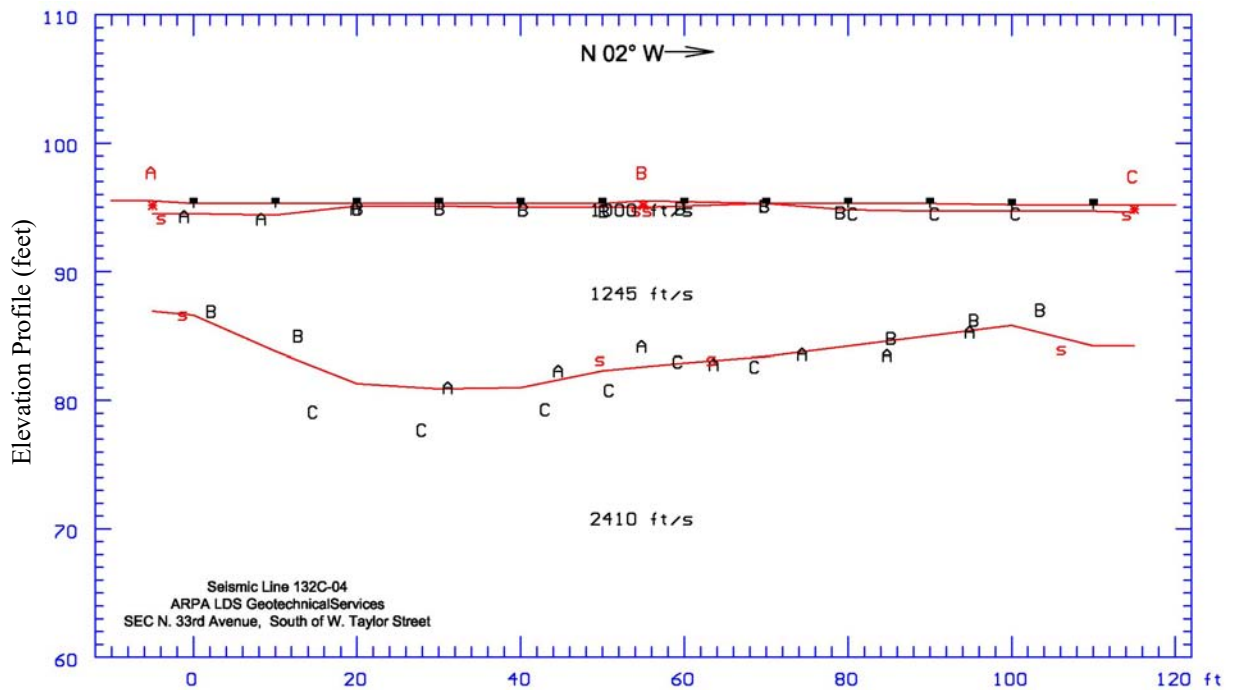
Seismic survey line location: A-shot point start; C-shot point end. Refer to Figure 12 for interpreted seismic line velocity zone cross-section and travel time-distance plot.

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Seismic Refraction Survey
Seismic Line Photographs—132C-04
Figure 11**



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Seismic Refraction Survey 132C-04
Velocity Profile & Time-Distance Plot
Figure 12

Refer to Figure 8 for seismic survey line location and Figure 11 for photographs of the seismic survey line layout



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APPENDIX A

SEISMIC REFRACTION SURVEY

APPENDIX A SEISMIC REFRACTION SURVEY

A.1 GENERAL

In general, seismic wave velocities are related to the hardness, consolidation, and density of the materials through which seismic (shock) waves travel. Seismic velocities of subsurface soils and bedrock can be correlated to some of the physical properties of the material with reasonable levels of confidence. As with rock rippability (ease of excavation) for example, the Caterpillar tractor Company has correlated ranges of seismic velocities in different rock and soil materials to qualitative estimates of rippability for their D-9 tractor with a mounted hydraulic No.9 ripper.

The use of seismic velocities measured in various soils and rock types are considered reasonably conservative for evaluating soil and rock characteristics by "indirect" shallow geophysical seismic methods. Some general correlations are as follows:

- Soil, loose surface material, alluvium and strongly weathered and broken bedrock has velocities ranging from 500 feet per second (fps) to 1,200 fps;
- Moderately hard, slightly to moderately cemented, dense alluvial and colluvial sediments and moderately weathered and broken bedrock range from 1,200 fps to 3,000 fps;
- Very dense, hard, well-cemented soils and moderately competent bedrock range from 3,000 fps to 6,000 fps;
- Sound, relatively homogeneous or tightly jointed bedrock and uniformly, strongly cemented soils (silica hardpan, caliche, calcrete, etc.) have seismic velocities greater than 6,000 fps.

Soils and rock with velocities of less than 3,000 fps can usually be excavated with conventional earth moving equipment. Where materials with velocities in excess of 6,000 fps are found, blasting would normally be required for efficient fragmentation. However, if the rock is thinly bedded, jointed, or fractured, it may be possible to break the rock with heavy ripping using a single shank ripper or large ram-hoe. The resulting fragments will be of a size consistent with the fracture spacing and the progress of the excavation would be very slow. The intermediate material (velocities between 3,000 fps and 6,000 fps) would likely require heavy equipment and possibly the localized use of jack- hammers, ram-hoes, or selective blasting to provide cost-effective excavation.

A.2 DATA COLLECTION

Refraction data were collected along seismic survey lines consisting of 12 geophones spaced 10 feet apart. This geometry provided coverage of about 110 feet along each survey line. Refer to Figures 2, 5, and 8 for the seismic survey line locations. Seismic waves were generated at shot points located at line ends and the center to measure shallow materials (near-surface) seismic velocities. Data were recorded from both line ends so the effect of layer inclination, or dip on velocity boundaries, could be calculated. This geometry provided at least 30 feet, or more, of penetration at most line locations.

A.3 REFRACTION SEISMIC SURVEY LIMITATIONS

The seismic survey data presented in this report are derived from and interpreted from an indirect geophysical investigative technique (seismic refraction surveys) employed at the specific locations indicated and from observations made of the surface geologic conditions exposed at the site. The interpretations made at the specific seismic survey sites are believed to be reasonable based on the information available at the time of this study. The interpretations may not represent, nor are they intended to represent, the subsurface condition at other locations.

Geologic contacts between rock and soil units are approximate, may be either gradual or abrupt, and the calculated depths could vary from 10 to 20 percent or more. Geological and geotechnical information provided others and our experience on similar projects in similar geological terrain were considered in the interpretations of subsurface conditions.

A.4 REFRACTION DATA PROCESSING

Seismic Refraction Interpretation Programs (SIP) computer programs by RIMROCK GEOPHYSICS, were used to analyze seismic data obtained in the field. The programs calculate average velocities of any number of layers assuming the multilayered intervals do not include velocity inversions or "hidden" zones (i.e., high velocity zone over a low velocity zone). Thicknesses of each layer, except for the lowermost layer, are calculated along with the dip (inclination) angle of the layer boundary. The depth below the ground surface to each layer boundary is also provided.

Input data, velocity of each layer and seismic wave arrival times, obtained during the field work are checked by the computer program to assure that they satisfy reciprocity at least within 20 percent. These data are used to develop a meaningful geological model used to interpret subsurface stratigraphic conditions.

APPENDIX B

ROCK HARDNESS & EXCAVATION CHARACTERISTICS

Tables B-1, B-2, and B-3

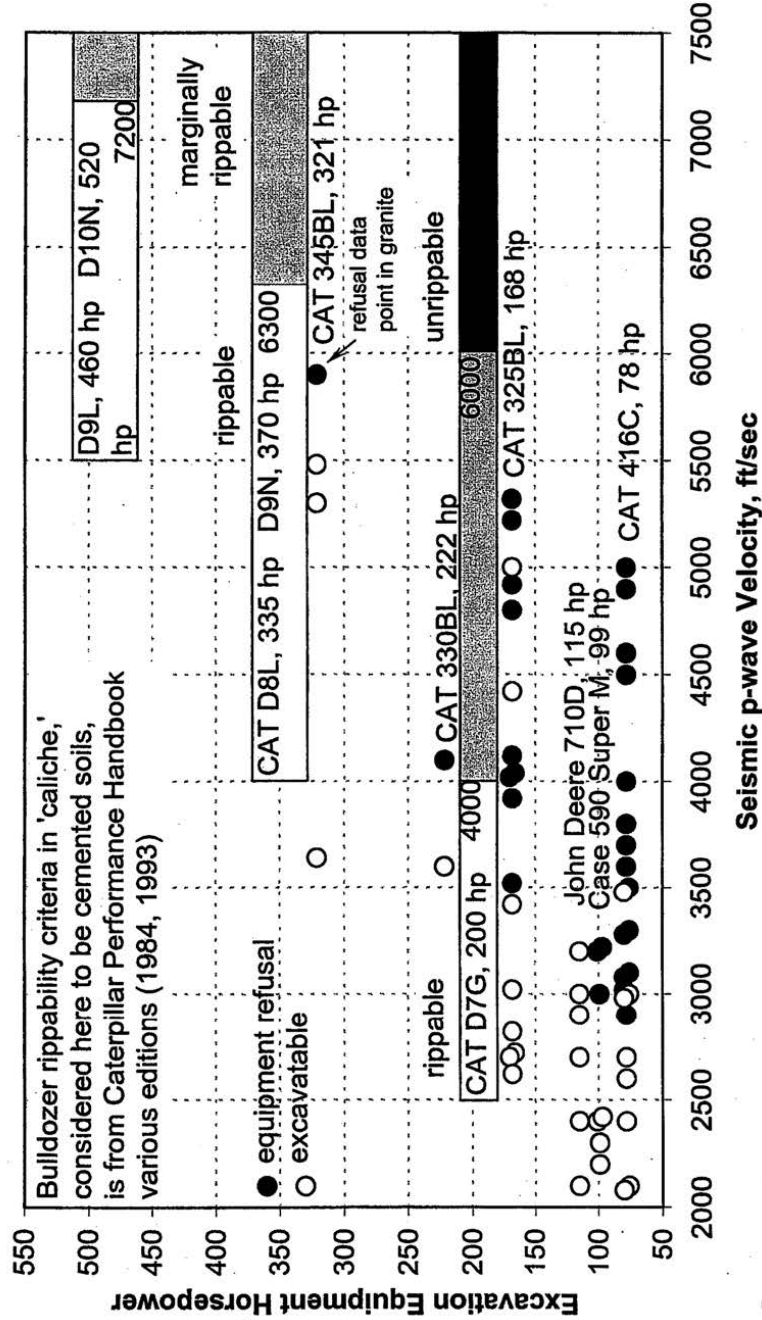
Table B-1
Rock Hardness & Excavation Characteristics⁽¹⁾

Rock Hardness Description	Identification Criteria	Unconfined Compressive Strength		Seismic Compression (P-Wave) Velocity		Excavation Characteristics
		MPa	psi	m/s	f/s	
Very Soft Rock	Material crumbles under firm blows with sharp end of geological pick; can be peeled with a knife; too hard to cut a triaxial sample by hand. SPT will refuse. Pieces up to 3-cm thick can be broken by finger pressure.	1.7 - 3.0	246 - 435	450 - 1,200	1,475 - 3,935	Easy Ripping
Soft Rock	Can just be scraped with a knife; indentations 1-mm to 3-mm show in specimen with firm blows of the pick point; has dull sound under hammer.	3.0 - 10.0	435 - 1,450	1,200 - 1,500	3,935 - 4,920	Hard Ripping
Hard Rock	Cannot be scraped with a knife; hand specimen can be broken with a pick with a single firm blow; rock rings under hammer.	10.0 - 20.0	1,450 - 2,900	1,500 - 1,850	4,920 - 6,070	Very Hard Ripping
Very Hard Rock	Hand specimen breaks with a pick after more than one blow; rock rings under hammer	20.0 - 70.0	2,900 - 10,150	1,850 - 2,150	6,070 - 7,050	Extremely Hard Ripping or Blasting
Extremely Hard Rock	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.	> 70.0	> 10,150	> 2,150	> 7,080	Blasting

Note: (1) Table from Weaver, J.M.; 1975; Geological Factors Significant in the Assessment of Rippability; The Civil Engineer in South Africa (*Die siviele Ingenieur in Suid-Afrika*); Volume 17, Issue 12, December 1975; pp. 313-316.

Table B-2
Typical Excavatability Performance in Cemented Soils⁽²⁾

Figure 1 - Typical Excavatability Performance in Cemented Soils for Various Equipment Completing Test Pits in Salt River Valley Area



Note: (2) From Caterpillar, Inc.; 2013; Caterpillar Performance Handbook, Edition 43; Section 18, Rippers, Seismic Wave Velocity Charts; pp. 18-75 to 18-80.

Table B-3
Excavatability of Materials⁽³⁾

Material & Range of Marginal Rippability by Seismic Velocity (Cat, 1984; 1993)	Typical Bulldozer Used as Ripper (Cat, 1984; 1993)	Equivalent Backhoe (Kirsten, 1982; 1988)
"Caliche"		
4,000 – 6,000 fps	D7G, 200 HP	235
6,300 – 8,600 fps	D8L, 335 HP	245
6,300 – 8,700 fps	D9N, 370 HP	-
7,200 – 10,300 fps	D9L, 460 HP	RH 40
7,200 – 10,300 fps	D10N, 520 HP	-
7,400 – 10,600 fps	D10, 700 HP	-
7,600 – 11,000 fps	D11N, 770 HP	-
Conglomerate		
4,600 – 5,700 fps	D7G, 200 HP	235
7,600 – 9,300 fps	D8L, 335 HP	245
7,600 – 9,300 fps	D9N, 370 HP	-
8,400 – 10,600 fps	D9L, 460 HP	RH 40
8,400 – 10,600 fps	D10N, 520 HP	-
9,000 – 11,000 fps	D10, 700 HP	-
9,300 – 11,500 fps	D11N, 770 HP	-
Granite		
4,300 – 4,800 fps	D7G, 200 HP	235
6,800 – 8,000 fps	D8L, 335 HP	245
6,800 – 8,000 fps	D9N, 370 HP	-
7,300 – 8,400 fps	D9L, 460 HP	RH 40
7,300 – 8,400 fps	D10N, 520 HP	-
7,800 – 9,000 fps	D10, 700 HP	-
8,100 – 9,500 fps	D11N, 770 HP	-
Schist		
4,300 – 5,300 fps	D7G, 200 HP	235
7,200 – 9,000 fps	D8L, 335 HP	245
7,200 – 9,000 fps	D9N, 370 HP	-
7,700 – 9,500 fps	D9L, 460 HP	RH 40
7,700 – 9,500 fps	D10N, 520 HP	-
8,000 – 10,000 fps	D10, 700 HP	-
8,300 – 10,500 fps	D11N, 770 HP	-

Note: Bulldozer and backhoe power are presented by Kirsten (1982, 1988) as a measure of equivalent performance for excavation. The Caterpillar D6D bulldozer and 225 backhoe and D4E/D5B bulldozer and 215 backhoe are considered equivalent. Seismic velocities below marginal indicate that the material is rippable. Seismic velocities above marginal indicate that the material is non-rippable. All velocities are approximate and represent a typical range. See the Caterpillar Performance Handbook (Caterpillar, 1984, 1993 or current edition) for details on use of this information. Different model configurations include variations in weight and horsepower.

From AMEC, 2005

Note: (3) From AMEC; 2005; consultants report prepared for City of Phoenix entitled "Refraction Seismic Evaluation, Deer Valley Road-7th Street to Cave Creek Road"; COP Project No. ST85100044, AMEC Job No. 5-119-000199, Report No. 2; 2 September 2005.